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Google Slides Lessons Preview

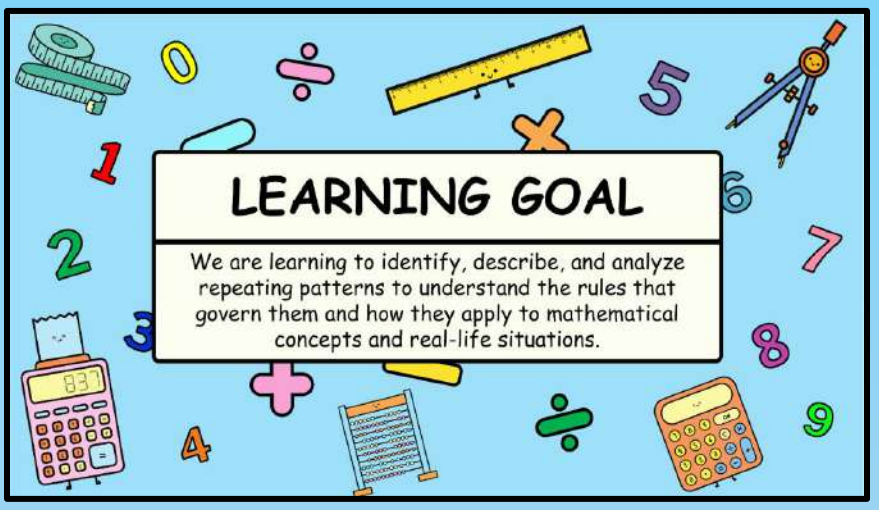
Ontario Math Curriculum

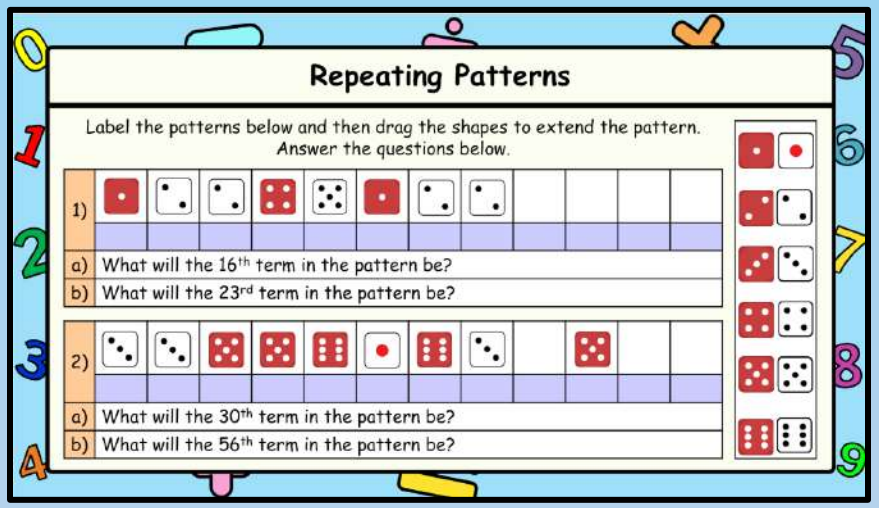
Algebra – Patterns, Equations – Grade 8

3-Part Lesson Format

Part 1 – Minds On!

- Learning Goals
- Discussion Questions
- Quotes
- And More!



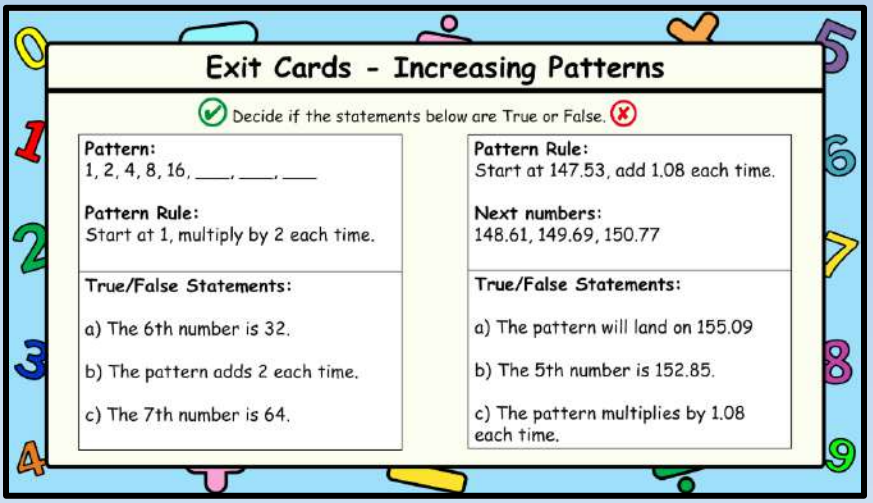


Part 2 – Action!

- Writing
- Matching
- Drag and Drop
- Drawing
- And More!

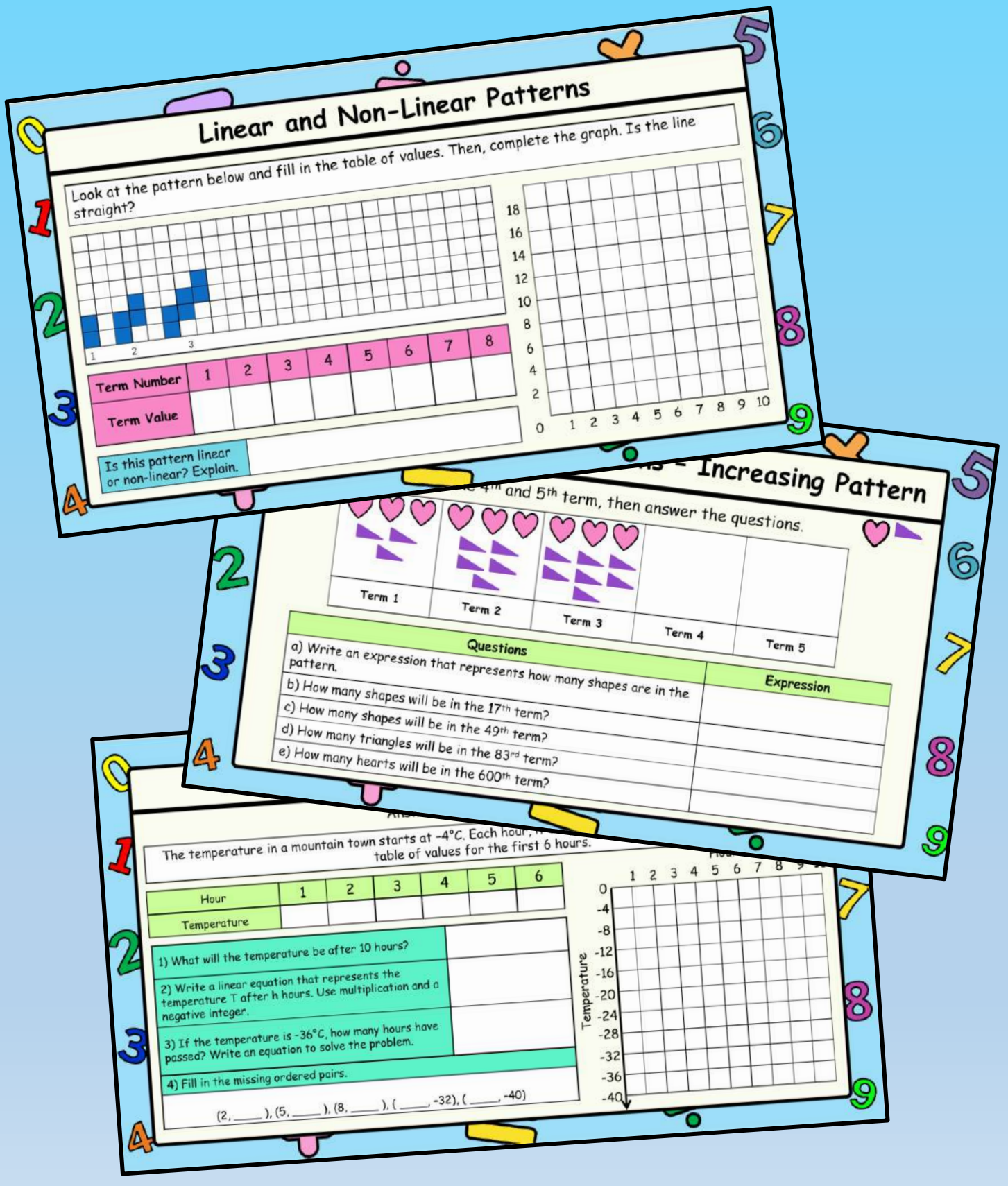
Part 3 – Consolidation!

- Exit Cards
- Quizzes
- Reflection
- And More!



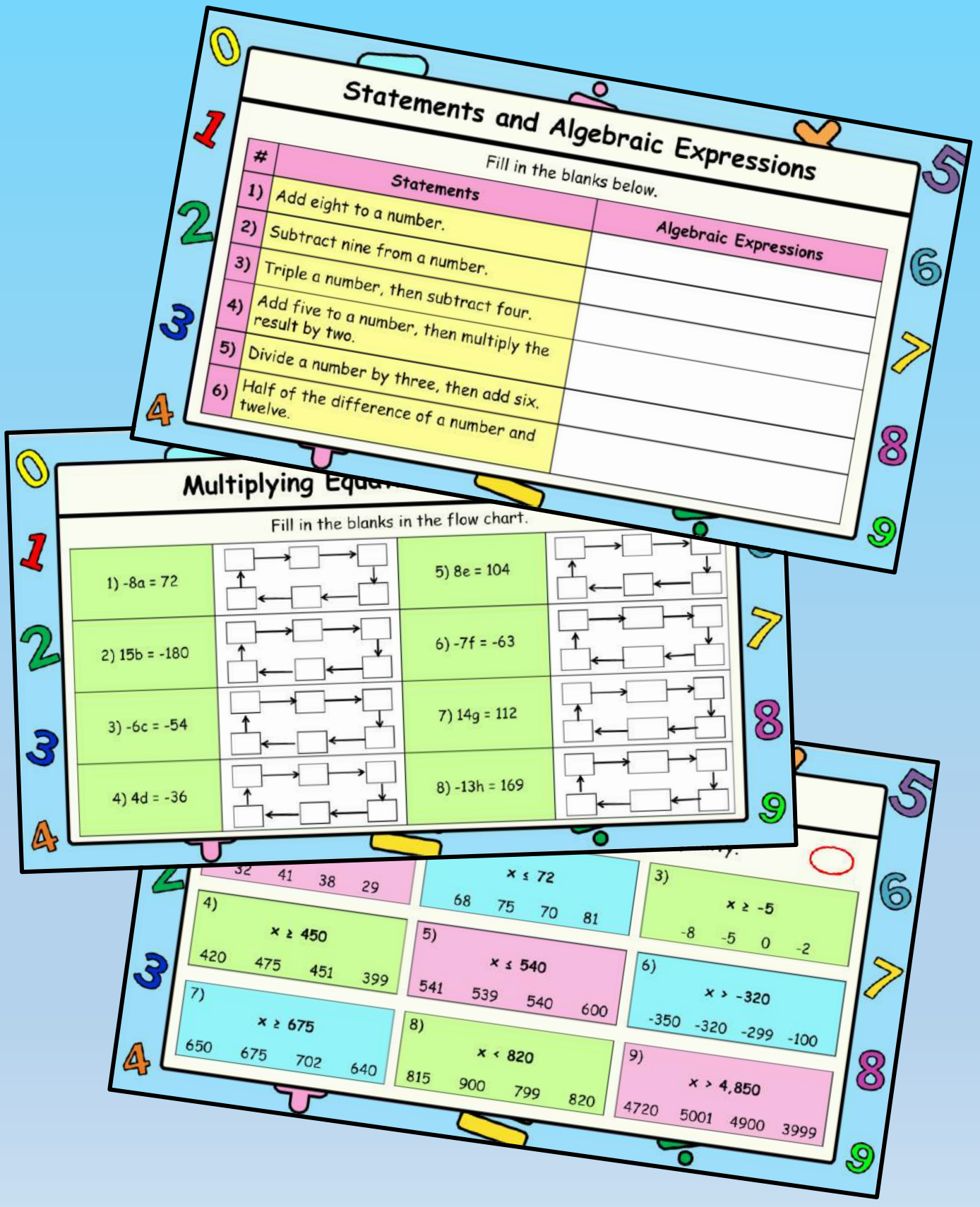
Ontario Math Curriculum

Algebra – Patterns, Equations – Grade 8



Ontario Math Curriculum

Algebra – Patterns, Equations – Grade 8



Workbook Preview

Grade 8
C1. Patterns and Relationships

	Curriculum Expectations	Pages That Cover the Expectations
C1.1	identify and compare a variety of repeating, growing, and shrinking patterns, including patterns found in real-life contexts, and compare linear growing and shrinking patterns on the basis of their constant rates and initial values	5 – 7, 11, 39 – 49, 52 – 57, 60 – 61
C1.2	create and translate repeating, growing, and shrinking patterns involving rational numbers using various representations, including algebraic expressions and equations for linear growing and shrinking patterns	35 – 38, 42 – 43, 50 – 51, 58 - 59
C1.3	determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in growing and shrinking patterns involving rational numbers, and use algebraic representations of the pattern rules to solve for unknown values in linear growing and shrinking patterns	8 – 10, 12 – 34, 52 – 57, 60 – 61
C1.4	create and describe patterns to illustrate relationships among rational numbers	62 – 80

Name: _____ 16

Curriculum Connection
C1.3

Pattern Rule – Input/Output Tables

Instructions Fill in the input/output tables below.

Rule: add 4	
In	Out
112	
121	
143	

Rule: add 7	
In	Out
235	
251	
274	
295	

Rule: add 12	
In	Out
344	
361	
387	
408	

Rule: sub	5
In	Out
473	
486	
504	
527	

le: subtract 11	
	Out
574	
592	
608	
646	

Rule: Subtract 9	
In	Out
778	
791	
807	
832	

Rule: multiply by 2	
In	Out
3	
12	
25	
41	

Rule: multiply by 5	
In	Out
5	
9	
13	
17	

Ru	tiply by 7
	Out
8	
10	
12	

Rule: divide by 3	
In	Out
150	
240	
300	
390	

Rule: divide by 4	
In	Out
40	
80	
100	
240	

Rule: divide by 6	
In	Out
48	
72	
120	
180	

Name: _____ 20

Curriculum Connection
C1.3

Algebra Jeopardy

Objective What are we learning about?

To reinforce students' understanding of basic algebraic concepts and their application to solve simple equations and word problems in a fun and competitive game for

Mat W you need for the activity?

- Jeopardy b the n
- Buzzer or bell

Instructions How will you compl activ

1. Print the Jeopardy board on the next p
2. Divide the class into two teams.
3. Ask one team to go first by selecting a point value.
4. Read the question aloud from the point value.
5. The first team to ring the bell or buzzer gets to answer.
6. If they answer correctly, award them the points. If not, another team can answer.
7. Continue the game until all questions have been answered.
8. Tally the points to determine the winning team.
9. Conclude by discussing what they learned about the topic in the questions.

Name: _____ 21

Curriculum Connection
C1.3

Jeopardy Questions | Ask students the questions below.

$100	$200	$300	$400	$500
87, 93, 99, _____	5.2, 5.5, 5.8, _____	Start at 1, multiply by 3 and add 1, what is the fourth term?	A plant grows 3.5 cm every week. If it was 12.3 cm tall at the start, how tall will it be after 3 weeks?	A builder lays 14.5 bricks per hour. If they have already laid 58 bricks, how many bricks will they have laid after 4 more hours of work?
148, 170, _____	15.8, 15.9, _____	rt at 6, divide by 2 add 1, what is 3rd m?	A rabbit population doubles every year. If there are 4 rabbits this year, how many will there be in 5 years?	A runner increases their distance by 1.75 km every week. If they started at 5.25 km, how far will they be running after 10 weeks?
82, 75, 68, _____	18.52, 18.59, 18.66, _____	Start ltipl 2 and ad 3, wh the fifth ter	need increases every hour. ca d at 40 km/h, speed b 4 h	A teacher's class size increases by 3.5 students every term. If the initial class size was 20 students, what will the class size be after 4 terms?
177, 168, 159, _____	35.7, 35.1, 34.5, _____	Start at 3, multiply by 4 and subtract 2, what is the fourth term?	A gravel meters 5 meters on day, and 7.5 me the third day. How will it travel in total by the sixth day?	Al ives a raise of $1 ery year. If his sta $45,000, wh fter 6
2, 10, 50, _____	17.3, 16.8, 16.3, _____	Start at 7, multiply by 3 and subtract 1, what is the third term?	A train travels 75 km in the first hour, 112.5 km in the second hour, and 150 km in the third hour. How far will it travel in total by the fifth hour?	A swimmer increases their training distance by 2.25 km every week. If they started at 4.75 km, how far will they be swimming after 8 weeks?
9, 18, 36, _____	11.32, 11.53, 11.74, _____	Start at 6, multiply by 5 and add 2, what is the fourth term?	A tree grows 5.5 inches in the first year, 7.5 inches in the second year, and 9.5 inches in the third year. How much will it have grown in total by the sixth year?	A bank account balance increases by $75.50 every month due to interest. If the initial balance was $2500, what will the balance be after 10 months?

Name: _____ 22

Curriculum Connection
C1.3

Table of Values – Finding Term N

When finding a random term in a pattern, we can use a variable. Often *n* is used to take the place of the term number. When we use *n*, we can change the value to find the term value for any term number.

We can find the value for *n* by looking at the pattern between the term number and term value. To do this, we look across the table from the term number to the term value.

Practice Find the pattern rule when you look across the table of values.

Term Number	Term Value
1	6
2	12
3	18
4	
5	
8	

1) 6n

Term Number	Term Value
1	3
2	8
3	13
4	
5	
9	

2) 5n - 2

Term Number	Term Value
1	4
2	8
3	12
4	16
5	

3) _____

Term Number	Term Value
1	9
2	16
3	23
4	30
5	
9	

4) _____

Term Number	Term Value
1	6
2	9
3	12
4	15
5	
10	

5) _____

Term Number	Term Value
1	4
2	10
3	16
4	22
5	
11	

6) _____

Name: _____ 23

Curriculum Connection
C1.3

Table of Values – Finding Term N

Practice Find the pattern rule when you look <u>across</u> the table of values.

Term Number	Term Value
1	10
2	15
3	
5	
8	

1) _____

Term Number	Term Value
1	7
2	17
3	27
4	37
5	

_____

Term Number	Term Value
1	5
2	13
3	21
4	29
5	
11	

3) _____

Term Number	Term Value
1	5
2	15
3	25
4	35
5	
11	

4) _____

Term Number	Term Value
	11
2	
3	
4	32
5	
11	

5) _____

Term Number	Term Value
1	5
2	14
	23
	32

6) _____

Word Problem Use a table of values and find the n^{th} term.

Owen's earnings are increasing in a pattern as he gets more customers. He earned $100 in his first month, $330 in his second month, $1020 in the third month and $3090 in the fourth month.

a) How much will he earn in the 5^{th} month if the pattern continues?

b) How much will he earn in the 10^{th} month if the pattern continues?

Name: _____ 24

Curriculum Connection
C1.3

Using Algebraic Expressions

In the expression $6y + 5$, the 6 is the **numerical coefficient** of the variable and the 5 is the **constant term**. The **variable** is the y, which can represent any number.

Part 1 Use the algebraic expression to fill in the tables.

Term Number	Term Value
1	
3	
4	
5	
8	

1) $5x + 2$

Term Number	Term Value
1	
2	
3	
4	
5	
9	

4)

Term Number	Term Value
1	
2	
3	
4	
5	
11	

3) $t + 9$

Term Number	Term Value
1	
2	
3	
4	
5	
11	

4) $4n - 3$

Term Number	Term Value
1	
2	
4	
5	
10	
20	

5) $20 \div x + 8$

Term Number	Term Value
4	
5	
11	

6) $7x - 6$

Part 2 Write 4 algebraic expressions using:
Variable = n Constant term = 12 Numerical coefficient = 4

1	
2	

3	
4	

Name: _____ 25

Curriculum Connection
C1.3

Pattern Rule – Input/Output Tables

Instructions Fill in the input/output tables below.

1)

In n	Out $3n$
1	
2	
3	
4	
5	

2)

In n	Out $3n + 2$
1	
2	
3	
4	
5	

3)

In n	Out $4n - 4$
1	
2	
3	
4	
5	

4)

In x	Out $5x - 4$
10	
20	
30	
40	
50	

5)

In	Out $10x$
2	
4	
6	
8	
10	

6)

In x	Out $50 + x$
1	
9	

7)

In p	Out $7p + 20$
20	
40	
60	
80	
100	

8)

In p	Out $10p - 15$
3	
6	
9	
12	
15	

9)

In p	Out $8p + 100$
5	
10	
15	
20	
25	

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Fill in the input/output tables below.

In *n*	Out 12x ÷ 3
3	
5	
7	
9	
11	

Name: _____

Fill in the input/output tables below.

In *n*	Out 12x ÷ 3
3	
5	
7	
9	
11	

Name: _____

Fill in the input/output tables below.

In *n*	Out 12x ÷ 3
3	
5	
7	
9	
11	

Name: _____

Fill in the input/output tables below.

In *n*	12x ÷ 3
3	
5	
7	
9	
11	

Name: _____ 27

Curriculum Connection
C1.3

Activity Title: Algebraic Adventure Hunt

Objective

What are we learning about?

To help students understand and practice filling in input/output tables using given expressions involving all four operations through a fun and engaging treasure hunt.

Materials

What will you need for the activity?

- St tch or d use a smartphone)
- Index card
- Markers
- Small prizes o s (fo s)
- Tape

Instructions

How will you compl ctiv

1) Cut out the index cards with the input/outp es pr se will be the treasure hunt challenge questions.
2) Hide these cards around the classroom or in a desig fe o are taping them under chairs, desks, or tucked into non-obvious sp
3) Divide the class into small teams and give each team a stopwa or
4) Explain the game: each team will hunt for a card, fill in the table as qu kly as they can, and return to you for verification.
5) Start the timer when you say "Go!" Each team rushes to find their first card.
6) When a team thinks they have the correct answer, they come back to you for verification. If they get it right, the teacher keeps the card. If the answer is wrong, they can try again or hide the card back in its original spot and find a new card.
7) The game continues until all cards are found or you call time. The team with the most correct answers wins.
8) Discuss the game, focusing on the concepts taught on the cards.

Name: _____ 31

Instructions

Cut out the cards below.

Curriculum Connection
C1.3

In h	Out h ÷ 6 + 5	In f	Out 5f – 51	In e	Out 15e + 20	In b	Out b ÷ 7 - 7
12		15		5		[illegible]	
24		20		9		70	
36		25		13		84	
48		30		[illegible]		98	
60		35		[illegible]		112	

In k	Out k ÷ 4 –18	In g	Out 13g	[illegible]	Out d ÷ 9 – 5	In c	Out 5c + 55
112		7		[illegible]5		3	
240		14		72		5	
304		21		99		7	
368		28		126		9	
432		35		153		11	

Name: _____ 33

Curriculum Connection
C1.3

Growing Patterns

Instructions How many blocks are in each term? Sketch the next 3 terms.

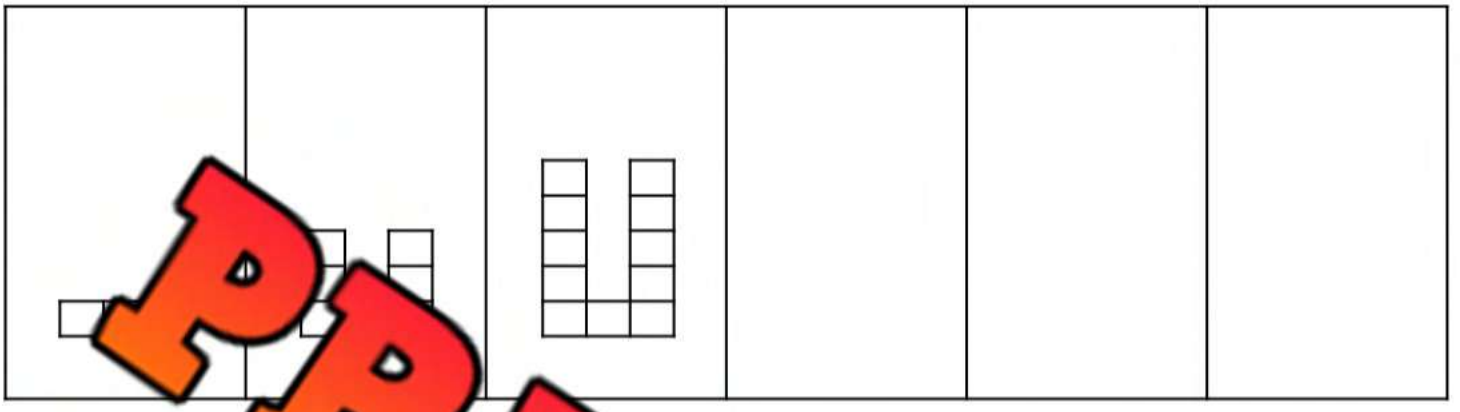
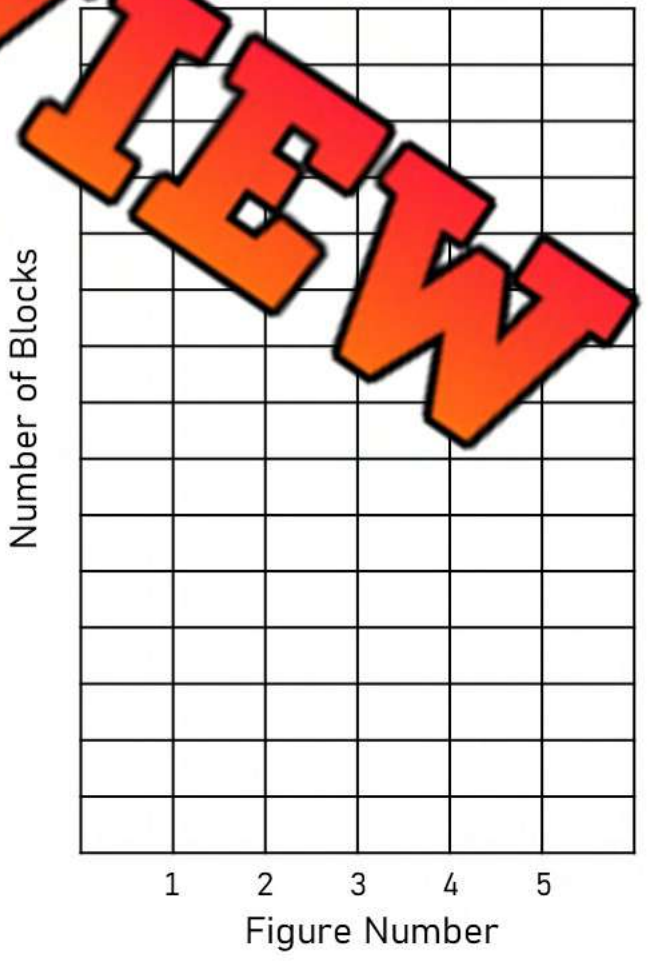


Figure Number			3	4	5	20	50
Number of Blocks							

1) Describe the recursive pattern?

2) What is the functional relationship between the variables? (Write the expression)

3) How many blocks would the 100th figure have?



Name: _____ 35

Curriculum Connection
C1.2

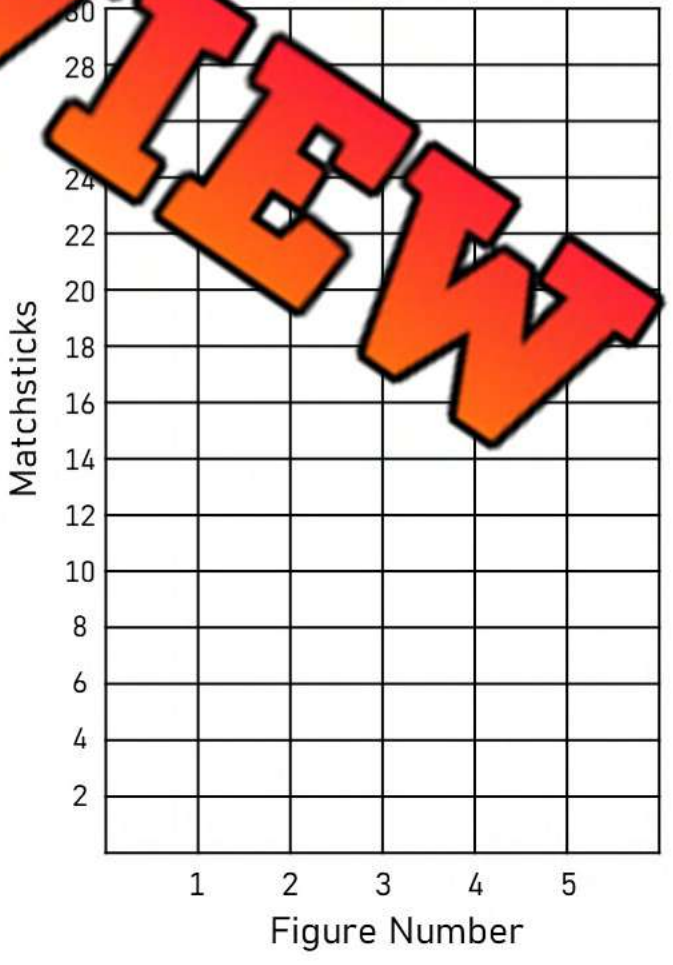
Matchstick Growing Patterns

Instructions How many matchsticks are in each figure? Draw the next 2 figures.

F-1	F-2	F-3	F-4	F-5
				

Figure Number			3	4	5	10	20
Number of Matchsticks							

Questions
1) Write an expression that represents the functional relationship.
2) How many matchsticks will the 7th term have?
3) How many matchsticks will the 10th term have?
4) What figure would use 201 matchsticks?



Name: _____ 37

Curriculum Connection
C1.2

Shrinking Patterns

Instructions How many grey blocks are in each term?

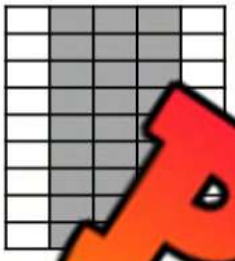
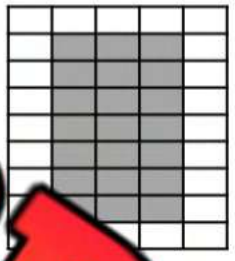
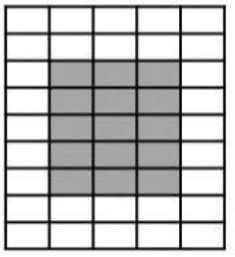
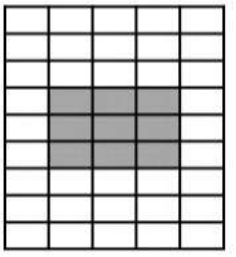
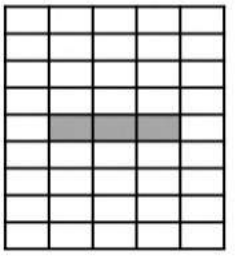
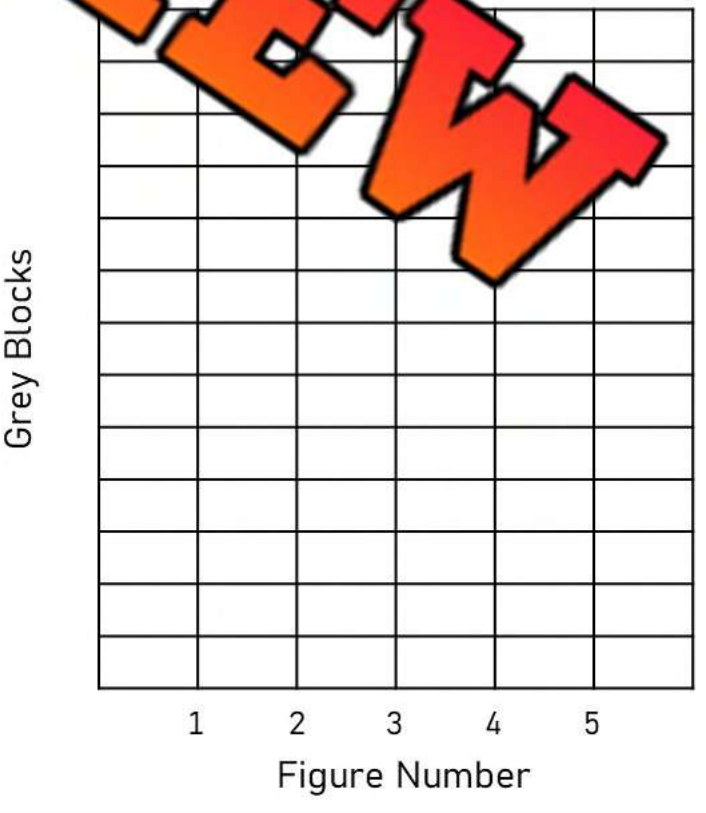
Figure 1	Figure 2	Figure 3	Figure 4	Figure 5
				

Figure Numb	1	2	3	4	5
Number Of Grey Blocks					
Number Of White Blocks					
Number Of Total Blocks					

Write the functional relationship between the two-variables below (Write the expression)
1) Figure number and grey blocks
2) Figure number and white blocks



Name: _____ 39

Curriculum Connection
C1.1

Two-Variable Linear Relationships

A **two-variable linear relationship** is when the increasing or decreasing of one variable causes a corresponding increase or decrease in the other variable. For example, driving 100km/hr would be a linear relationship between time driving and distance driven (for every hour driven, you travel 100km). As you drive longer, you travel further at a predictable distance.

Instructions Fill in the tables and answer the questions.

1) Ch... for today has been represented in the table below

Ho... orked (	1	2	3	4	5	6	7	8
Money Earn		44	66					

a) Is the relati... betw... variables linear? Yes No

b) What is the funct... onshi... een variables? _____

2) John sells cars. He earns a comm... en ...lls a car. His earnings for last week are represented in ...ble be... were some days he did not earn commission.

Days Worked (*x*)	0	1	2			6	7
Money Earned (*y*)	0	140	280	620	0	900	240	1280

a) Is the relationship between variables linear? Yes ...

b) If you graphed this relationship, would the line be straight ...ain.

_____

_____

3) Greg has a membership to a shopping website. He pays a yearly membership fee and orders the same thing each week for 10 weeks. His spending is displayed below.

Weeks (*x*)	0	1	2	3	4	5	6	7
Money Spent (*y*)	50	80	110	140	170	200	230	260

a) Is the relationship between variables linear? Yes No

b) What is the functional relationship between variables? _____

c) If you graphed this relationship, would the line be straight or curved? Explain.

_____

Name: _____ 40

Curriculum Connection
C1.1

Two-Variable Linear Relationships

Instructions Answer the question below.

1) At an ice cream shop, you pay for the cone and then more money for every scoop you add.

Scoops (*x*)	0	1	2	3	4	5
Cost (*y*)	$2.00	$2.50	$3.00	$3.50	$4.00	$4.50

a) What is the functional relationship between the two variables (algebraic expression)?

b) How much does a cone cost?

c) How much would a scoop cost on a cone?

2) It costs $15 for admission to the museum. Once inside, you pay for each additional ride you go on.

Rides (*x*)	0	1	2		4	5
Total Cost (*y*)	$15.00	$17.50	$	$	25.00	$27.50

a) What is the functional relationship between the two (algebraic expression)

b) How much would it cost to go on 50 rides?

3) Roger rents a truck and pays a set rate for every 10km he drives.

KM Driven (*x*)	0	10	20	30	40	50	60	70	80
Cost (*y*)	$50	$55	$60	$65	$70	$75	$80	$85	$90

a) What is the functional relationship between the two variables (algebraic expression)

b) How much would it cost to drive 250km?

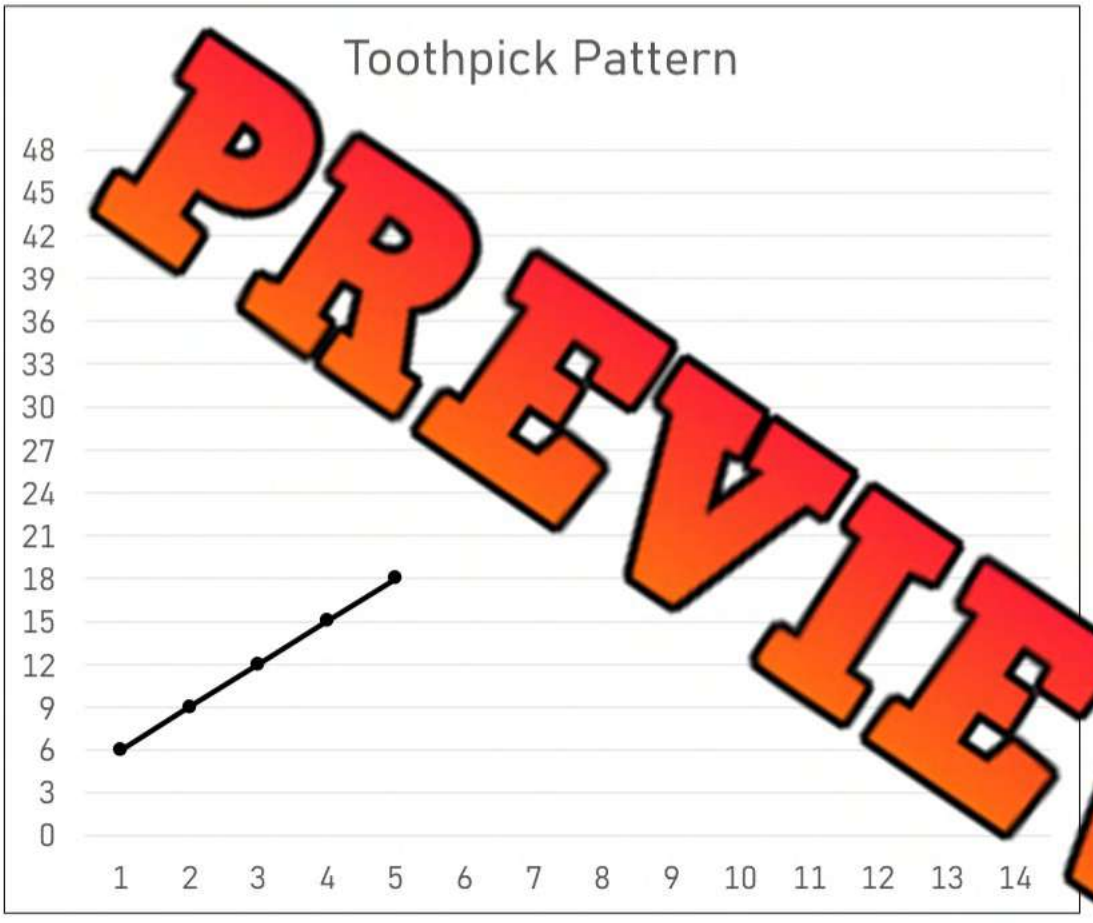
Name: _____ 41

Curriculum Connection
C1.1

Reading a Linear Pattern - Graph

A **linear** pattern displays a constant rate of change. The pattern increases or decreases by the same amount each time.

Instructions Continue the line on the graph and fill in the table of values.



Term Number	Term Value
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	

1) Draw the toothpick pattern below for the graph/table of values. Use any design you'd like.

Term 1	Term 2	Term 3	Term 4	Term 5

2) What is the constant rate of change?

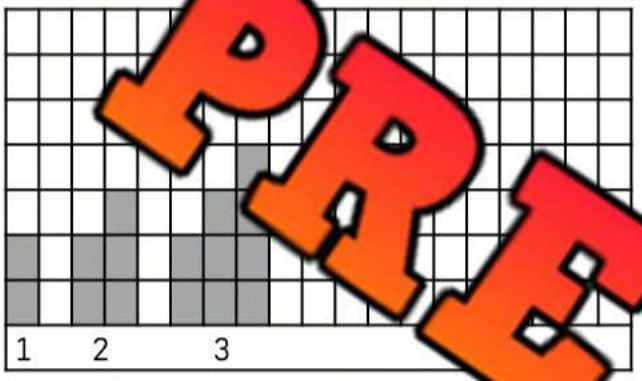
Name: _____ 42

Curriculum Connection
C1.1, C1.2

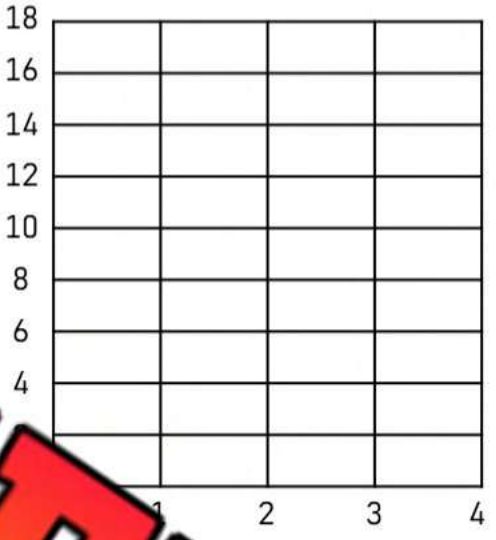
Linear and Non-Linear Patterns

Not all patterns are linear. Some patterns increase/decrease by the same amount each time, while others grow/shrink at different rates. When the pattern grows or shrinks by different amounts, it is called **non-linear.**

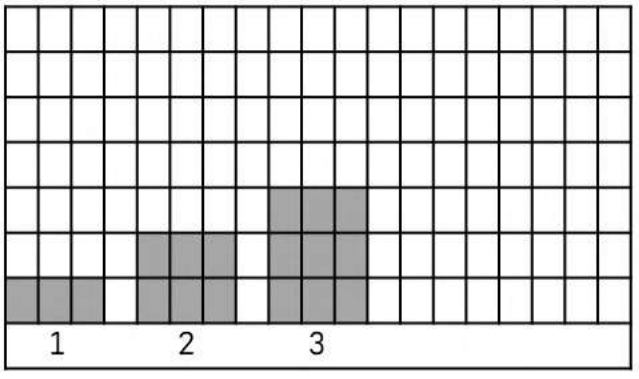
Instruction Look at the patterns below and fill in the table of values. Then complete the graph. Is the line straight?



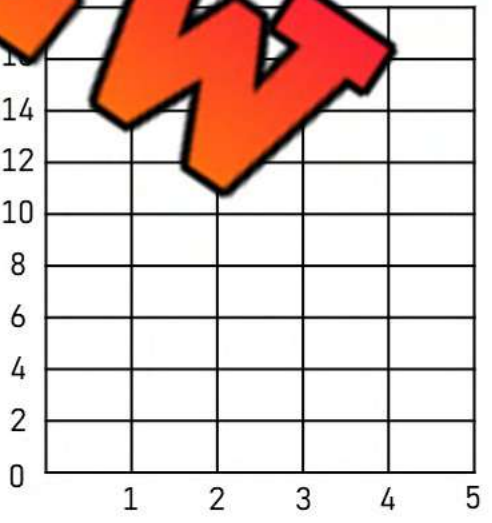
Term Number	Term Value
1	
2	
3	



1) Is this pattern linear or non-linear? Explain.



Term Number	Term Value
1	
2	
3	
4	
5	



1) Is this pattern linear or non-linear? Explain.

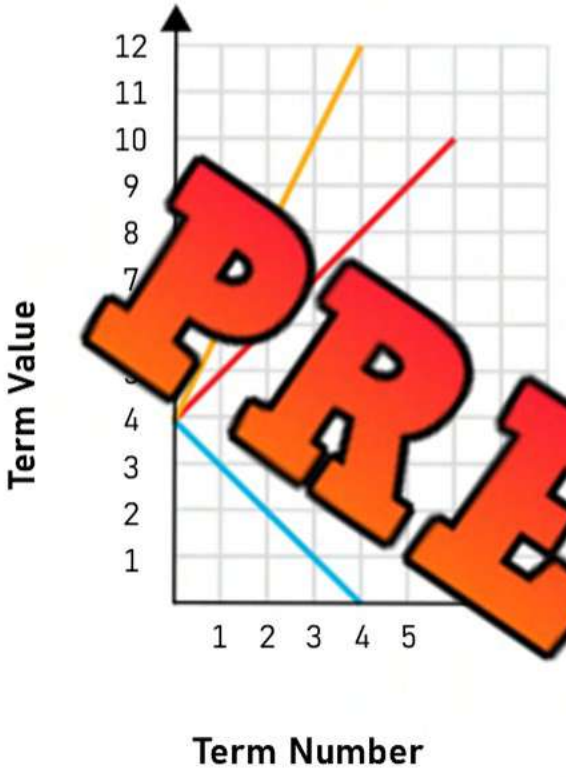
2) How many blocks would be in term number 10?

Name: _____ 43

Curriculum Connection
C1.1, C1.2

Linear and Non-Linear Patterns

Instruction Look at the graphs closely. Answer the questions below.



1) How are the lines the same?

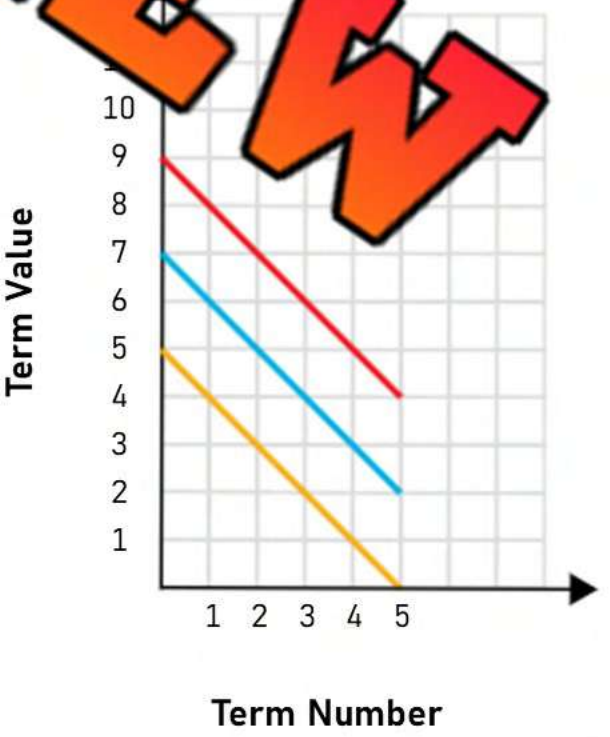
2) How are the lines different?

3) What could these three lines represent?

1) How are the lines the same?

2) How are the lines different?

3) What could these three lines represent?

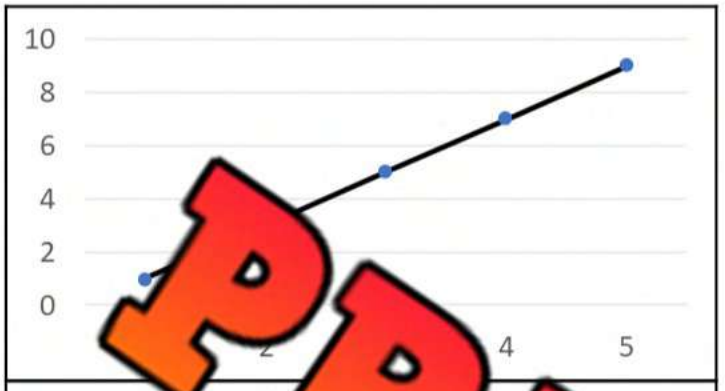


Name: _____ 44

Curriculum Connection
C1.1

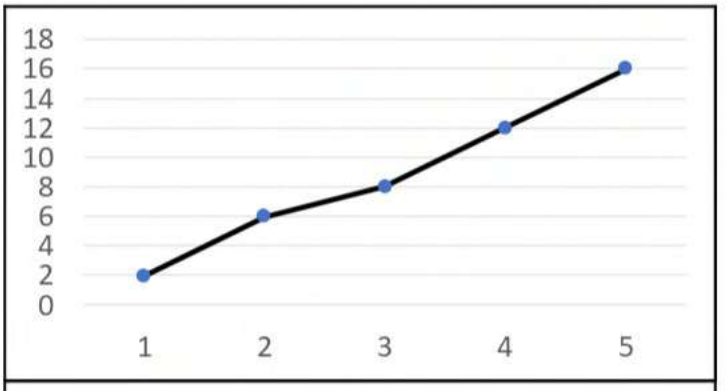
Increasing Linear Patterns – Yes or No?

Instructions Circle if the pattern displayed on the graph is linear or not.



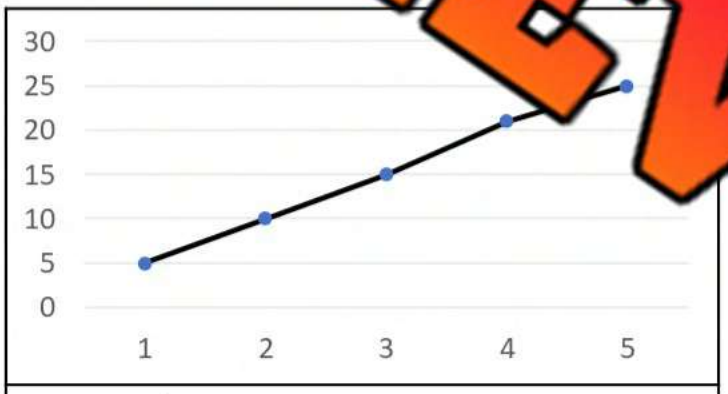
1) Linear Non-Linear

Rate of change =



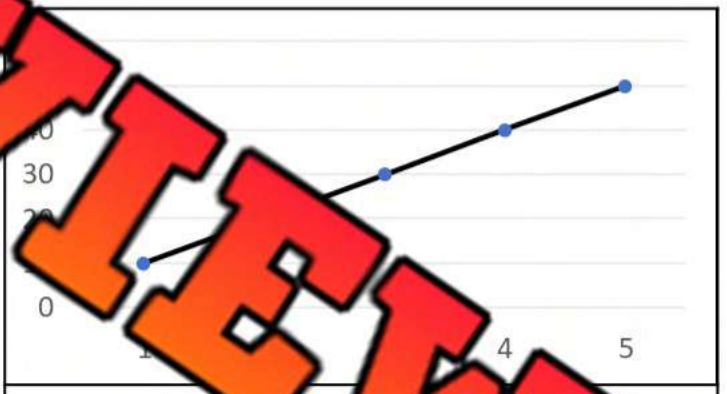
2) Linear Non-Linear

Rate of change =



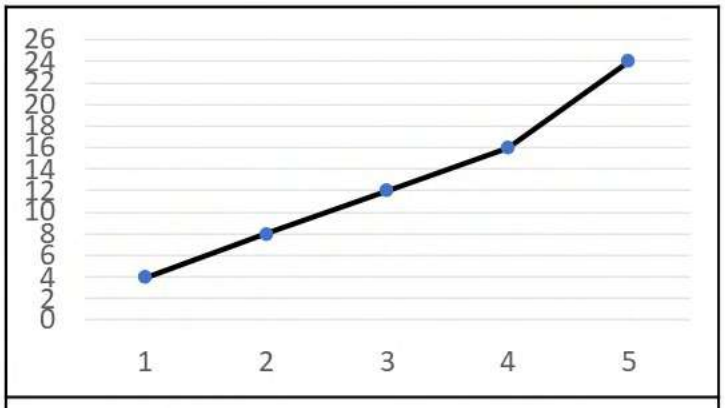
3) Linear Non-Linear

Rate of change =



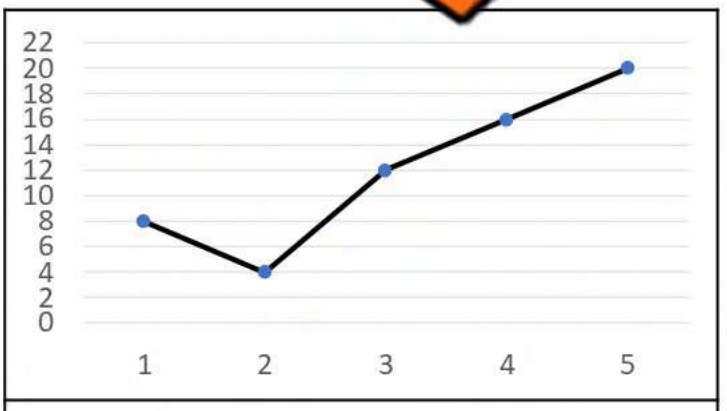
4) Linear Non-Linear

Rate of change =



5) Linear Non-Linear

Rate of change =



6) Linear Non-Linear

Rate of change =

Name: _____ 45

Curriculum Connection
C1.1

Increasing Linear Patterns – Yes or No?

Instructions Circle if the pattern is linear or not, based on the table of values.

Term Number	Term Value
1	5
2	9
3	13
4	
5	
Linear	Non-Linear

Term Number	Term Value
1	37
2	44
3	51
4	57
5	64
Linear	Non-Linear

Term Number	Term Value
1	88
2	96
3	104
4	112
5	120
Linear	Non-Linear

Term Number	Term Value
1	2.5
2	4.5
3	6.5
4	8.5
5	10.5
Linear	Non-Linear

Term Number	Term Value
1	
2	
3	
4	17.0
5	21.5
Linear	Non-Linear

Term Number	Term Value
1	200
2	275
3	350
4	425
5	
Linear	Non-Linear

Term Number	Term Value
1	44.0
2	47.5
3	50.5
4	54.0
5	57.5
Linear	Non-Linear

Term Number	Term Value
1	140
2	280
3	420
4	580
5	720
Linear	Non-Linear

Term Number	Term Value
1	112.1
2	112.3
3	112.5
4	112.7
5	112.9
Linear	Non-Linear

Name: _____ 47

Curriculum Connection
C1.1

Comparing Rates of Change

Questions Circle which variable (x or y) increases at a greater rate of change.

1) Term Number	1	2	3	4	5
x	25	45	65	85	105
y	10	35	60	85	110
		x	or	y	

2) Te	1	2	3	4	5
	117	123	129	135	141
y	139	144	149	154	159
			or	y	

3) Term Number	1	2	3	4	5
x	21		237	249	261
y	364			403	416
		x	or	y	

4) Term Number	1	2			5
x	0.5	1.2	1.		3.3
y	12.1	12.7	13.3		
		x	or	y	

5) Term Number	1	2	3	4	5
x	141	158	175	192	209
y	513	529	545	561	577
		x	or	y	

6) Term Number	1	2	3	4	5
x	17.8	19.9	22.0	24.1	26.2
y	22.3	23.7	25.1	26.5	27.9
		x	or	y	

Name: _____ 48

Curriculum Connection
C1.1

Comparing Rates of Pay - Employees

Jeffrey is the boss at his company. He determines how much to pay his employees. Sometimes, Jeffrey pays his employees a starting bonus, where they get a one-time payment for starting their job.

Questions Who will get paid more money over time?

Weeks	0	1	2	3	4	5	6	7
Colton's Earnings ($)	1000	1400	1800	2200				
Spencer's Earnings ($)	0	500	1000	1500				

a) Who will earn more after 7 weeks? _____

b) How much does Spencer earn per week? _____

c) How much is Spencer's bonus? _____

d) Whose earnings increase at a greater rate? _____

Weeks	0	1	2	3	4	5	6	7
Jacob's Earnings ($)	0	750	1500	2250				
Jeremy's Earnings ($)	1500	2000	2500	3000				

a) Who will earn more after 7 weeks? _____

b) How much is Jacob's earnings per week? _____

c) How much is Jeremy's earnings per week? _____

d) If we graphed both of their earnings, whose graph would be steeper? _____

Weeks	0	1	2	3	4	5	6	7
Amelia's Earnings ($)	2500	3350	4200	5050				
Raven's Earnings ($)	0	1150	2300	3450				

a) Who earned a bonus to start their job? _____

b) How much is Amelia's earnings per week? _____

c) How much is Raven's earnings per week? _____

d) Who will earn more after 7 weeks? _____ How much more will they earn? _____

Name: _____ 50

Curriculum Connection
C1.2

Writing Algebraic Expressions

Practice Answer the question below.

1)	Situation	Expression/Answer
a)	Caleb sells lemonade at his stand. For every sale (s), he earns $4. Write the expression.	
b)	Caleb [illegible]21 sales Monday. How much money did he mak[illegible]e expression and the answer.	
c)	[illegible]old 25[illegible] [illegible]the week. How much money did he make? Writ[illegible]sion [illegible]d the answer.	
d)	Caleb earned $[illegible]este[illegible] [illegible]monade. How many cups (c) did he sell[illegible]	

2)	Situation	Expression/Answer
a)	Maya earns $16 for every hour ($h$) she works. [illegible]as t spend $3 each time she works to take the b[illegible]te th expression.	
b)	Maya worked 7 hours yesterday. How much money t take home? Write the expression and the answer.	
c)	Maya earned $141 today after she paid for her bus ride. How many hours did she work? Write the expression and the answer.	

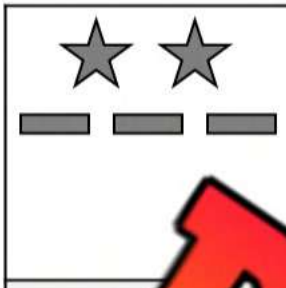
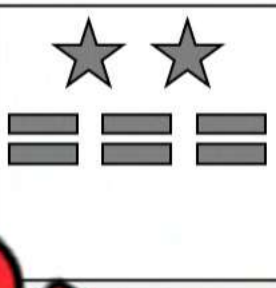
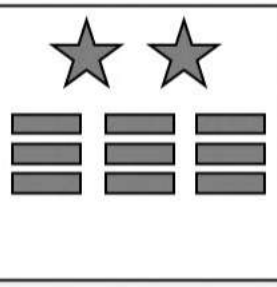
3)	Situation	Expression/Answer
a)	Isaac is driving across Ontario to visit a friend. For every hour (h) he drives, he travels 115km. Write the expression.	
b)	Isaac drove 11 hours today. How far did he go? Write the expression and the answer.	
c)	Isaac needs to drive 920km. How many hours does he need to drive?	

Name: _____ 51

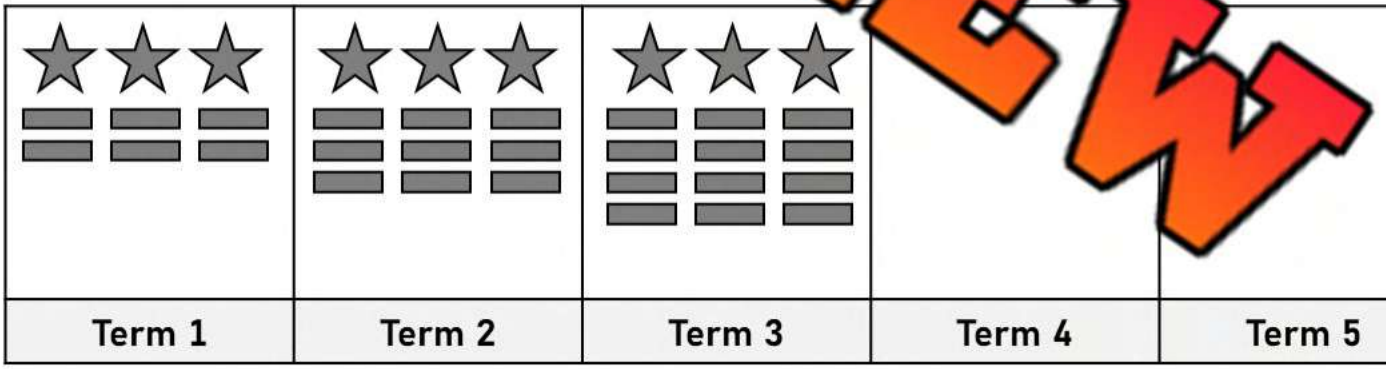
Curriculum Connection
C1.2

Writing Algebraic Expressions – Growing Pattern

Questions Draw the 4th and 5th term, then answer the questions.

				
Term 1	Term 2	Term 3	Term 4	Term 5

1) Questions	Expression
a) Write an expression that represents how many shapes are in the pattern using the variable *n* for term number.	
b) How many shapes will be in the 10th term?	
c) How many shapes will be in the 20th term?	
d) How many **rectangles** will be in the 50th term?	
e) How many **stars** will be in the 1000th term?	



Term 1	Term 2	Term 3	Term 4	Term 5

2) Questions	Expression
a) Write an expression that represents how many shapes are in the pattern using the variable *n* for term number.	
b) How many shapes will be in the 10th term?	
c) How many shapes will be in the 20th term?	
d) How many **rectangles** will be in the 50th term?	

Name: _____ 53

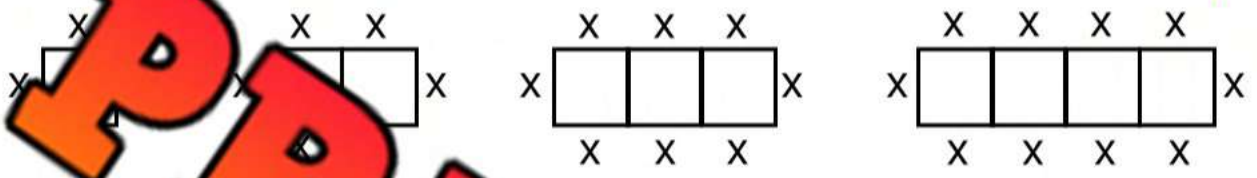
Curriculum Connection
C1.1, C1.3

Banquet Word Problem – T-Tables

Challenge Answer the word problem below. Use the T-Table to help.

You have been put in charge of organizing the end of the year banquet for your baseball team. You want to have as many seats as you can.

The diagram below shows how many people can sit at the tables.



a) Fill in the t… learn … about the pattern of how many people can attend the banqu…

Tables	1		3	5	10	20	50
# of Seats							

b) Write the algebraic expression you used to … the …

_____

c) What if you didn't put the tables together? Would 8 tab… tog… … less than 8 tables apart? Draw a diagram to help and fill in the …

Tables	1	2	3	4	5	6	20	50
# of Seats	4							

d) Write the algebraic expression you could use to solve any number of tables.

_____

Name: _____ 54

Curriculum Connection
C1.1, C1.3

Ice Cream Sundae – Challenge Problem

Challenge Answer the word problem below.

At Kai's Ice Cream Shop, a plain ice cream sundae costs $3.50. Each extra topping costs $0.75.

a) Write an algebraic expression that represents the cost of a sundae with *e* extra toppi

b) Eth wants ndae with 6 toppings. How much will it cost?

c) Levi ordered a sundae opp uch will it cost Levi?

d) Levi paid with a $20 bill. How much will eive ?

e) On Thursdays, sundaes are half price! Write an algebr c ex t represents the cost of a sundae with *e* extra toppings.

f) Jack ordered a sundae on Thursday with 10 toppings. How much did it cost him?

g) Scarlett ordered 2 sundaes for her and a friend. Both sundaes had 6 toppings each. Write an algebraic expression that represents the cost.

Name: _____ 56

Curriculum Connection
C1.1, C1.3

Two-Variable Linear Relationship - Scientist

Challenge Answer the word problem below.

Mrs. Ferrety teaches a grade 8 class. She invited a scientist to join her class to do some experiments with them. The scientist charges $40 for the materials they use for the experiments, plus an additional $3 per student who is in the class.

a) Fill in the table of values below using the linear equation: $y = 3x + 40$

# of Students						
Cost						

b) Graph the table of values

Questions
a) Fill in the missing values in the ordered pairs below: (25, _____), (50, _____), (100, _____) (_____, 67), (_____, 85), (_____, 106)
b) If 28 students are in the class, how much money will the scientist earn for their presentation?
c) If the scientist earned $136, how many students were in the class?

Name: _____ 57

Curriculum Connection
C1.1, C1.3

Two-Variable Linear Relationship - Working

Word Problems Investigate the relationship between the two-variables.

Stephanie earns $15 for every hour she works. She received a starting bonus of $50 before even working an hour.

1) Fill in the table of values to represent the linear relationship between hours worked and money earned.

2) Graph the table of values.

3) Questions

a) Write the linear equation that represents this situation.

b) Stephanie is scheduled to work 35 hours this week. How much will she earn with her bonus?

c) Fill in the missing values in the ordered pairs below.

(10, _____), (42, _____), (75, _____)

(____, 320), (____, 1055), (____, 3050)

d) Stephanie earned $1580 in her first month of work, including her bonus. How many hours did she work?

Name: _____ 58

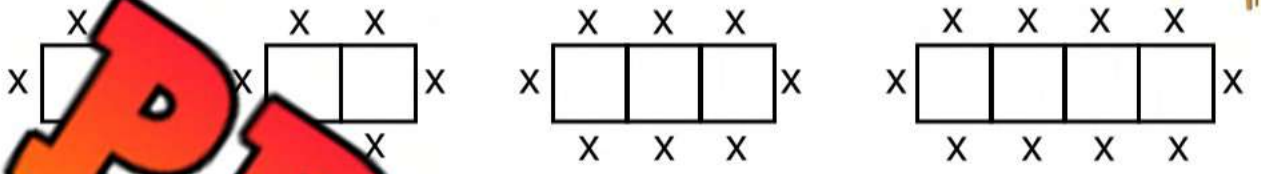
Curriculum Connection
C1.2

Graphing Linear Equations - Tables

Challenge Answer the word problem below.

You have been put in charge of organizing the end of year banquet for your baseball team. You want to have as many seats as you can.

The diagram below shows how many people can sit at the tables.



Fill in the table below to represent the relationship between the number of tables and seats.

Tables (*x*)			4	5	10	20	50
# of Seats (y)							

Questions
a) Write the linear equation that represents this problem.
b) If you had 61 tables, how many seats would you have?
c) Fill in the missing values in the ordered pairs below (15, _____), (75, _____), (135, _____) (_____, 132), (_____, 174), (_____, 500)
d) If you had 100 people attending the banquet, how many tables would you need?

Name: _____ 59

Curriculum Connection
C1.2

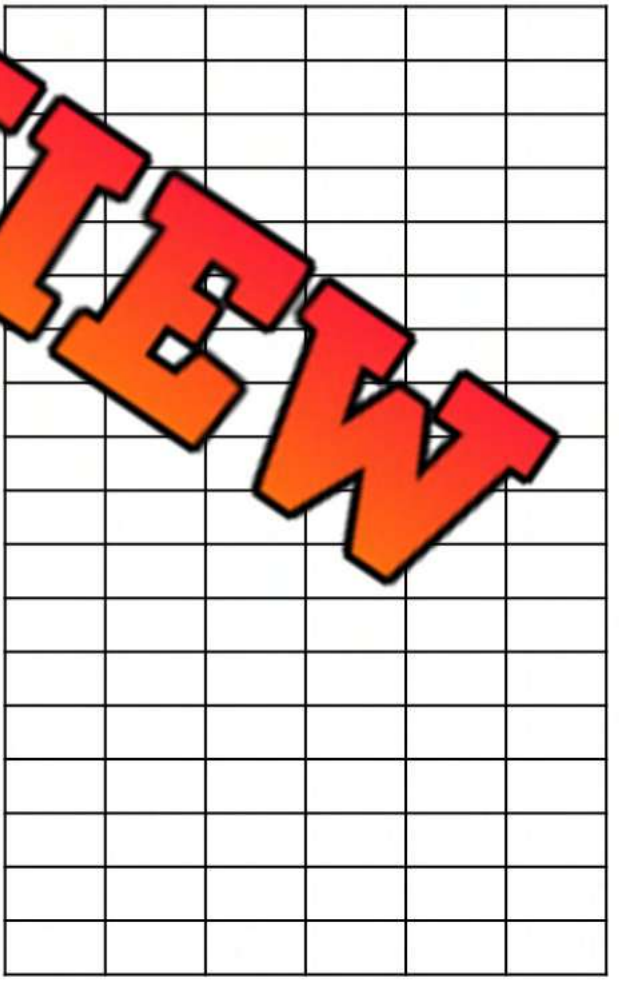
Two-Variable Linear Relationship – Moving Day

Challenge Answer the word problem below.

Aiden's family is moving. They rented a moving truck for $50 a day. They are charged an additional $0.50 for every 1km they drive.

1) Fill in the table of values below.

2) Graph the



3) Questions

a) Write the linear equation that represents this problem.

b) If Aiden's family drove 330km in one day, how much would they need to pay?

c) Fill in the missing values in the ordered pairs below.

(15, _____), (75, _____), (135, _____)

(_____, 130), (_____, 240), (_____, 500)

d) Aiden's family owes $660 to the moving company. How far did they drive?

Name: _____ 60

Curriculum Connection
C1.1, C1.3

Representing Situations - Division

Part 1 Solve the expressions below using n = 6 and y = 3

	Expression	Answer
1)	$(7 + 11) \div y$	
2)	$\frac{(n + 3)}{}$	
3)		
4)	12	

	Expression	Answer
5)	$\frac{(n + y + 6)}{y}$	
6)	$8 + \frac{(5n - 6)}{y}$	
7)	$\frac{n}{y}$	
8)	$\frac{(11 + 4)}{y}$	

Part 2 Write an exp si th le in brackets to represent the situations.

1) Gianna and her friends sold brac celet. They divided the earnings up equally amongst her (f) friend

a) Write an expression that represents t situation

b) If Gianna worked with 2 other friends, how mu uld d ?

2) Zoey made 3 trays of cookies with 12 cookies on each t he up equally between (n) number of friends.

a) Write an expression that represents the situation.

b) If Zoey split the cookies with 8 friends, how much would each friend get?

3) Mrs. Hubert has 8 packs of pencil crayons that have 12 crayons inside each pack. She divides the pencil crayons into (g) number of groups.

a) Write an expression that represents the situation.

b) If Mrs. Hubert gave 6 crayons to each group, how many groups did she give to?

Name: _____ 61

Curriculum Connection
C1.1, C1.3

Representing Situations – Organizing a Trip

Challenge Answer the word problem below.

Eli is organizing a trip to Canada's Wonderland. It costs him $50 per ticket and the bus rental is $400 for everyone to split.

a) Write an algebraic expression that represents the cost if p people go.

b) How much does the trip cost Eli if 10 people go?

c) How much will the trip cost if 20 people go?

d) If Eli has 20 people go, how much will it cost per person?

e) Eli wants to offer food as well. Suppose the food costs $10 per person. Write an algebraic expression that represents the cost for the bus and food if p people go.

f) Suppose 20 people decide to go on the trip and get food. How much will it cost Eli?

g) How much will Eli charge each person if 20 people go and get food?

Name: _____ 66

Curriculum Connection
C1.4

Integer Pattern – Adding Word Problem

-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Instructions Answer the word problem below.

Richard is ...g football. He plays defense, so he is often running backwards. He decides t... is steps forwards and backwards. For every step forward, he adds 1... ...ep backward, he adds -1.

a) Ea... quarte... ...akes 75 steps forwards, and -150 steps backwards. If every ste... ... en... step forwards, how many steps did Richard take in the ...ers of ...?

b) Fill in the table of values that re... ...s hov... steps Richard takes in two games (8 quarters).

Term Number (Quarter)							
Term Value (Steps)							

c) Write an algebraic expression to help you solve how many step... ...hard took in *n* number of quarters.

d) In 5 games, does Richard take more steps forward or backward?

e) How many steps does Richard take in 5 games?

Name: _____ 70

Curriculum Connection
C1.4

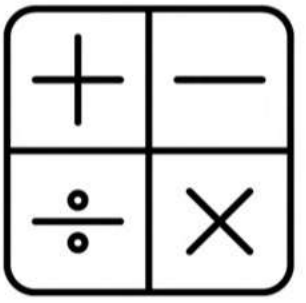
Task Cards: Patterning – All Operations

Objective What are we learning about?

To recognize and create patterns using the four basic mathematical operations.

Materials What will you need for the activity?

- 24 t
- S ets r for answers
- Pe



Instructions ll yo the activity?

1. Introduce the concept o s in perations and their relevance to problem-solving in everyda e.
2. Organize the students into pairs an ovide e air their sets of task cards.
3. Give each pair an answer recording sheet t dow ir ses.
4. Encourage teamwork by having students collabora ir p on finding solutions.
5. Allow students to select any task card to begin with, emphasiz an complete the cards in any order they prefer.
6. Instruct students to record the letter of their chosen answer (A, B, or C) on their answer sheet beside the task card's number.
7. Consider using a timer to create a dynamic challenge, adjusting the duration to fit the lesson's objectives and complexity.
8. After the activity, review the answers collectively, discussing any challenging patterns and strategies used to solve them.
9. Have students reflect on the activity, sharing the methods they applied and obstacles they overcame.

Name: _____ 71

Curriculum Connection
C1.4

Task Cards | Cut out the task cards below.

Card 1:
Start with 70. Subtract 30 and then add 10 for the next number. What is the second number?

a) 40
b) 50
c) 60

Card 5:
Start at -20, add 15 each time. What is the third number?

a) 10
b) -5
c) 20

Card 2:
Begin with 90 [illegible] divide by 5 for the next [illegible] What [illegible] third [illegible]?

a) 22
b) 26
c) 8.4

Card 6:
Start with -35. Multiply by 3 and then add 20 for the next number. What is the second number?

a) -85
b) -105
c) -55

Card 3:
Begin with 100. Subtract 40 and then multiply by 2 for the next number. What is the fourth number?

a) 20
b) 240
c) 120

Card 7:
Start [illegible] then add 12 for the [illegible] the second [illegible]

a) [illegible]
b) 24
c) 16

Card 4:
Start with 30. Multiply by 3 and then subtract 15 for the next number. What is the fifth number?

a) 1260
b) 75
c) 1830

Card 8:
Begin with 180. Divide by 6 and then subtract 10 for the next number. What is the second number?

a) 10
b) 20
c) 25

Name: _____ 73

Curriculum Connection
C1.4

Task Cards | Cut out the task cards below.

Card 17:
Start with 45. Add 25 and then subtract 30 for the next number. What is the sixth number?

a) 40
b) 25
c) 20

Card 21:
Start at -25, add 20 each time. What is the seventh number?

a) 100
b) -35
c) 95

Card 18:
Begin with 2[illegible] 80[illegible] then divide by 4 fo[illegible] numb[illegible]t is the sec[illegible]umb[illegible]

a) 30
b) 25
c) 20

Card 22:
Start with -45. Multiply by 3 and then add 25 for the next number. What is the third number?

a) -110
b) -220
c) -305

Card 19:
Begin with 75. Subtract 35 and then multiply by 3 for the next number. What is the fourth number?

a) 1875
b) 660
c) 255

Card 23:
Sta[illegible]id b[illegible]nd then add 9 for the [illegible]ber. [illegible]s the fourth [illegible]umb[illegible]

a)
b) 11
c) 19

Card 20:
Start with 50. Multiply by 2 and then subtract 25 for the next number. What is the third number?

a) 75
b) 125
c) 100

Card 24:
Begin with 170. Divide by 5 and then subtract 10 for the next number. What is the second number?

a) 20
b) 24
c) 34

Name: _____ 74

Curriculum Connection
C1.4

Integer Patterns - Retirement

Instructions Answer the questions below.

Jeremy just retired from his job. He has $350 000 in his bank account to live off during his retirement.

a) If he withdrawals -$25 000 a year for 6 years, how much money will he have l

b) F ch ble ues.

Year 1		Ye	Year 4	Year 5	Year 6	Year 7

c) Write an algebraic exp tha how much money Jeremy will have left for each year (y). se a a negative integer.

d) Jeremy has a pension that pays him +$12 Ho could Jeremy live off his pension and $350 000 if he contin ng -$2 a year?

e) Jeremy wants to buy a boat for $120 000 and is hoping his mon last for 15 years. Can he afford the boat even with his pension? Write an equation that represents the problem.

f) Now that Jeremy owns a boat, his expenses have gone up. He now withdrawals -$35 000 each year. Can he afford his new lifestyle with his $230 000 and pension for 15 years?

Name: _____ 75

Curriculum Connection
C1.4

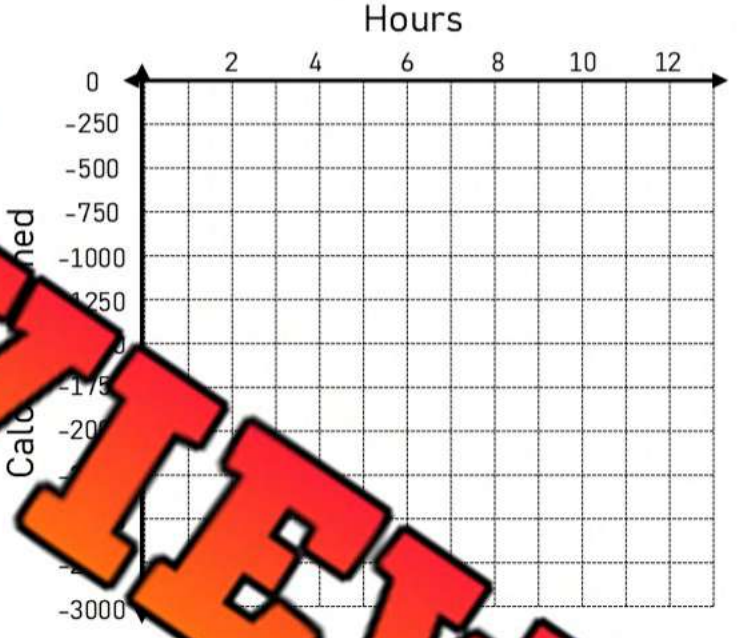
Graphing Linear Equations - Exercise

Instructions Answer the questions below.

For every 1-hour Logan exercises, he burns 250 calories. Use negative integers to fill in the table of values that tracks Logan's calorie burn.

1-Hour	2-Hours	3-Hours	4-Hours	5-Hours	6-Hours	7-Hours

a) If Logan exe... hours a week, ho... ...ies w... ...e burn?



b) Write the linear equation that represents the situation. Use multiplication and a negative integer.

c) If Logan has already burned 750 calories this week, how many more hours will he need to exercise to burn 2250 calories? Write an equation that represents the situation.

d) Describe the re... ...n the two variab... ...words.

e) Fill in the missing values in the ordered pairs below

(14, _____), (20, _____), (32, _____)

(____, -4250), (____, -6500), (____, -9750)

Name: _____ 76

Curriculum Connection
C1.4

Graphing Linear Equations - Advertising

Instructions Answer the questions below.

Chloe has an advertising budget of $150. She decides to spend $15 a day. Use negative integers to fill in the table of values that tracks her advertising spending. Display the table of values as a graph as well.

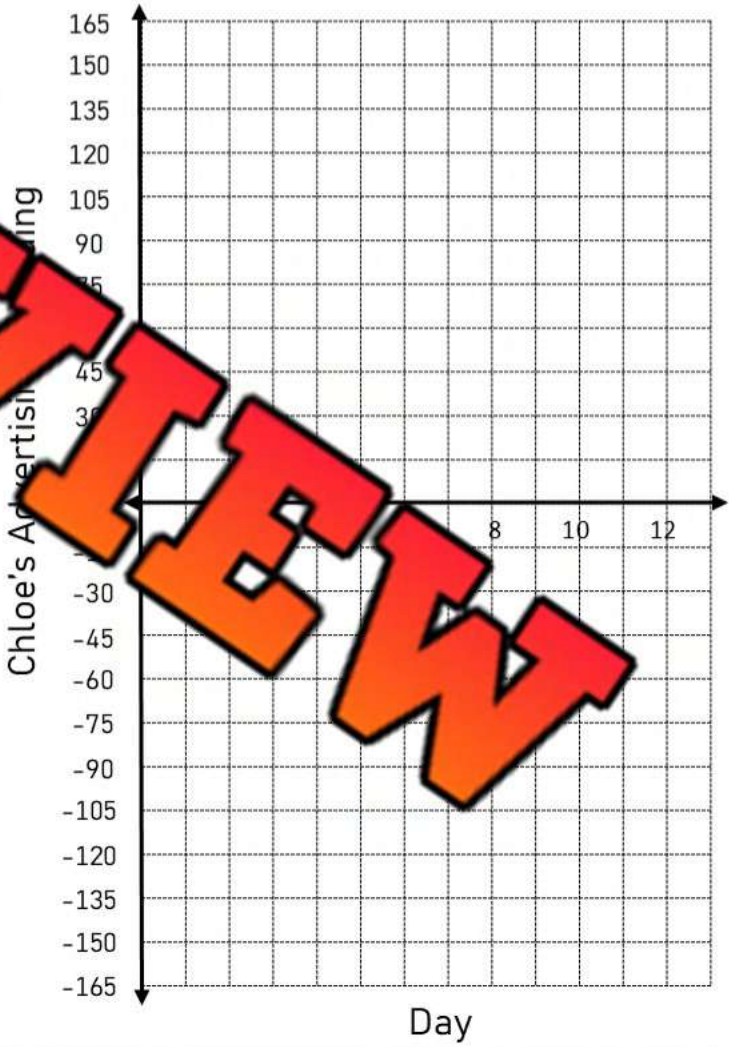
Qu

1) After 20 da... of a ...et will Chloe have ... negative...

2) Write the linear equation that represents the situation. Use multiplication and a negative integer.

3) Chloe has discovered that she earns $20 a day from people buying her products after seeing her advertisements. Use the numbers/operations below to write a new linear equation that represents the situation.

y x -15 20 + =



4) Matthew answered the question above using this equation: y = x(-15) + 20 but he isn't getting the correct answer. How could he move one bracket to get the correct answer? Why was he wrong before?

Name: _____ 78

Curriculum Connection
C1.4

Exponential Patterns – Word Problems

Instructions Answer the questions below.

1) Steel in 2021 costs $2 a kg. The prices are expected to double each year for the next 10 years.

a) Fill in the table of values to represent the cost over the next 7 years.

b) [illegible] represents the situation using an exponent and the variable *y* for [illegible]rs.

c) How much will [illegible] cost [illegible]? Show your work using the expression you wrote above.

2) If one person tells 3 people a message, and e[illegible] those [illegible]ll another 3 people and those people tell another 3 people, [illegible]ave t[illegible] [illegible]ading of information. This exponential growth is how things [illegible]

a) Fill in the table to represent how many people rece[illegible] [illegible]ssa[illegible]r each new level sends the message.

Level	1	2	3	[illegible]	[illegible]
# of People told the message					

b) Write an expression that represents how many people receive the message if it is spread to (l) levels of people.

c) In the scenario above, how many people would get the message after the message was passed to the 10th level of people?

d) What level of people would spread the message to over 1 million people?

Name: _____ 79

Curriculum Connection
C1.4

Exponential Patterns – 1 Cent Doubled

Instructions Answer the questions below.

1) $10 or 1 cent doubled daily

a) Which would you rather - $10 today or 1 cent doubled for 10 days. For example, 1 cent on day 1, 2 cents on day 2, and 4 cents on day 3.

b) How many days would it take for the doubling cents to be more than the $10.

2. 1 million dollars or 1 cent doubled

a) Which would you rather - $1 million today or 1 cent on day 1, and a doubling of the cents each day for one month (30 days). For example, 1 cent on day one, 2 on day 2, 4 cents on day 3 and so on.

b) How many days would it take for the doubling cents to be more than one million dollars?

3. Write an algebraic expression that represents this situation using an exponent and the variable *n* for the number of days.

Name: _____ 80

Curriculum Connection
C1.4

Exponential Patterns – Power of 10

Instructions Answer the questions below.

1) The Richter Scale explains how strong an earthquake is. We categorize earthquakes based on the amount of seismic energy they produce. The Richter Scale is a scale from 1 to 10, but each number represents a power of 10. For example, the Queen Charlotte Islands earthquake in British Columbia reached a magnitude of 8 on the Richter Scale. This means it produced 8×10^8 of seismic energy.

a) An earthquake hit an island once a year for 10 years. The first year it was a 2 on the Richter Scale. The second year, it was a 3 on the Richter Scale and the third year, it was a 4. With a growing pattern, how much seismic energy would be produced after year 7?

b) How much seismic energy was produced in year 10?

2) On average, the Earth is about 4.5×10^8 kilometres from Mars. A spacecraft traveled 15×10^7 kilometres per week.

a) Fill in the table of values to represent how far the spacecraft was after 5 weeks.

Week	1	2	3	
Distance (km)				

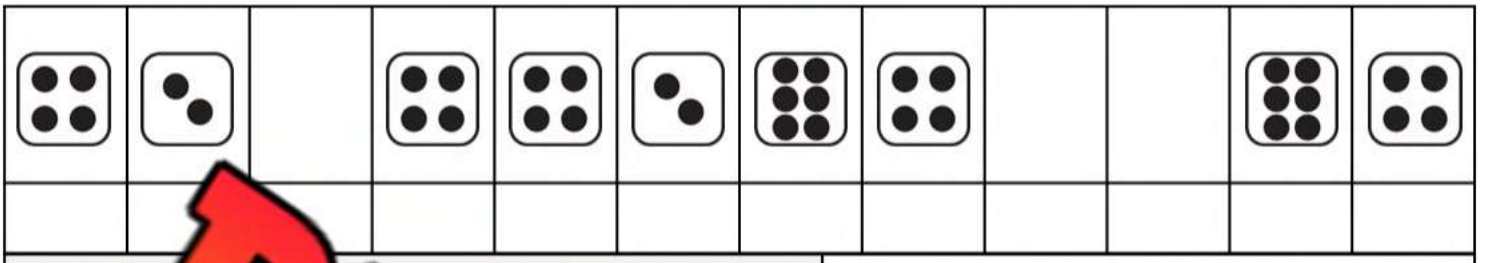
b) How many weeks did it take the spacecraft to reach Mars?

c) How many km did the spacecraft travel to get to Mars and back to Earth?

Name: _____ 81

Algebra Quiz - Patterning

Part 1 Label the A/B patterns below and then extend the pattern.

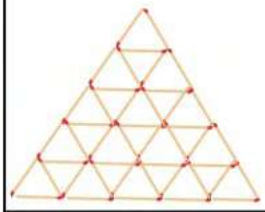
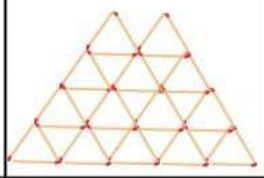
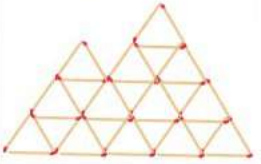


1) What [illegible]th]rm in the pattern be?	
2) Wh[illegible] the 50[illegible] the pattern be?	

Part 2 H[illegible] block[illegible]ach term? Sketch the next 3 terms.

F-1	F-2	F[illegible]		F-5	F-6

Describe the Pattern Rule					
Figure #	1	2	3	5	20
# of Matchsticks					

F-1	F-2	F-3	F-4	F-5	F-6
					

What is the Pattern Rule?					
Figure Number	1	2	3	4	5
Number of Matchsticks					
How many matchsticks would be in term 10?					

Part 3 Fill in the tables below to show a constant rate of change.

1) Cole's pay for today has been represented in the table below

Hours Worked	0	1	2	3	4	5	6	7	8
Money Earned ($)	0	27	54	81					

What is the rate of change? ________ Is the rate of change constant? Yes No

2) It costs $[illegible] for admission to an amusement park. Once inside, you pay for each additional [illegible] u go on.

Ride[illegible]	[illegible]	1	2	3	4	5
To[illegible]	[illegible]	$31.50	$33.00	$34.50	$36.00	$37.50

a) Write [illegible] rule f[illegible] ut [illegible] ch it costs to enter the park and go on rides.

b) Write an algebra[illegible] essi[illegible] at [illegible] ents the rule for riding *n* number of rides.

c) How much would it cost to [illegible] ri[illegible]

Part 4 Fill in the input/output ta[illegible] es belo[illegible]

In *n*	**Out** $n + 15$
135	
142	
163	
178	

In *n*	[illegible] $n + (-$[illegible]
3	
5	
8	
11	

[illegible]	**Out** $n - 11$
[illegible]	
[illegible]	
453	
488	

In *n*	**Out** $3n + 6$
1	
2	
3	
4	
5	

In *n*	**Out** $4n + (-6)$
5	
10	
15	
20	
25	

In *n*	**Out** $n - (-7)$
-1	
-2	
-3	
-4	
-5	

Part 5 Answer the word problem below.

Nathan drives a car that burns 10 litres of gas every 100km.

a) Use negative integers in the table of values to represent how much gas he uses compared to how far he drives.

Distance (km)							
Fuel (L)							

b) If he [illegible]00km, how many litres of gas would he need?

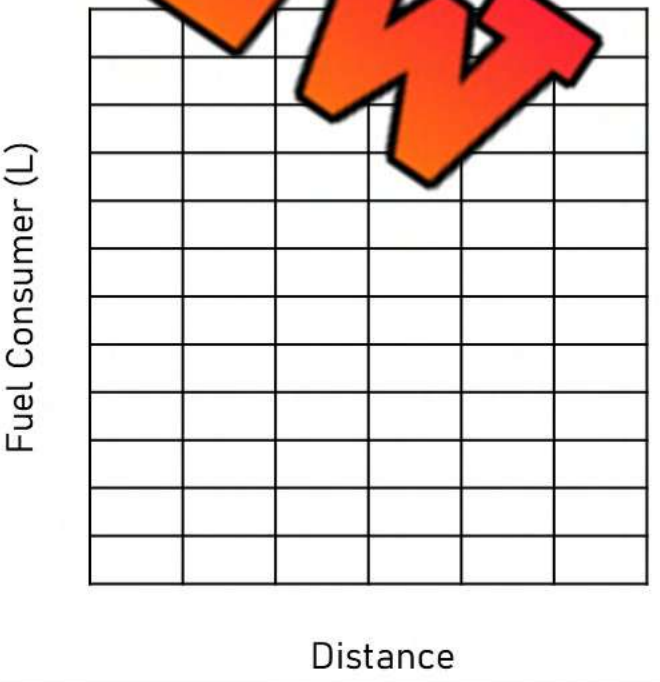
c) Write an alg[illegible] expre[illegible] represents how many litres of gas he needs compared to th[illegible] Use a negative integer.

d) If Nathan drives 550km, how ma[illegible]es of g[illegible]le he need?

e) Display the data in the graph by using a line gr[illegible]

f) Is the pattern a linear pattern? Explain.

g) How many km would he drive to burn 5,000 litres of gas? Show your work by using the expression from above.



Part 6 Draw the 4th and 5th term. Then answer the questions.

				
Term 1	**Term 2**	**Term 3**	**Term 4**	**Term 5**

Question	**Expression**
a) Write an expression using the variable *t* for term number that represents the number of shapes in the pattern?	
b) How many shapes will be in the 10th term?	
c) How many shapes will be in the 100th term?	
d) How many rectangles will be in the 10th term?	
e) How many stars will be in the 1000th term?	

Part 7 Answer the word problem below.

Admission to an arcade is $5. Each game you play will require you to buy 2 tokens. Each token costs $1.

a) Fill in the table of values to represent the cost of going to the arcade.

b) Write an expression that represents how much it will cost you to enter the arcade and play (*n*) number of games.

c) Albert plays 25 games at the arcade. How much did he have to spend?

d) What is the pattern rule?

Grade 8
C2. Equations and Inequalities

	Curriculum Expectations	Pages That Cover the Expectations
C2.1	add and subtract monomials with a degree of 1, and add binomials with a degree of 1 that involve integers, using tools	86 - 101
C2.2	evaluate algebraic expressions that involve rational numbers	102 - 113
C2.3	solve equations that involve multiple terms, integers, and decimal numbers in various contexts, and verify solutions	114 - 152
C2.4	solve inequalities that involve integers, and verify and graph the solutions	153 - 184

Name: _____ 86

Curriculum Connection
C2.1

What is a Monomial?

A **monomial** is an algebraic expression that has only one term. A **term** is a single mathematical expression. It could be a single number, a single variable, or several variables multiplied together. A term is not numbers or variables added or subtracted.

For example, 2*y* is a monomial because it is just one term. 2y – 3 is not a monomial because it has two terms: 2y and 3. On the other hand, 2yx is one term because the numbers and variables are multiplied, not added or subtracted. This means 2yx is a monomial. If an expression has 2 terms, it is called a binomial.

Part 1 ms does the expression have? Is it a monomial or binomial?

	on	# of Terms	Monomial or Binomial
1	+ 3*y*		
2	*x*		
3	21 – 1		
4	(12*nxy*)		
5	3(2x)		
6	15(9yx)		
7	(2x) + (15y)		
8	3(5x) – 2(5yn)		
9	4(5x + 6)		
10	14(3x) – 2(2x)		

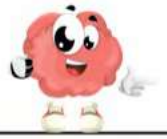
Part 2 Write your own monomials and binomials using: 8 y x 6

	Monomial or Binomial	# of Terms	Expression
1	Monomial		
2	Monomial		
3	Binomial		
4	Binomial		
5	Binomial		

Name: _____ 87

Curriculum Connection
C2.1

What is a Monomial?



Part 1 Add the monomials together.

1) 8n + 3n = _____n	2) 11p + 4p = _____p	3) 12t + 14t = _____t
4) [illegible]13b = _____	5) 24n + 44n = _____n	6) 34p + 32p = _____p
7) 5y + [illegible] = _____y	[illegible]3n + 28n + 21n = [illegible]	9) 24x + 39x + 32x = _____x

Part 2 Add the monomial[illegible]er.

1) 7n + 2c + 6c + 8n = _____n = _____c	[illegible]r + 9s = _____s [illegible]
3) 12n + 19p + 27p = _____n = _____p	4) 19n + 21c + [illegible] + 11n = _____n = _____c
5) 19s + 24r + 33s = _____s = _____r	6) 23s + 17r + 12s + 24r = _____s = _____r

Curriculum Connection
C2.1

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Add the monomials together

1) [illegible]	2) 11q + 7q = _____p
3) 8f + 5c + 7c + 2f = _____f = _____c	
4) 9g + 2k + 3g + 8k = _____g = _____k	

Name: _____

Add the monomials together

1) 9s + 3s = _____n	2) 11q + 7q = _____p
3) 8f + 5c + 7c + 2f = _____f = _____c	
4) 9g + 2k + 3g + 8k = _____g = _____k	

Name: _____

Add the monomials together

1) 9s + 3s = _____n	2) 11q + 7q = _____p
3) 8f + 5c + 7c + 2f = _____f = _____c	
4) 9g + 2k + 3g + 8k = _____g = _____k	

Name: _____ 90

Curriculum Connection
C2.1

Simplifying Expressions - Adding Monomials

Questions Simplify the expressions by solving one step at a time.

1) 3m + 9m + (7y + 10y) 3m + 9m + 17y 12m + 17y	2) 22s + 3r + 11r + 6s
= 17y	= _____s = _____r
18n + 3 + 36p	4) 16n + 31n + 18c + 27c
= _____n = _____	= _____n = _____c
5) 35s + 12s + 24r + 13r	6 + 11r + 19r + 6r + m
= _____s = _____r	= _____s _____m
7) 14y + 19n + 15c + 11c + 25n + 4y	8) 29n + 34y + 16 28n
= _____n = _____c = _____y	= _____n = _____c = _____y
9) c + 54y + 49b + 52b + 73y + c	10) 73n + 41c + 67c + 24n + 1y + 18y
= _____y = _____b = _____c	= _____n = _____c = _____y

Name: _____ 91

Curriculum Connection
C2.1

Adding Monomials – Missing Addend

Part 1

What is the value of the missing addend?

1)	3y + 6y = 9y
2)	11m + ☐ = 19m
3)	+ ☐ = 27t
4)	17b = 34b
5)	☐ 2y =
6)	15r + ☐
7)	☐ + 36y =
8)	46y + ☐ = 52y
9)	☐ + 22y = 57y
10)	51b + ☐ = 77b

11)	29y + 13y + ☐ = 56y
12)	☐ + 22t + 36t = 79t
13)	33y + 16y + ☐ = 72y
14)	☐ + 21t + 46t = 89t
15)	36y + 23y + ☐ = 87y
16)	☐ + 27t + 42t = 77t
17)	☐ + 57t + 66t = 109t
18)	44 y + ☐ = 135y
19)	☐ + 51 t = 149t
20)	64y 73 y

Part 2

Write an addition equation using the monomials pro d.

1)	27y	71y	44y
2)	36n	24n	12n
3)	31b	35b	4b
4)	79c	108c	29c
5)	84y	27y	57y
6)	61n	34n	95n

Name: _____ 92

Curriculum Connection
C2.1

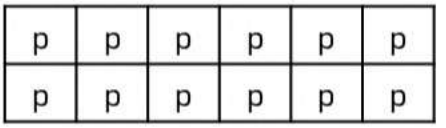
Subtracting Monomials - Tiles

Questions Subtract the monomials by crossing out the tiles you've subtracted.

1) 10n – 3n – 2n

= _____n

2) 12p – 6p– 2p

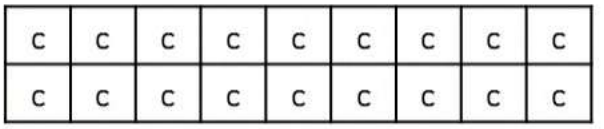


= _____p

3) 17s – 9s – 5s

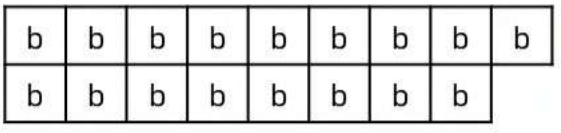
= _____s

4) 18c – 12c – 3c



= _____c

5) 17b – 9b – 3b

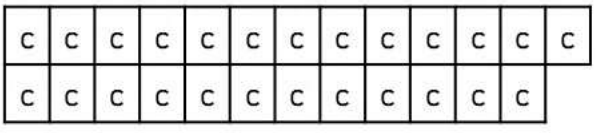


= _____b

6) 22y – 11y – 5y

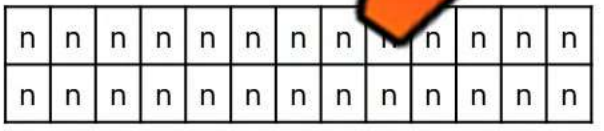
= _____y

7) 25c – 8c – 13c



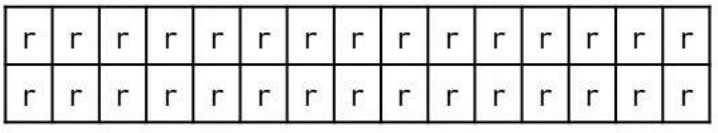
= _____c

8) 26n – 14n – 9n



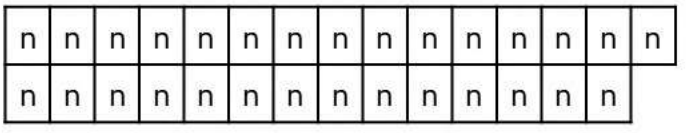
= _____n

9) 30r – 11r – 15r



= _____r

10) 29n – 16n – 11n



= _____n

Name: _____ 93

Curriculum Connection
C2.1

Subtracting Monomials

Part 1 Subtract the monomials.

1) 7n - 2n = _____n	2) 9p - 4p = _____p	3) 15t - 10t = _____t
4) [illegible] 9b = _____b	5) 28n - 14n = _____n	6) 34p - 19p = _____p
7) 65y - 2[illegible] = _____y	[illegible]52n - 34n - n - 11n = _____n	9) 57y - 12y - 7y - 9y = _____y
10) 33n - 11n - 11n = _____n	[illegible]39y [illegible]y - 14y = _____y	12) 94a - 25a - 21a - a = _____a

Part 2 What is the value of the missing ad[illegible]?

1)	15y - [6y] = 9y	8)	[illegible]
2)	18m - [ ] = 1m	9)	[ ] - 7t - [illegible] = 18t
3)	25t - [ ] = 17t	10)	58y - 14y - [ ] = 17y
4)	39b - [ ] = 24b	11)	[ ] - 13t - 26t = 29t
5)	[ ] - 22y = 31y	12)	76y - 13y - [ ] = 41y
6)	45r - [ ] = 23r	13)	[ ] - 21t - 32t = 46t
7)	[ ] - 31y = 19y	14)	[ ] - 68t - 56t = 49t

Name: _____ 94

Curriculum Connection
C2.1

Adding and Subtracting Monomials

Follow these steps to simplify the expressions below
1) Identify like terms (terms with the same variable)
2) Rearrange terms so that the like terms are together
3) Combine like terms

6m + 8y – 3m – y
6m – 3m + 8y – 1y
3m + 7y

Questions Simplify the expressions by solving one step at a time.

1) [illegible] 2m – 11m	2) 12n + 14n – 17n + n
= _____m	= _____n
3) 15s – 3r + 7	4) 2n – c + 13n – 21c
= _____s = _____r	= _____c
5) 13s + 12r – 14s – 13r	6) [illegible] 12r + 6r
= _____s = _____r	= _____s [illegible]
7) 15m + 7y – 3m – 3y	8) 23n – 18p – 17[illegible] + 15p
= _____m = _____y	= _____n = _____p
9) 18s – 33r + 15r – 22s	10) 22n – 53c – 33n + 21c
= _____s = _____r	= _____n = _____c

Name: _____ 96

Curriculum Connection
C2.1

Distributive Property - Addition

The distributive property is used to make difficult problems simpler. It means that when we multiply a number by the sum of two or more addends, we get the same result as multiplying each addend separately by the number.

You can use the distributive property of multiplication to rewrite expressions that have a number outside of a parenthesis.

Example 1

$7(5$
7×5

	5	3
7	35	21

Example 2

$4(y + 8)$
$4 \times y + 4 \times 8$
$4y + 32$

	y	8
4	$4y$	32

Evaluate Fill i… …del … represent the distributive property of the expressions.

1) $9(4 + 6)$

2) $6(3 + n)$

3) $8(7 + 3)$

4) … $n)$

5) $6(f + 11)$

6) $-3(5 + p)$

Expand Evaluate the expressions below.

1) $9(t + 7)$	2) $-2(8 + 12)$	3) $-6(x + 3)$
4) $8(y + 4)$	5) $5(-11 + n)$	6) $-4(-12 + k)$

Name: _____ 98

Curriculum Connection
C2.1

Distributive Property – Equivalent Expressions

Match Write the letter from column 2 beside the equivalent expression from column 1.

1

Answer	Column 1	Letter	Column 2
	3(9 – 5)	a	15 + 27
	-3(9 + 5)	b	(-15) + 27
	3(5 + 9)	c	3 x 9 – 3 x 5
	-3(5 - 9)	d	(-27) + (-15)

2

Answer	Colu	Letter	Column 2
		a	-63 - 7t
		b	7t + 63
	7(t +)		-7t + 63
	-7(t - 9)		63 - 7t

3

Answer	Column 1	Lett	n 2
	8(11 – n)	a	
	-8(n + 11)	b	
	8(11 + n)	c	-8 8
	-8(11 - n)	d	88 + 8n

4

Answer	Column 1	Letter	Column 2
	3(y – 5)	a	3y + 15
	-3(y + 5)	b	-3y + 15
	3(y + 5)	c	3y - 15
	-3(y - 5)	d	-3y - 15

Name: _____ 102

Curriculum Connection
C2.2

Mixed Operations - BEDMAS

When solving an equation, you need to follow the order of operations. This means you have to solve the equation in the correct order, not just from left to right. Using BEDMAS helps us remember the order to solve.

1. Brackets 2. Exponents 3. Division or Multiplication (whichever is first) 4. Addition or Subtraction (whichever is first)

Exampl
2 + (
2 = n
n = 14

Example 2
n – (2 x 3) = 4
n – 6 = 4
= 10

Example 3
8 – (4n) = 20
8 – 7 x 4 = 20
n = 7

Part 1

Which op you te first?

1) 3 + (4 x 5) = n	2) 21) =	3) (8 x 4) + (4 ÷ 2) = t
4) n + (12 ÷ 6) = 12	5) 12 + (2 + 1	2 = 8

Part 2

Alex and Avery both answered the questions below. Cir o's right.

	Question	Alex's Answer	Avery's Answer
1	2 + 6 x 4 + 12	44	38
2	10 – 2 x 3	4	24
3	9 – 3 x (2 + 1)	0	18
4	5 x 3 + 8 ÷ 2	19	11
5	12 ÷ 3 x (5 + 5)	25	40

Name: _____ 103

Curriculum Connection
C2.2

Writing Algebraic Expressions

Using algebraic expressions helps us understand mathematical situations. We can use a variable to replace a changing number, like how many tickets are sold to a game – t x 10

Part 1 Write each algebraic expression in words.
Use the words, "a number" in place of the variable.

1) $9 - t$

Nine sub[illegible]mber

2) n[illegible]

3) $6 + b$

4) $12r$

5) $\frac{y}{8} + 5$

6) $9 - t + 21$

7) $\frac{21}{y} + 13$

8) $(8b) - (4x)$

9) [illegible] $- \frac{y}{3}$

10) [illegible]

Part 2 Write an algebraic expression for each state[illegible].

1) Twelve times a number subtract eight

2) Divide a number by seven and multiply it by a different number

3) A number is subtracted by fourteen divided by five

4) Triple a number subtracted by double a different number

5) Divide eighty by a number, then multiply by four

Name: _____ 105

Curriculum Connection
C2.2

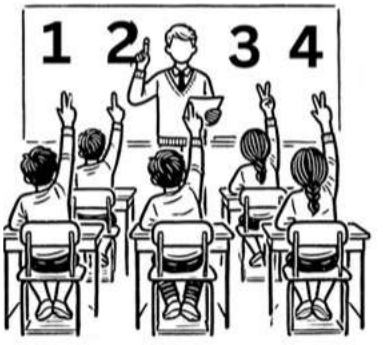
Finger Signals Quiz - Understanding Algebraic Expressions

Objective What are we learning about?

Students will reinforce their understanding of algebraic expressions through an interactive finger signals quiz.

Materi ill you need for the activity?

- A list of q o



Instructions How w mple tivity?

1. Prepare a list of questions with nswer s labeled A, B, C, and D.
2. Explain the finger signals for each answ ice: for A, two fingers for B, three fingers for C, and four fingers D.
3. Inform the students they will show their answer u e fi n when you read each question.
4. Read the first question aloud clearly and repeat if necessary.
5. Give students a few moments to think about their answer and decide independently.
6. After a countdown (e.g., "3, 2, 1"), have all students show their answer simultaneously by raising the appropriate number of fingers.
7. Reveal the correct answer and explain why it is correct.
8. Repeat with different questions to reinforce understanding of algebraic expressions.

Name: _____ 106

Curriculum Connection
C2.2

Question	A	B	C	D
A student reads r pages each day for 6 days. What is the total number of pages read?	6 + r	6 - r	6r	r ÷ 6
A photographer takes p photos, takes 4 more each day for 6 days, and then deletes 8. How many photos are there now?	p + (4 × 6)	(p + 24) - 8	p + 24	p + (4 x 6) - 8
A farmer has f cows, buys 18 more, and sells 7. How many cows are there now?	f + 18 – 7	f × 18 - 7	f + 18 + 7	f ÷ 18 - 7
A librarian shelved 40 books over the course of h hours. Wha[illegible] average number of books shelved per h[illegible]	40 + h	40 - h	40h	40 ÷ h
A farmer p[illegible] h row and has 6 rows. W[illegible] n[illegible] trees?	6 + f	6 - f	6f	f ÷ 6
A worker[illegible] w doll[illegible] for 7 hours. What is the total e[illegible]	7 + w	7 - w	7w	w ÷ 7
A library has b boo[illegible] more, a[illegible] loses 20. How many bo[illegible] there	b + 50 - 20	b × 50 - 20	b + 50 + 20	b ÷ 50 - 20
A factory produces p product[illegible] 10 days. What is the total productio[illegible]	[illegible]	10 - p	10p	p ÷ 10
A librarian has b books, receives 7 mo[illegible]ch hour for 8 hours, and then donates 10. How many books are there now?	[illegible] 8) - [illegible]	[illegible]56) - 10	b + (7 × 8)	b ÷ 7 x 8 - 10
A runner runs 40 kilometres over the course of d days.	40[illegible]	40[illegible]	40d	40 ÷ d
A school has s students but loses 20. What is the total number of students?	s + 20	[illegible]	[illegible]	s ÷ 20
A gardener has g plants, plants 5 more each day for 3 days, and then removes 4. How many plants are there now?	(g + 15) – 4	g + (5[illegible]) – 4	[illegible]	[illegible] × 3)
A chef cooked 120 meals over the course of m days. What is the average number of meals cooked per day?	120 + m	120 - m	120m	120 ÷ m
A baker makes b batches of cookies each day for 4 days. What is the total number of batches?	4 + b	4 - b	4b	b ÷ 4
Sarah has s apples and buys 5 more. How many apples does she have now?	s + 5	s - 5	5s	s ÷ 5
A store has k kites but sells 30. What is the total number of kites left?	k + 30	k - 30	30k	k ÷ 30
An artist has p paintings, paints 2 more each day for 5 days, and then sells 6. How many paintings are there now?	a + (2 × 5)	(a + 10) - 6	a + (2 x 5)	a + (2 x 5) - 6

Name: _____ 107

Curriculum Connection
C2.2

Evaluating Algebraic Expressions - Addition

Part 1 Evaluate the following expressions for x = -7

1) $x + 13$	2) $9 + x$	3) $25 + x$	4) $x + 17$
5) $39 +$	6) $83 + x$	7) $74 + x + 11$	8) $87 + x + 24$

Part 2 Eva he f pressions for y = -7 and n = 4

1) $n + y$	2) $1 y$	$+ y + n$	4) $y + 18 + n$
5) $54 + y + n$	6) $n + (y + 20)$	7) $+ n$	$75 + n + (y + 4)$

Part 3 Evaluate the following expressions for x = -5 and p = -1

1) $(x) + (p) - 23$	2) $17 + x + (p)$	3) $(19 + x) + (p)$	4) $x + (35 + p)$
5) $(p + 27) + x$	6) $x + 49 + (p)$	7) $(x + 63) + (p)$	8) $88 + p + x$

Curriculum Connection
C2.2

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Evaluate the following expressions for x = -5 and p = -12

1) (19 + x) + (p)

2) x + (35 + p)

3) (x) + (p) − 23

Name: _____

Evaluate the following expressions for x = -5 and p = -12

1) (19 + x) + (p)

2) x + (35 + p)

3) (x) + (p) − 23

Name: _____

Evaluate the following expressions for x = -5 and p = -12

1) (19 + x) + (p)

2) x + (35 + p)

3) (x) + (p) − 23

Name: _____

Evaluate the following expressions for x = -5 and p = -12

1) (19 + x) + (p)

2) x + (35 + p)

3) (x) + (p) − 23

Name: _____ 109

Curriculum Connection
C2.2

Evaluating Algebraic Expressions - Subtraction

Subtraction Integers Rules

To subtract integers, it is easiest to change the operation to addition and then follow the addition rules. We can do this by using the rule – Keep, Flip, Change. We keep the first number the same, flip the operation from subtraction to addition, and then change the third number's sign.

Example: 5 – (-6) = ? becomes 5 + 6 = 11

Keep the first integer

Flip the operation

Change the sign of the next integer

Part 1 Eva[illegible]tow[illegible]pressions for x = -8

1) x - 15	2) [illegible]	3) 27 - x	4) x - 31
5) 47 - x	6) 61 - x	7) [illegible] - 16	8) 94 - x - 14

Part 2 Evaluate the following expressions for y = -12 and n = -5

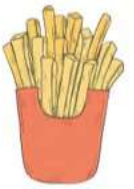
1) y - n	2) (16 - n) - y	3) 15 – (y - n)	4) y - 11 - n
5) 21 - y - n	6) (n – y) - 36	7) y – (n – 43)	8) (28 – n) - y

Name: _____ 110

Curriculum Connection
C2.2

Evaluating Expressions – Food Truck

Walker works at a food truck selling burgers, hot dogs, fries, and pogos. He uses algebraic expressions to determine the cost of his customer's orders.



Menu	
Burger (b)	$4.50
Hot Dog (h)	$2.75
Fries (f)	$3.25
Pogo (p)	$3.50

Solve Write t… …aic expression and then evaluate using the menu prices.

Customer Orde…	Expression	Answer
1) 2 burgers, 1 fry	2 x b + f …0 + 3.25	
2) 4 hot dogs, 2 pogos		
3) 5 fries, 2 pogos		
4) 3 burgers, 2 fries, 2 pogos		
5) 3 fries, 5 burgers, 4 hot dogs		
6) 10 burgers, 10 fries		
7) 5 hot dogs, 7 fries, 3 pogos		
8) 4 burgers, 9 hot dogs		

Name: _____ 112

Curriculum Connection
C2.2

Evaluating Algebraic Expressions – (x ÷)

Part 1 Evaluate for x = -3. Use brackets to separate the numbers.

1) $7x$	2) $6x$	3) $4x - 5$	4) $12x + 7$
5) $17x$	6) $15x - 10$	7) $8x - x$	8) $13x + 6 - x$

Part 2 Evaluate the following expressions for y = -8

1) $\frac{y}{2}$	2) $\frac{32}{y}$		4) $\frac{y}{2} + 5$
5) $\frac{48}{y} + 7$	6) $\frac{88}{y} + y$	7) $\frac{0}{y}$	x y

Challenge! Use three -5s and any operation or brackets to write an expression with the values provided.

	Your Expressions	Value
1)		-125
2)		-5
3)		0
4)		50

	Your Expressions	Value
5)		5
6)		30
7)		20
8)		-6

Name: _____ 117

Curriculum Connection
C2.3

Matching Game: Do The Equations Match?

Objective What are we learning about?

To enhance students' understanding of equivalent equations. Students will identify and match pairs of equations that yield the same result, fostering critical thinking and prob lving skills in a collaborative group setting.

Mat W you need for the activity?

- Pre-prepar re-c g cards.
- Small bags or envel ld t ts for each group

Instructions How will you complete the a ?

1. Before the class, the teacher will cut out the p ed m ng game cards.
2. Divide the students into small groups and give each group ag elope containing a set of the matching cards.
3. In their groups, students will spread out the cards face down on their table.
4. Each person takes a turn to try to match two cards. They will need to solve both equations to see if they match (equal the same).
5. If they find a correct match, they keep the cards out and continue with their next turn. If the cards don't match, they turn them back over in the same place, and the next player takes a turn.
6. The activity continues until all pairs are correctly matched within each group.

Name: _____ 118

Curriculum Connection
C2.3

Cards | Matching Game Cards

60 + (-15) + 20	55 - (-10)
15 5	100 + (-25)
90 + (-20) + 12	32 30 + 30
-104 + 151 + 112	366 - 150 57
20 + 180	250 - 50

Name: _____ 121

Curriculum Connection
C2.3

Cards | Matching Game Cards

98 + (-43)	75 + 20 - 40
-6 8	290 – 99
89 - 49 + 18	6 12 + 14
-83 + 249	199 + (-66) + 33
77 - 25 + 12	40 + 24 - 0

Name: _____ 122

Curriculum Connection
C2.3

Finding The Value of a Variable

When we write an algebraic expression with an equal sign, it becomes an equation. An equation is a statement that two expressions are equal.

We can solve for a variable by balancing an equation, making sure both sides of the equal sign have the same value.

Part 1 Find out the value of the variable.

n =	2) n + 15 = 29 n =	3) 36 - n = 28 n =
4) 45 - 19 = p p =	+ p = 62	6) p – 13 = (-25) p =
7) 13 - y = (-10) y =	8) y =	9) (-32) – 15 = y y =
10) 27 + t = (-12) t =	11) 36 - t = ( )	(2) + t = (-49)

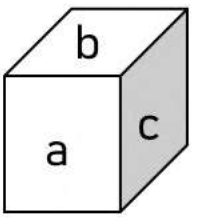
Part 2 The formula for calculating the surface area of a rectangular pr o add the areas of each side together.

Use the following equation to find the surface area (*s*) of a rectangular prism:

$s = a + a + b + b + c + c$ or $s = 2a + 2b + 2c$

1) a=6 b=11 c=10	SA=
2) a=9 b=14 c=21	SA=
3) a=11 b=21 c=25	SA=

4) a=26 b=15 c=41	SA=
5) a=35 b=32 c=49	SA=
6) a=29 b=19 c=52	SA=



Name: _____ 124

Curriculum Connection
C2.3

Addition Equations – Golf Tournament - Challenge

Zack hosted a 4-round golf tournament. He has the results and needs to find out who won the tournament. The leaderboard is below but is missing numbers.

Directions Fill in the leaderboard.

Player	Round 1	Round 2	Round 3	Round 4	Final Score
Ri		-6	4	-5	
Charlie		-2	5		-5
Dominic				9	-6
Kayden	-3	-7	-1	-5	
Silas	5	3			-1
Lillian	5	8			9
Brooklyn	-4	-2			-5
Natalie		7	2	-6	-4
Andrew	-5	4	1		
Santiago		-3	-8		-22

Results Who won the golf tournament?

1) Who won the golf tournament?	
2) The entry fee for the tournament was $75. All the money went to the prize (p). Write an equation that determines the value for (p).	
3) More golfers joined the tournament. The prize ended up being $1125. Write an equation that determines how many golfers (g) participated in the tournament.	

Name: _____ 127

Curriculum Connection
C2.3

Integer Patterns – Average Temperatures

Directions Answer the questions below.

6 friends participated in a 4-round golf tournament. The table below shows what each friend scored.

Player	Round 1	Round 2	Round 3	Round 4	Final Score
Kylie (	-3	-5	+4	-4	
Finn	-3	+2	+5	-6	
M		-3	+1	+7	
Daws (*d*)		-9	-2	-4	
Zayn (*z*)			-8	+5	
Leon (*l*)			-6	+4	

a) Fill in their final sco

b) Write an equation that sh s th etween Finn's (*f*) final score and Zayn's (*z*) final score. e vari efore you solve.

c) Suppose Kylie and Maggie played on a te gai nn. Write an equation that shows the difference between t a score

d) Suppose Dawson and Zayn were on a team against Leon a M rite an equation that shows the difference between their team scores.

e) Suppose Kylie, Finn, and Maggie played on a team against Dawson, Zayn, and Leon. Write an equation that shows the difference between their team scores.

f) Use the variables *b* for best round and *w* for worst round to write an equation that finds the difference between the best and worst players.

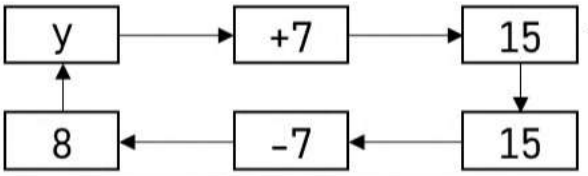
Name: _____ 128

Curriculum Connection
C2.3

Adding and Subtracting Equations – Flow Chart

We can use a reverse flow chart to calculate the value of a variable in an equation.

Example: $y + 7 = 15$



- Equation represented the same

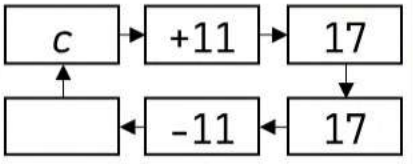
- Use the opposite operation in the middle and solve for the last box

Direction Use the flow chart to find the value of the variable.

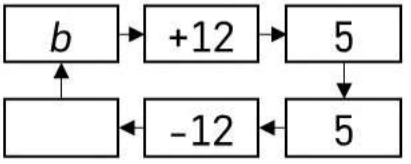
1) $t - 7 = 12$

2) $r - 9 = 16$

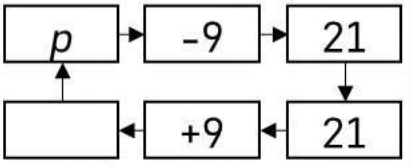
3) $c + 11 = 17$



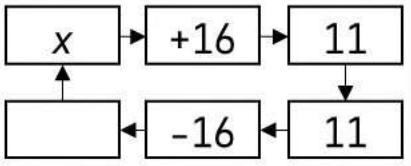
4) $b + 12 = 5$



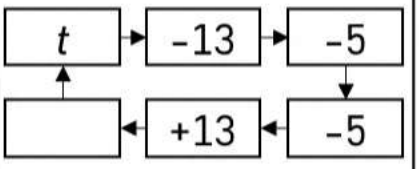
5) $p - 9 = 21$



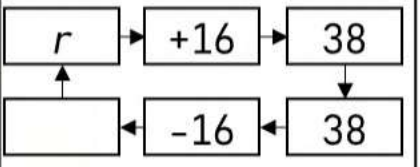
6) $x + 16 = 11$



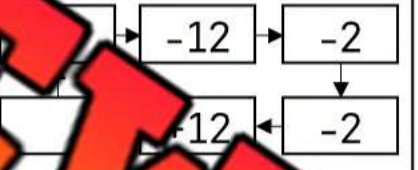
7) $t - 13 = -5$



8) $r + 16 = 38$

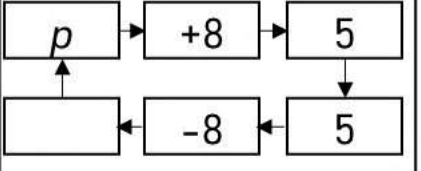


9) $c - 12 = -2$

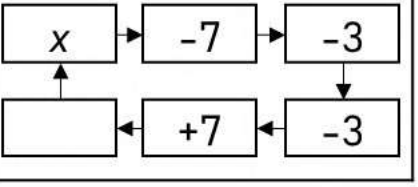


10) $b + 14 = 31$

11) $p + 8 = 5$



12) $x - 7 = -3$



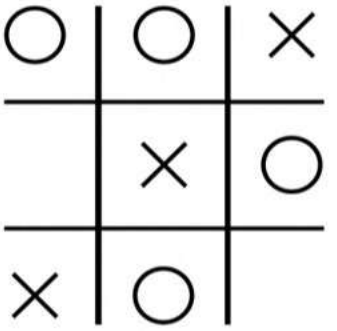
Name: _____ 133

Curriculum Connection
C2.3

Math Tic-Tac-Toe: Balance The Equations

Objective — What are we learning about?

To help students practice solving and balancing equations involving variables in a fun and interactive way thro[illegible] Tic-Tac-Toe game.



Mate[illegible] — W[illegible]ll you need for the activity?

- Tic-Tac-T[illegible] [illegible]oards [illegible]ided

Instructions — How wi[illegible]s[illegible]aplet[illegible]ivity?

1. Find a partner to play the game[illegible]
2. The goal is to solve and balance the alg[illegible] equ[illegible]s[illegible]ch square to place your marker (X or O).
3. One player will be "X" and the other will be "O".
4. Take turns choosing a square and solving the equation in t[illegible]s[illegible] find the value of the variable.
5. Write down the solution below the equation and place your marker (X or O) in the square.
6. If a player chooses a square and solves the equation incorrectly, they do not get to place their marker in that square. The other player gets a chance to solve it correctly and place their marker.
7. The first player to get three markers in a row (horizontally, vertically, and diagonally) wins the game. Continue playing with different tic-tac-toe grids on the sheet.

Name: _____ 135

Curriculum Connection
C2.3

Tic-Tac-Toe

Use the following tic-tac-toe grids for the game.

96 ÷ ___ = 16	(-12) x ___ = 60	___ ÷ 6 = 12
(-42) x ___ = 84	48 ÷ (-8) = ___	___ x 5 = 35
180 ÷ ___ = (	x (-4) = ___	___ ÷ 9 = (-9)

128 ÷ ___ = 16	(-18) x ___ = 72	___ ÷ 4 = 8
(-36) x ___ = 108	75 ÷ (-15) = ___	___ x 6 = 36
110 ÷ ___ = (-11)	(-25) x (-8) = ___	___ ÷ 10 = (-6)

192 ÷ ___ = 16	(-24 = 48	÷
(-30) x ___ = 90	54 ÷ (-6) = ___	___ x 12 =
200 ÷___ = (-10)	(-44) x (-3) =___	___÷ 2 = (-10)

72 ÷ ___ = 9	(-15) x ___ = 60	__ ÷ 4 = 10
(-22) x /6	80 ÷ (-8) = ___	___ x 14 = 98
135	32) x (	___ ÷ 6 = (-5)

48 ÷ ___ = 8	(-21) x ___ = 105	___ ÷ 7 = 9
(-16) x ___ = 48	60 ÷ (-10) = ___	___ x 11 = 88
72 ÷ ___ = (-6)	(-40) x (-4) = ___	___ ÷ 3 = (-8)

64 ÷ ___ = 16	(-20) x ___	___ ÷ 8 = 5
(-28) x ___ = 56	100 ÷ (-25) = ___	___ x 7 = 28
90 ÷ ___ = (-9)	(-36) x (-2) = ___	___ ÷ 12 = (-6)

Name: _____ 136

Curriculum Connection
C2.3

Finding The Value of a Variable

When we multiply a number by a variable, we do not need to use the multiplication sign. It is known that any variable next to a number means the operation we are using is multiplication.
Example: 7n = 14 means 7 x n = 14
We can figure out the unknown number by balancing the equation: n = 2.

Part 1 Find out the value of the variable.

1) [illegible]	2) (-4n) = 16 n =	3) (-9s) = 54 s =
4) [illegible] x (-4) p	5) $\frac{-77}{p}$ = -11 p =	6) $\frac{-28}{k}$ = -7 k =
7) (-3n) = (-1[illegible] n =	[illegible] (-42)	9) $\frac{n}{8}$ = -9 n =
10) $\frac{-40}{5}$ = n n =	11) [illegible]	12) $\frac{p}{15}$ = -5 p =
13) (-8n) = 96 n =	14) $\frac{110}{n}$ = n =	15) 7d = 56 d =

Part 2 Calculate the area of a circle and a triangle [illegible] the [illegible]ow.

The formula for calculating the area of a circle is: A = [illegible] = ~3.14
Calculate the area in the questions below using the values for radius and pi

	Radius	Area - Circle
1)	r = 9cm	A =
2)	r = 6cm	A =

	Radius	Area - Circle
3)	r = 12cm	A =
4)	r = 7cm	A =

	Radius	Area - Circle
5)	r = 13cm	A =
6)	r = 11cm	A =

The formula for calculating the area of a triangle is: A = $\frac{(b)(h)}{2}$

	b	h	Area - Triangle
1)	6	2	A =
2)	9	6	A =

	b	h	Area - Triangle
3)	8	4	A =
4)	7	5	A =

	b	h	Area - Triangle
5)	3	4	A =
6)	8	6	A =

Name: _____ 137

Curriculum Connection
C2.3

Writing Multiplication Equations – Gas Station

Tyler works at a gas station. He sells fuel by the litre, chips, drinks, and chocolate bars.

Fuel (f)	Chips (c)	Drinks (d)	Chocolate Bars (b)
$1.33/L 	$1.75 	$1.25 	$1.99 

Instructi Complete the table below. The first one is done for you.

#	f	c	d	b	Equation	Answer
1	20	2		0	20f + 2c	t = 20 x 1.33 + 2 x 1.75 t = 26.6 + 3.50 t = $30.1
2	50	0	3	2		
3	0	2	1	0		
4	60	1	2	2		
5	0	2	0	0		
6	0	1	1	0		
7	25	2	1	2		
8	70	0	1	3		

Name: _____ 142

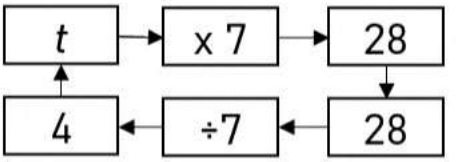
Curriculum Connection
C2.3

Multiplying Equations – Flow Chart

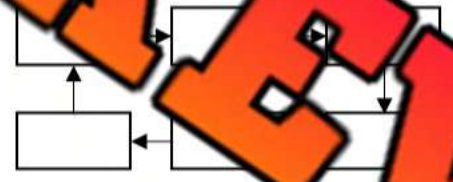
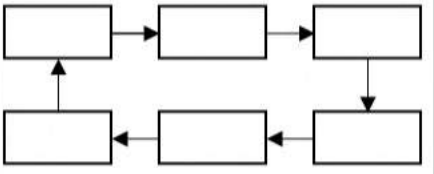
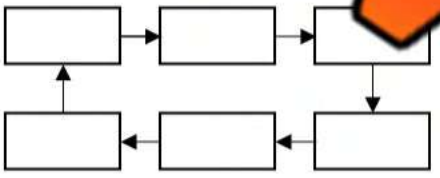
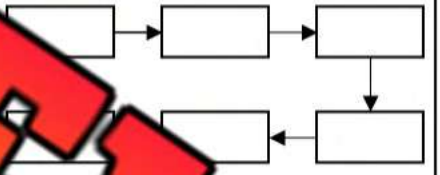
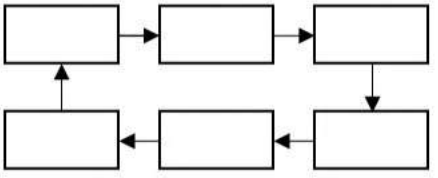
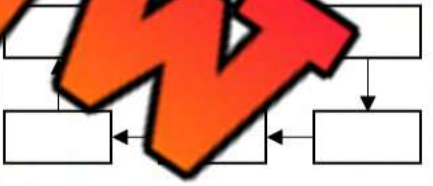
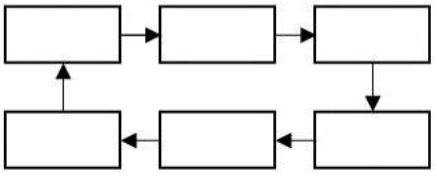
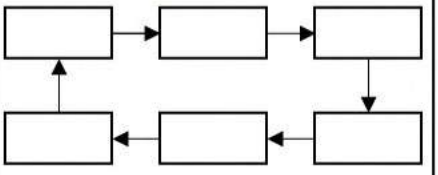
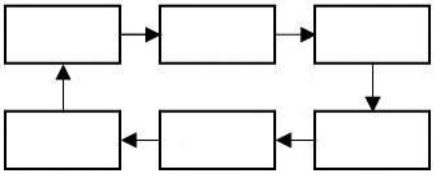
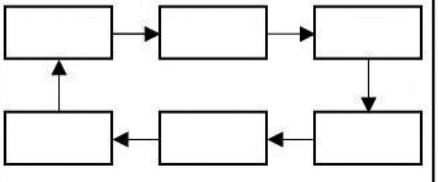
Steps to fill in a flow chart:

1) Write the variable in the first box
2) Write the second value in the second box
3) Write the answer in the third box
4) We are working in reverse now. Write the answer in the first box
5) We d[illegible] opposite to the next box as we did with the second box
6) Fill i[illegible]t box to find the value of the variable, which it points to

Example: $7t = 28$



Direc[illegible] [illegible]he blanks in the flow chart.

1) $7t = 28$		$12t = -84$	
2) $3r = 15$		[illegible] $= -55$	
3) $-9c = 36$		8) $-7c = 63$	
4) $-6b = -42$		9) $-12b = -132$	
5) $8p = -72$		10) $-9n = 63$	

Name: _____ 145

Curriculum Connection
C2.3

Writing Division Equations - Investments

An investment club is a group of investors who pool their money to make investments. Each member of the group helps study new investment opportunities. When an investment earns money, they split the earnings. When an investment loses money, they split the losses.

Instructions Use a formula to find out the balance for each person in the club.

#	Investment (i)	# of People in the Club (n)	Formula	Answer
1	00 loss	8	$\frac{i}{n}$ = t	$\frac{-400}{8}$ = -50
2	$600 ga			
3	$800 loss	5		
4	$1200 loss	8		
5	$ 750 gain	5		
6	$5000 gain	20		
7	$2500 loss	25		
8	$3600 loss	24		
9	$12500 gain	5		
10	$8000 gain	40		
11	$6800 loss	17		
12	$25000 loss	20		
13	$84000 gain	16		

Name: _____ 146

Curriculum Connection
C2.3

Division Equations – Flow Chart

Directions Fill in the blanks in the flow chart.

1) $\frac{t}{-6} = 4$	t → ÷ -6 → 4 -24 ← x -6 ← 4	7) $\frac{t}{8} = -4$	
2) $\frac{r}{-7} = 8$		8) $\frac{r}{-12} = 9$	
3) $\frac{c}{4} = -7$		9) $\frac{c}{-6}$	
4) $\frac{b}{11} = 6$		10) $\frac{b}{-15} = 4$	
5) $\frac{p}{-7} = -12$		11) $\frac{p}{8} = 12$	
6) $\frac{n}{-2} = -33$		12) $\frac{n}{-13} = -6$	

Name: _____ 148

Curriculum Connection
C2.3

Mixed Operations - BEDMAS

When solving an equation, you need to follow the order of operations. This means you have to solve the equation in the correct order, not just from left to right. Using BEDMAS helps us remember the order to solve.

1. Brackets 2. Exponents 3. Division or Multiplication (whichever is first) 4. Addition or Subtraction (whichever is first)

Exam
2 + (
2
n

Example 2
n - (2 x 3) = 4
n - 6 = 4
n = 10

Example 3
(4n) - 8 = 20
4 x 7 - 8 = 20
n = 7

Questions

out t e variables using BEDMAS.

1) 9 + (4 x 5) = n	– (	3) (9 x 6) + (12 ÷ n) = 58
4) n + (32 ÷ 8) = 12	5) 5(2 + p) = 45	9n ÷
7) 48 ÷ t + (7 + 11) = 24	8) 32 – (3n + 16) = 1	9) 24 – (n x 5) = 4
10) $\frac{18 + n - 4}{4} = 5$	11) $\frac{9n + 9}{3} = 24$	12) 24 – 15 + (t x 3) = 27

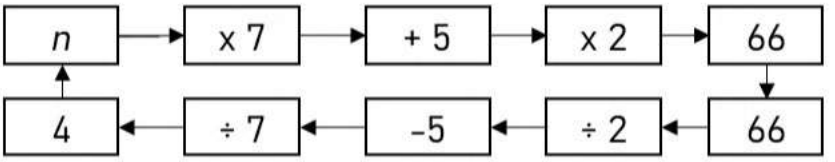
Name: _____ 149

Curriculum Connection
C2.3

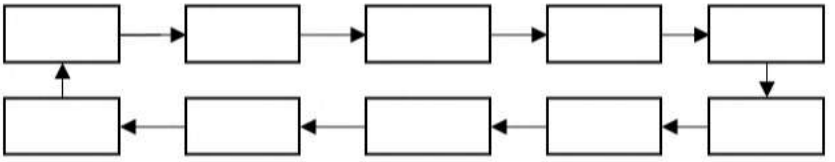
Division Equations – Flow Chart

Directions Fill in the blanks in the flow chart.

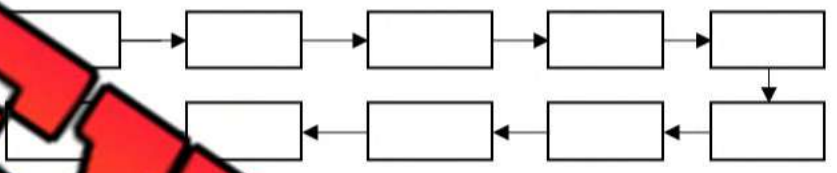
1) $2(5 + 7n) = 66$



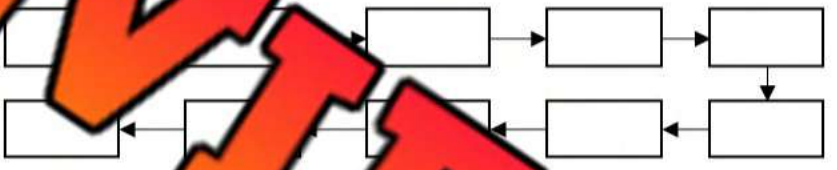
2) $3(1$



3) $-5(4t - 31) =$

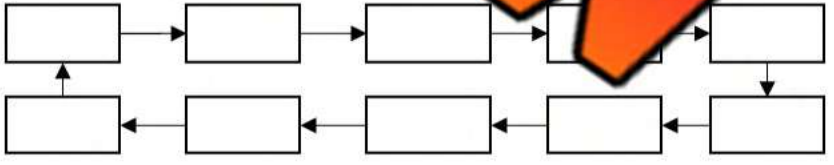


4) $-4(\frac{8r}{2} - 6) = -24$

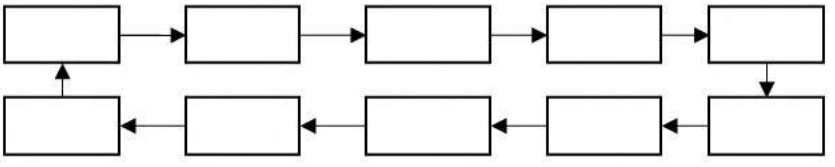


5) $8(3 + 4n) = 88$

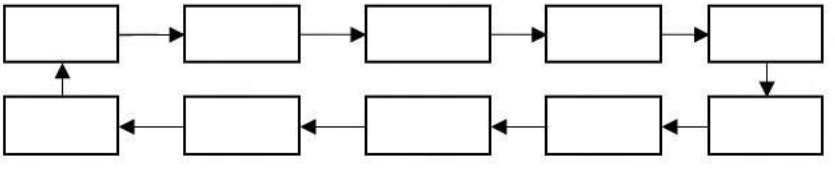
6) $-2(3 - 7y) = 36$



7) $\frac{6 + 6r}{2} = 15$



8) $-3(3n - 6) = 45$



Name: _____ 150

Curriculum Connection
C2.3

Mixed Operations - BEDMAS

Questions Find out the value of the variables using BEDMAS.

1) $-3(y + 6) = -30$	2) $3(11 - 4) + t = 35$	3) $8 + 4 \times 3 + (p) = 15$
4) $-5($ [illegible]	5) $11 - 4 + (n \times 8) = -41$	6) $8(7 + 4) - p = 61$
7) $\frac{49}{4+3} + t = 22$	[illegible]	9) $p + 28 + 12 \div 3 = 40$
10) $-5n - (49 \div 7) = -47$	11) $\frac{7t+6}{9}$ + (– [illegible]	[illegible] $12 \times 5 + p = 23$

Word Problem Write the equation for the situations below and answ[illegible]e question.

1) Calvin went to the mall with $65. He bought 3 video games for n number of dollars. He then bought a drink for $4. He left the mall with $16? How much did each video game cost?

2) Freya ordered two slices of pizza and one soda for lunch. A slice of pizza is $3.50, and a soda is $2.00. Freya did the math below. What did she do wrong?

$3.50 + $2.00 x 2 = ?
$5.50 x 2 = $11.00

Name: _____ 152

Curriculum Connection
C2.3

Mixed Operations - BEDMAS

Word Problems Write the equation for the situations below and answer the question.

1) Omar is building his YouTube channel. He has some videos on his channel already and made 3 more last weekend. If he triples the number of videos he has, he will have 45 videos in total.

a) Write an equation that represents the problem.

b) How many videos did Omar start with?

2) A group of 9 friends went to the movies. Each movie ticket costs $11. All 9 friends decided to get the same popcorn and pop combo. The total cost for the 9 friend's tickets and drink/popcorn combos was $171.

a) Write an equation that represents the problem.

b) How much did each drink and popcorn cost?

3) A basketball team gets 2 points for a win, 1 point for a tie, and 0 points for a loss. The Vaughan Panthers ended the season with 42 points. They tied 4 games.

a) Write an equation that represents the problem.

b) How many games did they win?

c) If they played 30 games in total, how many games did they lose?

Name: _____ 153

Curriculum Connection
C2.4

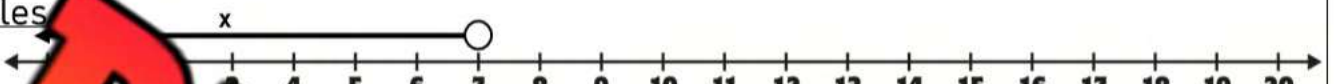
Introduction to Inequalities

Inequalities are used to tell the relative size of two expressions or numbers. We can use the greater than sign (>), or the smaller than sign (<). We can also use a new sign (≥) to show that a value is equal to or greater/less than the other value.

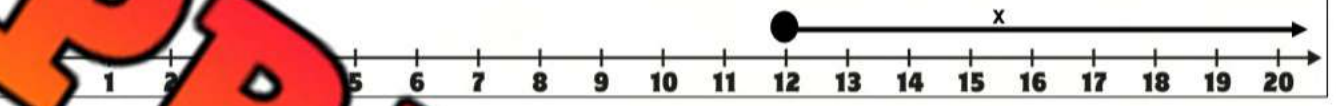
We often use a number line to graph the range of values that hold true for an inequality. An open dot on a number line is used when an inequality involves "less than" or "greater than", and a closed dot is used when it also includes "equal to".

Examples

X < 7



X ≥ 1



Questions

For the inequality on the number line and write the word form.

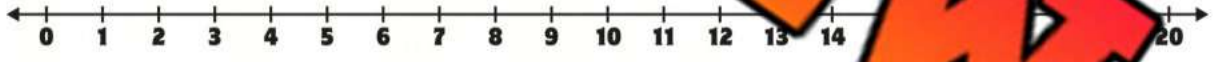
1) X ≥ 6

Word Form - x is greater than or equ

2) X ≤ 11

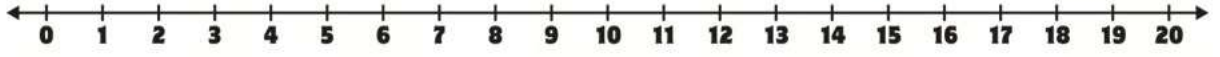
Word Form - _____

3) X < 9



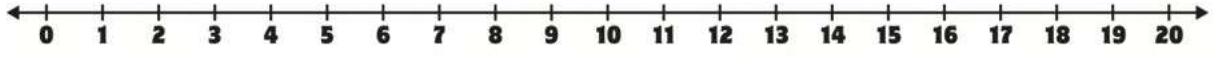
Word Form - _____

4) X > 15



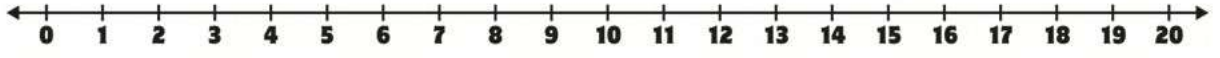
Word Form - _____

5) X ≥ 7



Word Form - _____

6) X ≤ 8



Word Form - _____

Name: _____ 154

Curriculum Connection
C2.4

Inequalities – Multiple Choice

Questions Circle the values that satisfy each inequality.

1) $x > 48$

45 [illegible] 52 -45

2) $x < 31$

30 33 -8 -32

3) [illegible]

21 [illegible]

4) $x > 75$

74 -76 75 76

5) $x < -5$

-5 -6 -4 5

$x \leq 99$

[illegible] 97 -2

7) $x > -27$

-28 -26 -27 -30

8) [illegible]

-42 -40 [illegible]

9) $x \leq 79$

80 78 81 79

10) $x > -84$

-83 -85 -84 -86

11) $x < 87$

88 86 85 -87

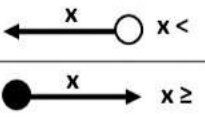
12) $x < 145$

-144 145 -146 143

Name: _____ 155

Curriculum Connection
C2.4

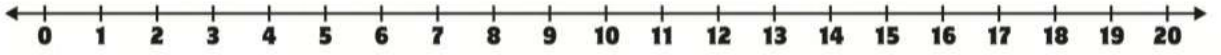
Introduction to Inequalities



Part 1

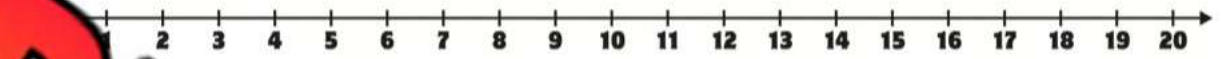
Graph the inequality on the number line and write the word form.

1) X > 9



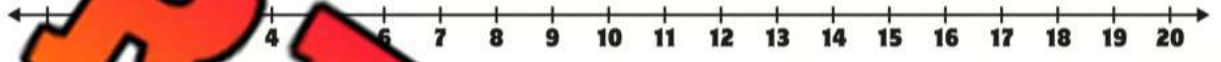
Word Form - _____

2) X ≤ 5



Word F_____

3) X < 1



Word Form - _____

4) X > 7

Word Form - _____

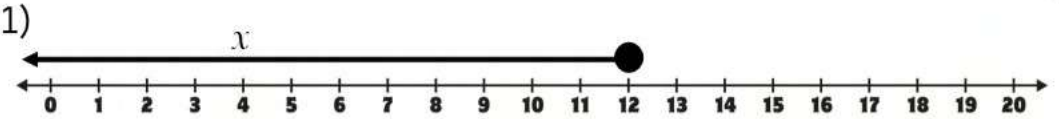
5) X ≥ 14

Word Form - _____

Part 2

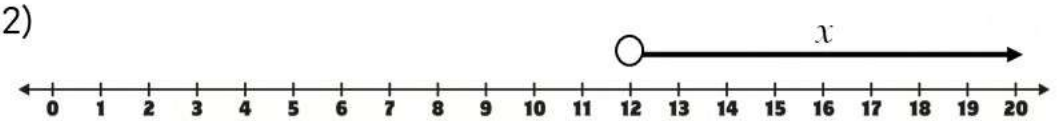
Write the inequality shown by each numb_____ line.

1)



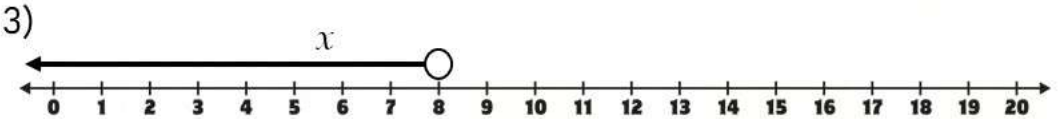
_____nswer _____

2)



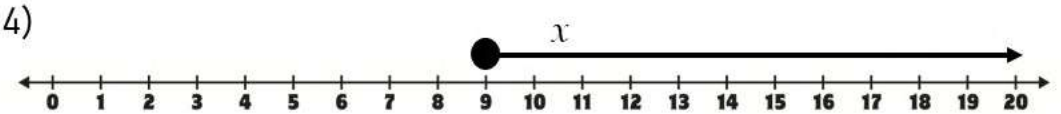
Answer _____

3)



Answer _____

4)



Answer _____

Name: _____ 157

Curriculum Connection
C2.4

Inequalities in a Set - Addition

Questions Which numbers in the set satisfy the inequality.

1) Solve the inequality $x \leq 8$ in the set (6, 10, 7, 8, 13, 15, 0)

Numbers that fit: 0, 6, 7, 8

2) Solve the inequality $x + 12 \leq 19$ in the set (8, 4, 7, 9, 3, 6, 10)

Numbers that fit: _____

3) Solve the inequality $x + 6 \leq 15$ in the set (-15, -25, -30, -10, -20, -22)

Numbers that fit: _____

4) Solve the inequality $x + 47 \leq 50$ in the set (39, 36, 40, 43, 32, -8)

Numbers that fit: _____

5) Solve the inequality $x + 8 \leq -21$ in the set (-35, 22)

Numbers that fit: _____

6) Solve the inequality $x + 47 > 56$ in the set (-9, 10, 11, 8, 9, 12)

Numbers that fit: _____

7) Solve the inequality $-23 + x > -35$ in the set (-10, -15, 12, 16, 22, -13)

Numbers that fit: _____

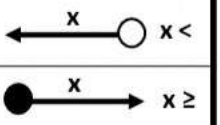
8) Solve the inequality $-32 + x < -41$ in the set (-10, -12, 15, 9, -11, -8, -9)

Numbers that fit: _____

Name: _____ 158

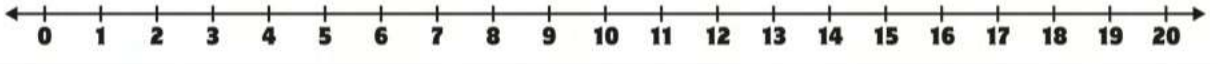
Curriculum Connection
C2.4

Solving Inequalities - Subtraction

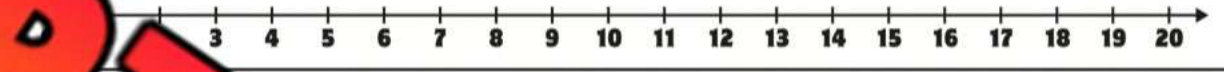


Questions Graph the subtraction inequalities using the number line.

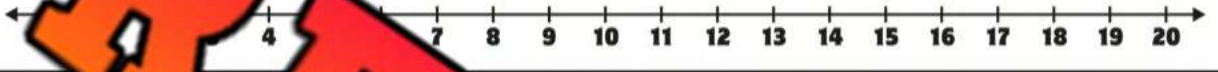
1) $14 - x > 9$



2) $17 - x$



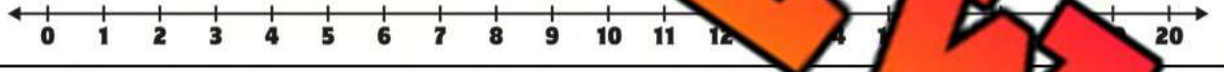
3) x



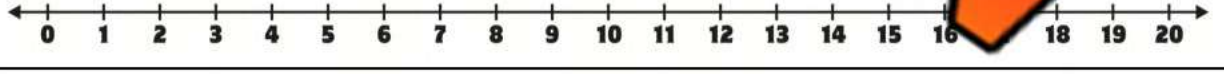
4) $x - 11 \leq -8$

5) $-12 - x \geq 4$

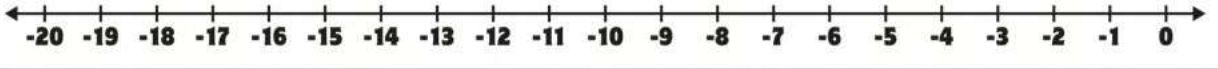
6) $8 - x > -6$



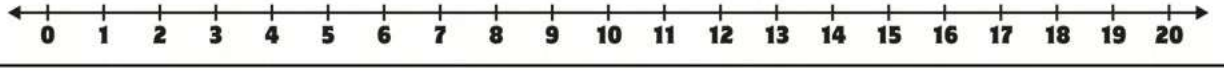
7) $x - 6 > -5$



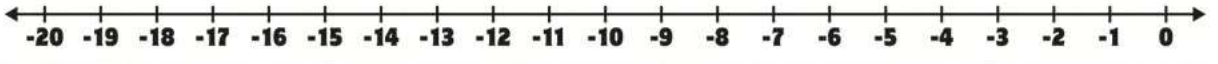
8) $(-4) - x \geq 8$



9) $12 - x > -4$



10) $x - 3 \leq -9$



Name: _____ 160

Curriculum Connection
C2.4

Inequalities – Adding and Subtracting

Questions Solve the inequalities below.

1) $x > 9 + 14 - 5$

x > 18

2) $x < 7 \times 4 - 11$

3) $x \leq 30$ [illegible] 5

4) $x \geq 25 - 4 \times 3$

5) $x < 6 + 5 - 5 \times$ [illegible]

$x \leq 14 + 3 - 23$

7) $x > 8 \times 5 \div (-2)$

8) (2 [illegible] 7

9) $x \leq 24 \div 6 \times (-5)$

10) $x > 61 - 6 + (-15)$

11) $x < -5(4 + 6)$

12) $x < -8(32 \div 8)$

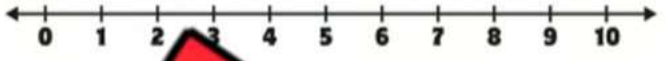
Name: _____ 162

Curriculum Connection
C2.4

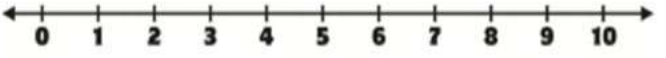
Graphing Inequalities – Multiple Operations

Questions Graph the inequalities on the number line.

1) $x > 8 + 5 - 7$

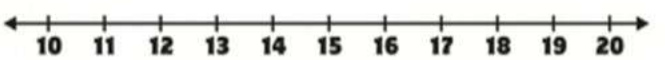


2) $x < 16 - 4 + (-7)$

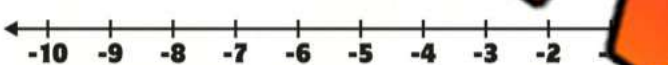


3)

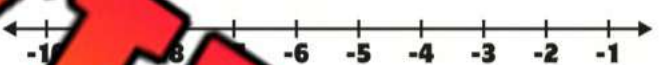
4) $x > 7 - 9 + 15$



5) $x \geq (-2) \times 5 + 3$



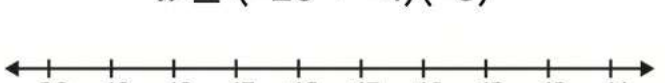
$x \leq 6 \div (-2) - 4$



7) $x > (-7) \times 2 + (-5)$

8)

9) $x \leq (-20 \div -4)(-3)$



10) $x > -15 + 13 - 12$

11) $5(10 \times 2) \div 2 < x$

12) $44 \div 4 \times 8 - 30 > x$

Name: _____ 163

Curriculum Connection
C2.4

Inequalities – Isolating the Variable

Steps to isolate a variable:

1. Add or subtract the same amount from both sides so that the variable is by itself
2. If the number that is with the variable is positive, you will subtract the same number from both sides.
3. If it is negative, you will add the number to both sides.
4. Since we want the variable on the left, we might need to flip it to the other side at the end. When we do this, we switch the inequality sign from < to > or from > to <.

Examples

$x - 14 \leq 9$
$x + 14 \leq 9 + 14$
$x \leq 23$

$15 > x + 9$
$15 - 9 > x + 9 - 9$
$6 > x$
$x < 6$

Questions

Solve the inequalities below.

1) $x - 5 < 15$

$x + 17 < 31$

3) $x + 12 \leq 25$

4) [illegible]

5) $9 < x + 13$

6) $24 \leq x - 15$

7) $x + 32 > 25$

8) $48 < x + 56$

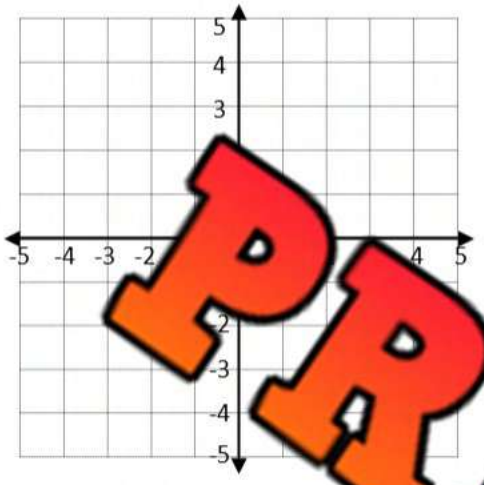
Name: _____ 165

Curriculum Connection
C2.4

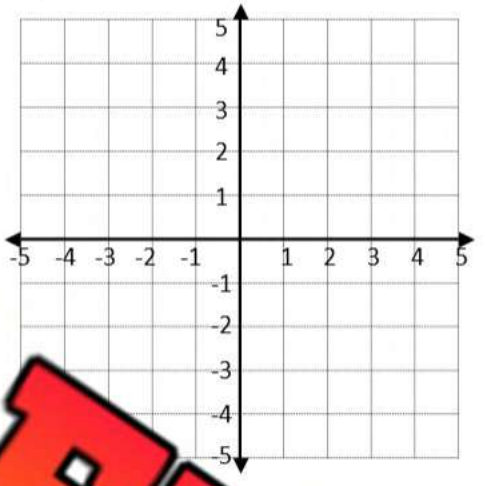
Graphing Inequalities – Cartesian Plane – One Variable

Questions Graph the inequalities on the cartesian plane.

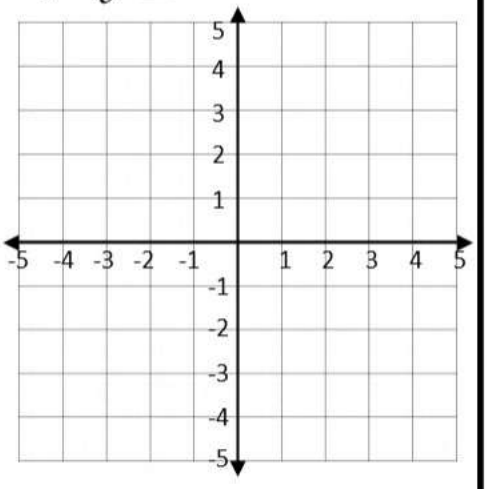
1) $x > 4$



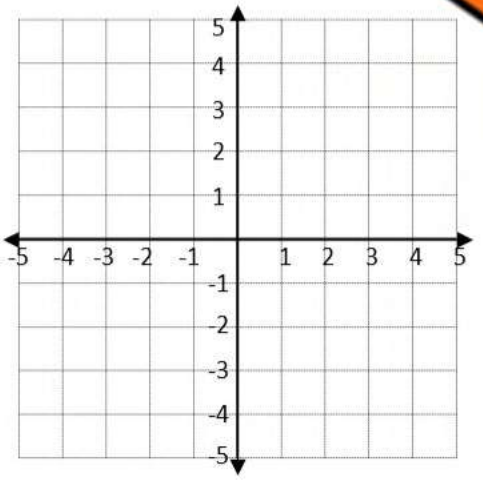
2) $x < -2$



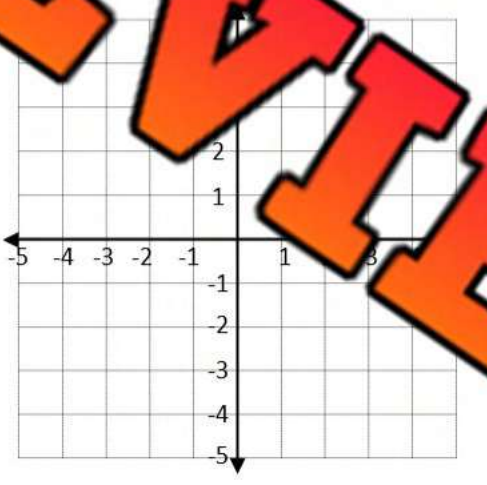
3) $y \leq 4$



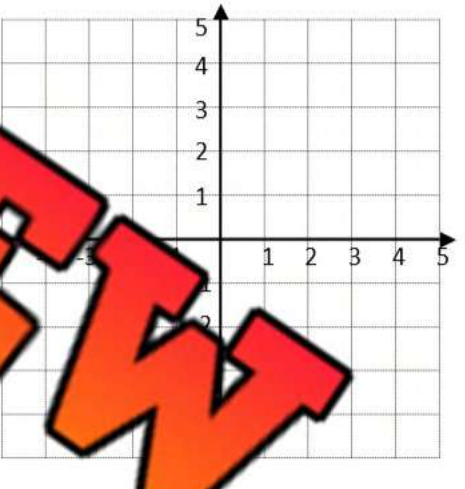
4) $3 + x > 6$



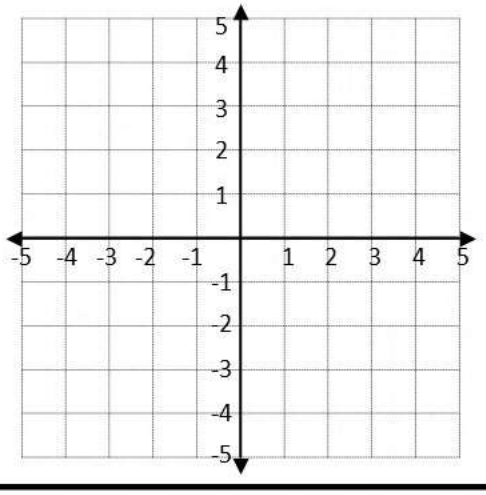
5) $x -$



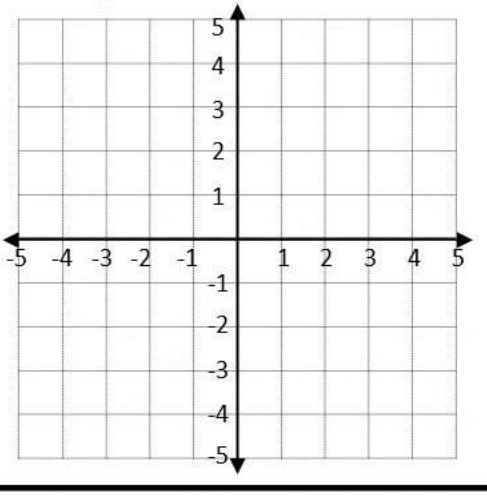
6) $y + 5 \leq 7$



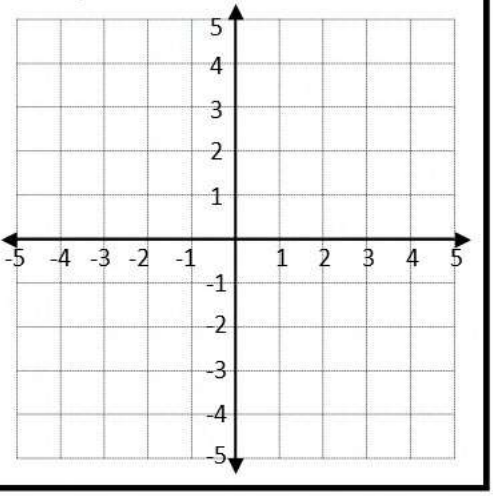
7) $9 + x \geq 11$



8) $y - 6 < -2$



9) $y + (-2) \leq -1$



Name: _____ 167

Curriculum Connection
C2.4

Linear Equations – Table of Values

A **linear equation** is an equation that is written for two different variables. The variables have a relationship where they increase or decrease at the same rate. This means when the variables are plotted on a graph, the line will be straight.

It is helpful to use a table of values to represent the values of both variables. This allows us to see the relationship between the variables. We can find any missing value by using an equation that represents the relationship between the variables. A related pair of *x* and *y* values is called an ordered pair.

Practice Complete the tables using the equations below.

x	*y*
1	
2	14
3	20
4	
5	
6	

1) $y = 6x + 2$

x	*y*
1	-2
2	1
3	
4	
5	
9	

2) $y = 3x - 5$

x	*y*
1	
2	
3	
4	
5	

x	*y*
1	
2	
3	
4	
5	
9	

4) $y = 4x - 7$

x	*y*
1	
2	
3	
4	
5	
10	

5) $y = -3x - 4$

x	*y*
1	
2	
3	
4	
5	
11	

6) $y = 5x - (-8)$

Name: _____ 168

Curriculum Connection
C2.4

Linear Equations – Table of Values

Practice Write the equation that represents the relation between x and y.

x	y
1	2
2	9
3	16
4	
5	
6	

1) _____

x	y
1	-7
2	-11
3	-15
4	-19
5	
9	

_____

x	y
1	-3
2	0
3	3
4	6
5	
11	

3) _____

x	y
1	5
2	0
3	-5
4	-10
5	
9	

4) _____

x	y
1	-2
2	
3	
4	16
5	
10	

5) _____

x	y
1	-7
2	-18
3	-29
	-40

6) _____

Practice Read the problem and represent it in the table of values.

An ice cream shop sells cones for $3 and toppings for $2 each. An equation for this relation is $y = 2x + 3$ where the 3 dollars is constant, and the x represents how many toppings are chosen.

a) Fill in the table of values

b) Fill in the ordered pairs below – Remember (x, y)

(1, ___) (2, ___) (3, ___) (8, ___) (12, ___) (20, ___)

x	y
1	
2	
3	
4	
5	

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Curriculum Connection
C2.4

Linear Equations – Table of Values

Practice Make a table of values for each relation.

1) $y = 3x + 2$

2) $y = 5x - 6$

3) $y = -2x + 3$

4) $y = 4x - 2$

6) $y = -7x - 8$

Challenge Can you determine the equation using the

These ordered pairs are in the same linear relation: (-2, -4), (0, 4), (2, 12), (4, 20)

a) What is the equation that represents the values in the ordered pairs?

b) Fill in the missing value in the ordered pairs.
(1, ___), (3, ___), (8, ___), (-4, ___), (-8, ___), (___, 56) ,(___, -56)

c) Fill in the table of values for the linear relation.

x	-6	-3	0	5	7	12	15	20
y								

Name: _____ 171

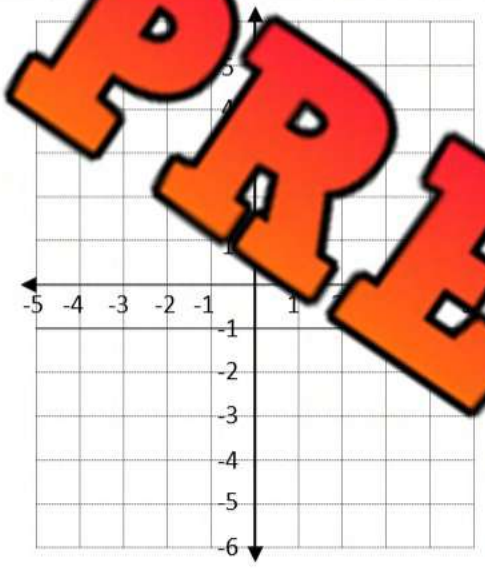
Curriculum Connection
C2.4

Linear Equations – Graphing 2 Variables

Instructions Fill in the table of values and then graph the results using ordered pairs.

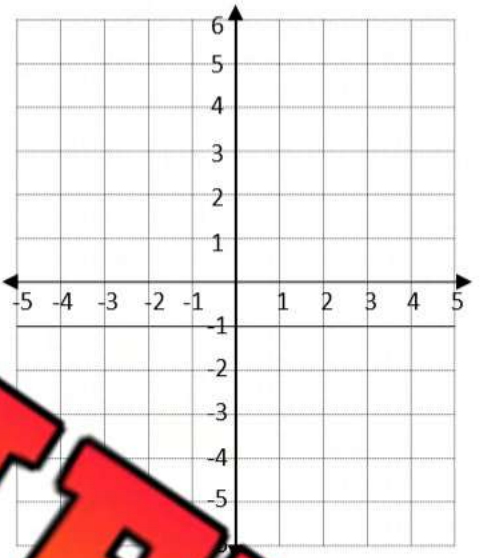
1) $y = 2x - 2$

x	0	1	2	3	4
y					



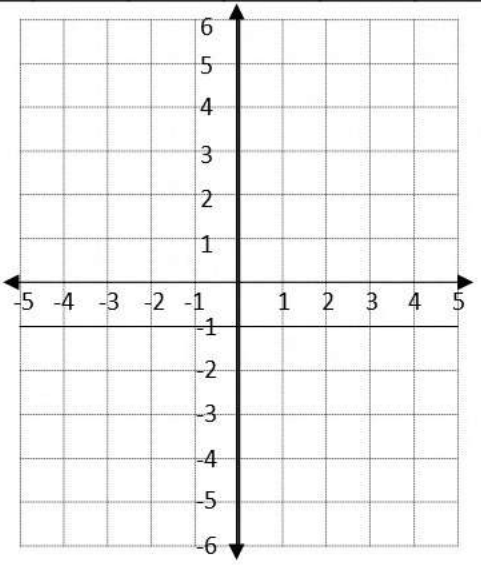
2) $y = 3x - 6$

x	0	1	2	3	4
y					



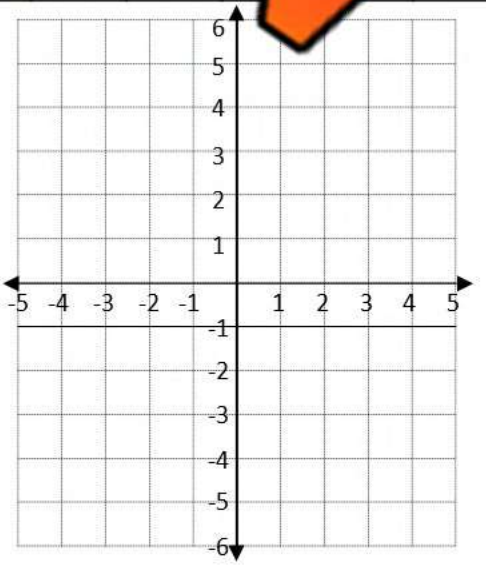
3) $y = -x + 2$

x	0	1	2	3	4
y					



4) $y =$ 3

x		1			
y					



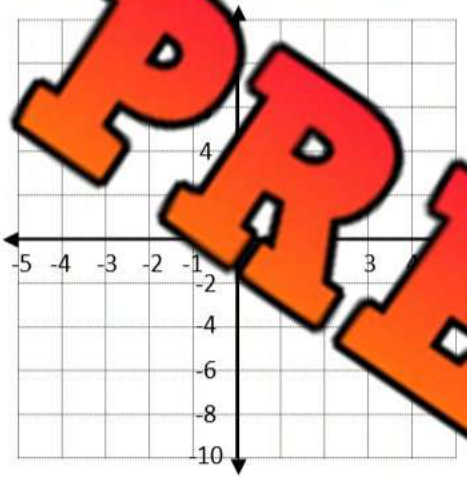
Name: _____ 173

Curriculum Connection
C2.4

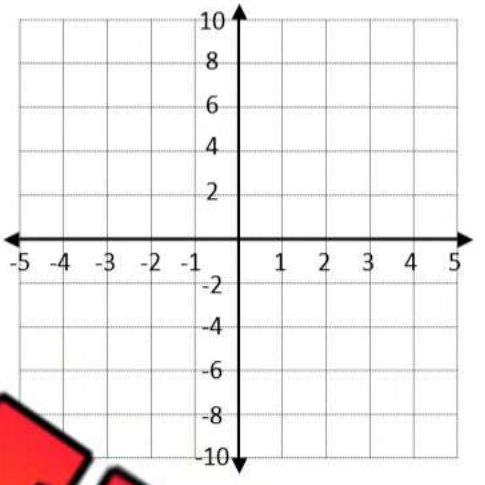
Linear Equations – Graphing 2 Variables

Instructions Graph the equations below. Create a table of values if necessary.

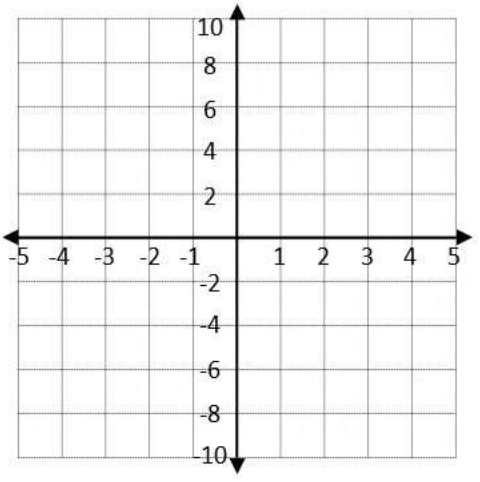
1) $y = 3x - 4$



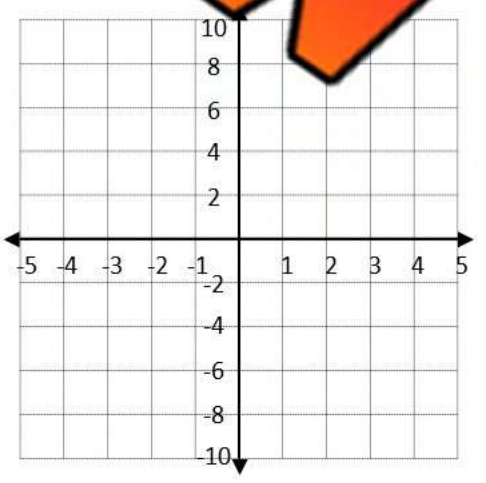
2) $y = -4x + 10$



3) $y = -3x + 8$



4) $y = 4$



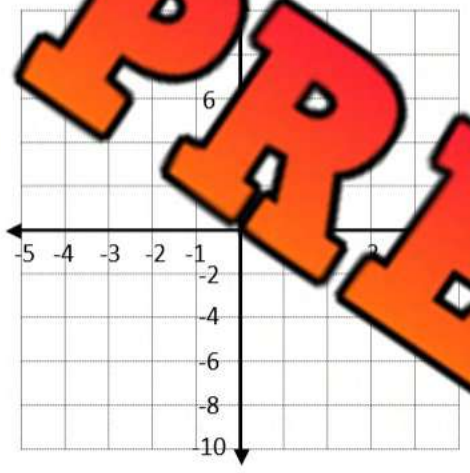
Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Graph the equations below.

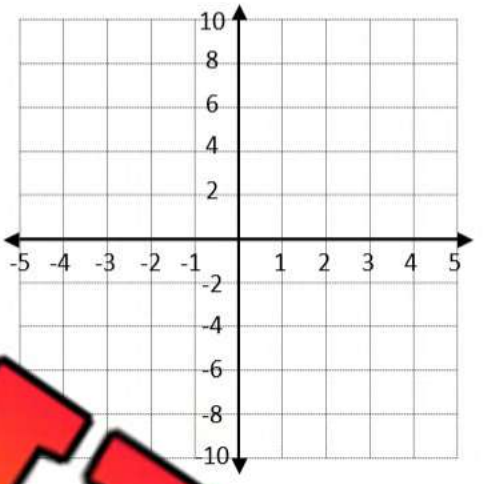
y = -6x +



Name: _____

Graph the equations below.

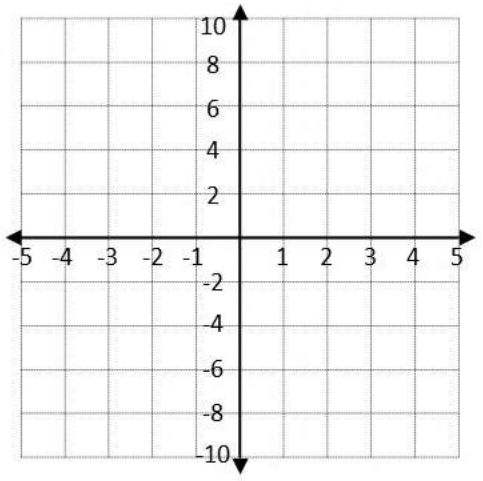
y = -6x + 4



Name: _____

Graph the equations below.

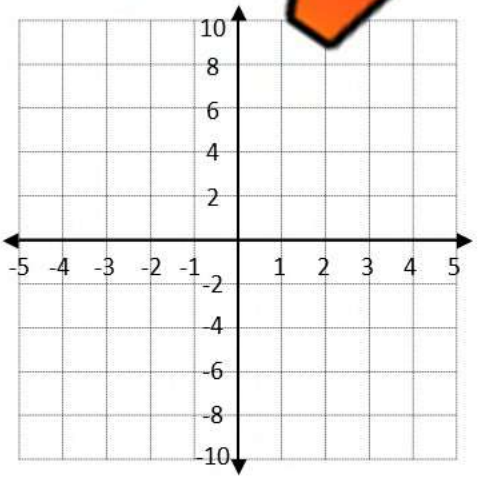
y = -6x + 4



Name: _____

Graph the equation

y = -6x + 4



Name: _____ 176

Curriculum Connection
C2.4

Linear Equations – Graphing 2 Variables

Instructions Fill in the table of values and then graph the results using ordered pairs.

Matt is hosting a pizza party. He will buy 2 slices for each person coming and 4 extra slices in case someone shows up unexpectedly. He determined an equation that will help him decide how many slices to buy: $y = 2x + 4$

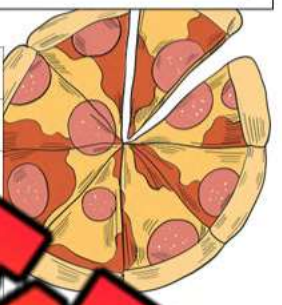
a) Fill in the table of values using the equation above.

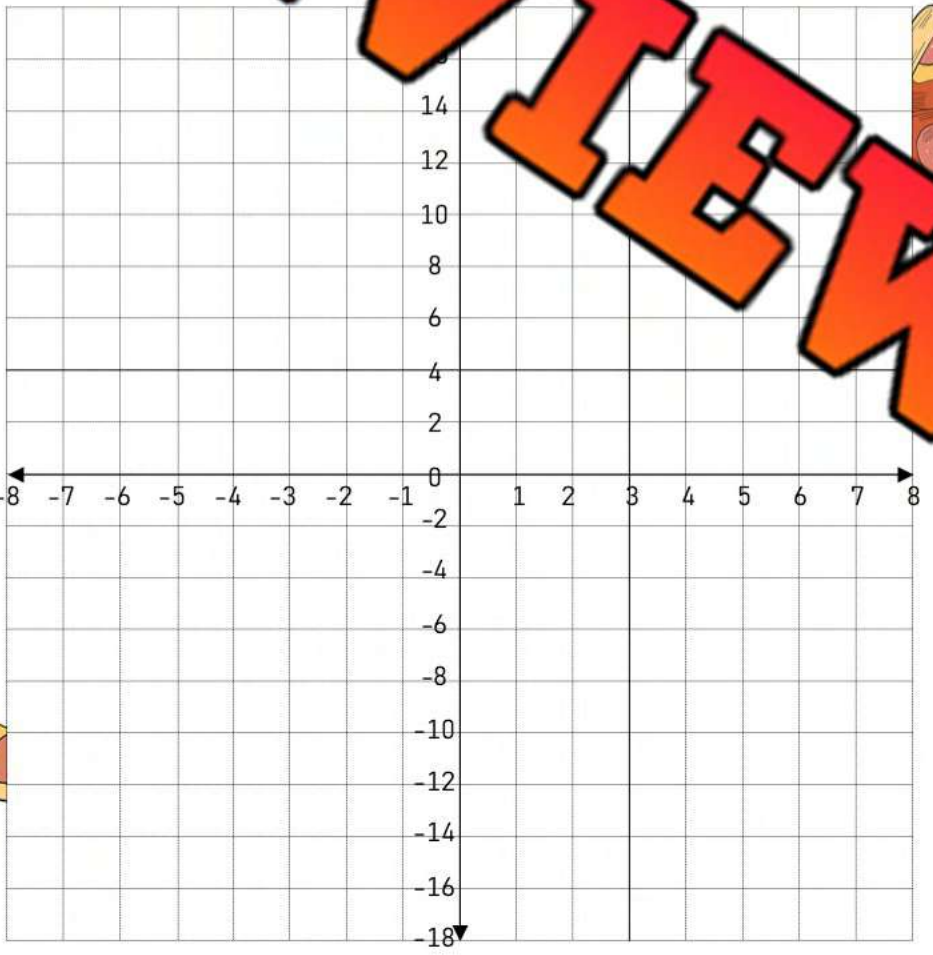
x	0	1	2	3	4	5	6
y							

b) Represent the values on the graph. Connect the dots using a line. Is the relation linear? Explain.

_____

_____





Name: _____ 177

Curriculum Connection
C2.4

Linear Equations – Graphing 2 Variables

Instructions Fill in the table of values and then graph the results using ordered pairs.

Hadley sells her homemade scarfs at a flee market. It costs her $10 to rent a table but she makes $5 each hour she is there. She uses the following equation to represent her earnings: $y = 5x - 10$

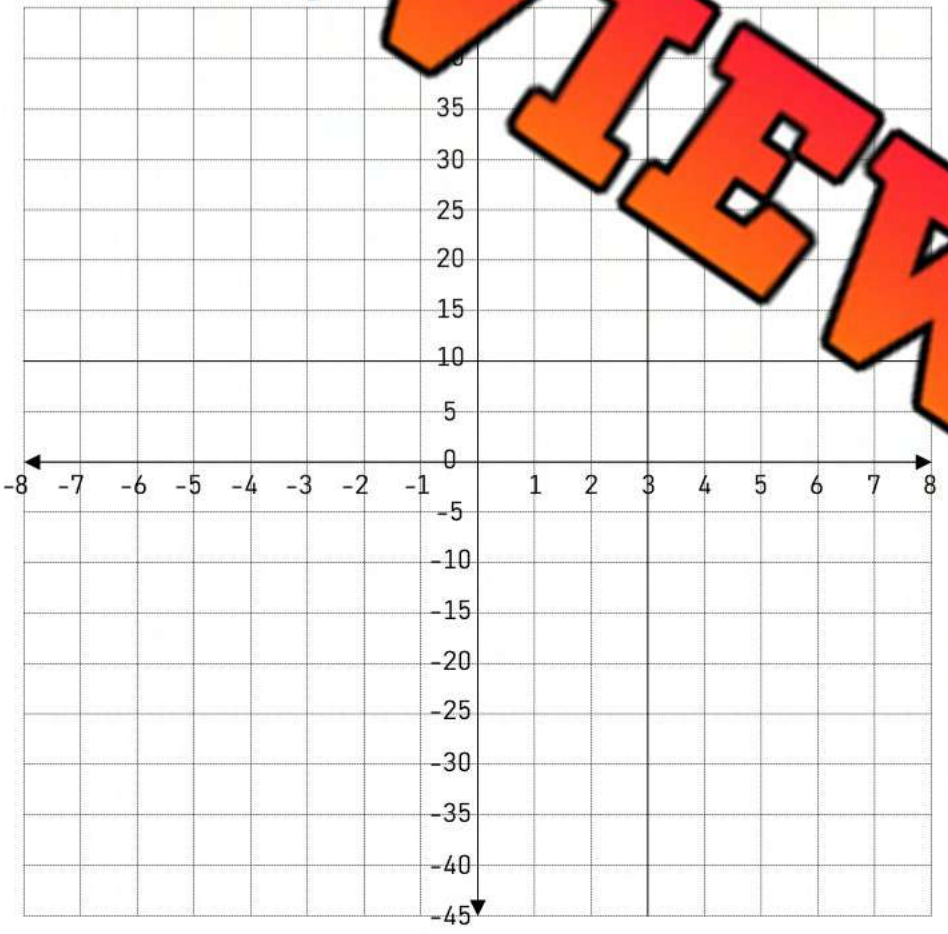
a) Fill in the table of values using the equation above.

x		2	3	4	5	6	7	8
y								

b) Represent the values in the table on the graph. Connect the dots using a line.

c) Fill in the missing values in the ordered pairs below

(10, ___), (20, ___), (, ___), (, 80), (___, 100), (___, 150)



Name: _____ 178

Curriculum Connection
C2.4

Linear Inequalities – Boundary Line

When we graph an inequality on a cartesian plane, we use a dashed line or a solid line depending if the inequality is greater/less than or greater/less than or equal to.

Greater/less than or equal ≤ ≥	Greater/less than < >
———	- - - - - - - - - - - -

Part 1 s the inequalities require a dashed or solid boundary line?

	In	Dashed or Solid Boundary Line?
1)		
2)	-3	
3)	$11 \geq$	
4)	$y - 7 \geq 13$	
5)	$y > 6 + 16$	

If the inequality uses a greater than or equa we s the line. When we have a less than or equal sign, we shade **be** th

Part 2 Fill in the table below.

	Inequality	Dashed or Solid Boundary Line?	Shade or Below
1)	$x \geq 9$		
2)	$y < 5$		
3)	$12 - (-4) \geq x$		
4)	$9 + x \leq 25$		
5)	$15 - y < 25 + 3$		
6)	$x + 12 - 6 > 29$		
7)	$8 + 6 - y < 31 + 5$		
8)	$y - 5 \geq 11 \times 6 - 8$		

Name: _____ 179

Curriculum Connection
C2.4

Linear Inequalities – Boundary Line

Questions Fill in the table below.

	Inequality	Simplify (if necessary)	Dashed or Solid Line	Shade Above or Below
1)	> 15			
2)				
3)	$13 \leq$			
4)	$11 + x \geq 15 \times 2$			
5)	$9 + (-5) > y + 9$			
6)	$8 < 32x$			
7)	$5 + y \geq \frac{48}{-6}$			
8)	$7 > \frac{56}{7} + y$			
9)	$y \geq 25 + \frac{-48}{12}$			
10)	$13 - 5 < -2x$			

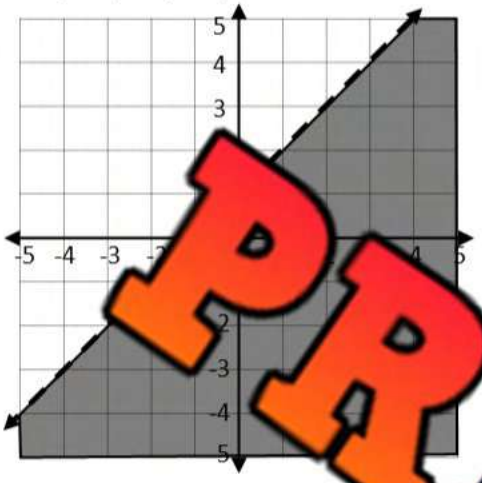
Name: _____ 180

Curriculum Connection
C2.4

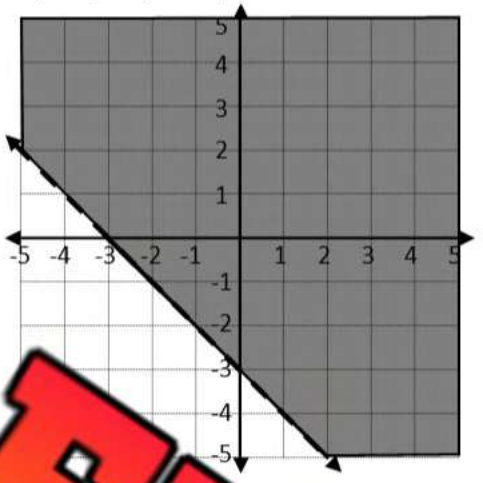
Linear Inequalities – Order Paris

Questions Circle whether the ordered pair is a solution of the graph.

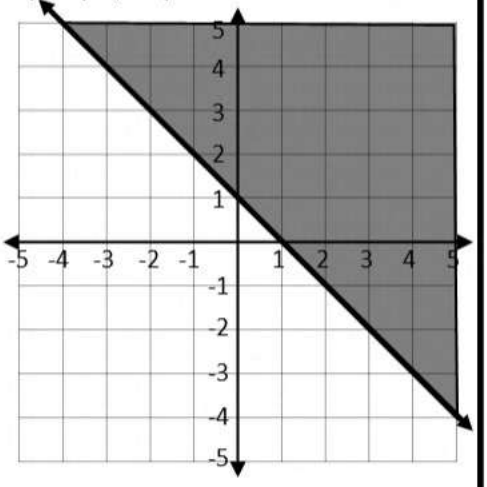
1) (-3, 2) Yes No



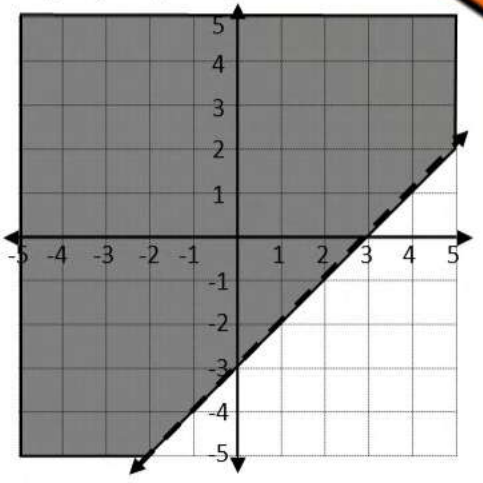
2) (-4, -2) Yes No



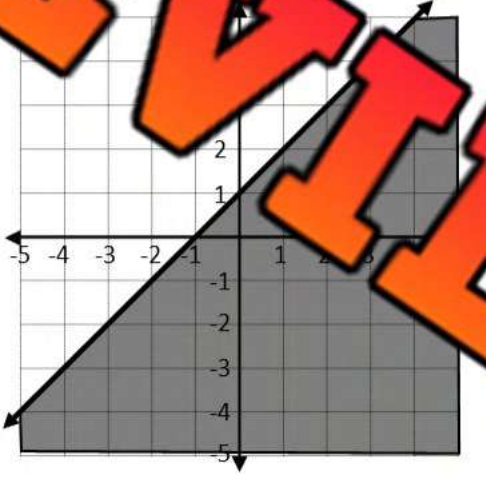
3) (3, 4) Yes No



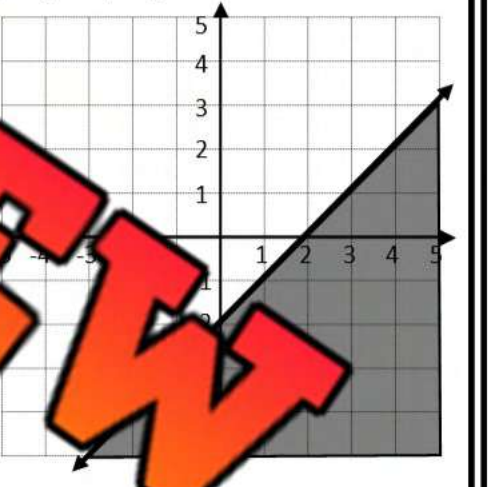
4) (-5, -5) Yes No



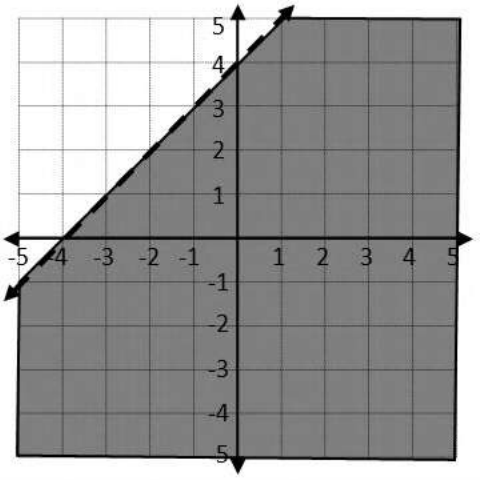
5) (2, 4) Yes No



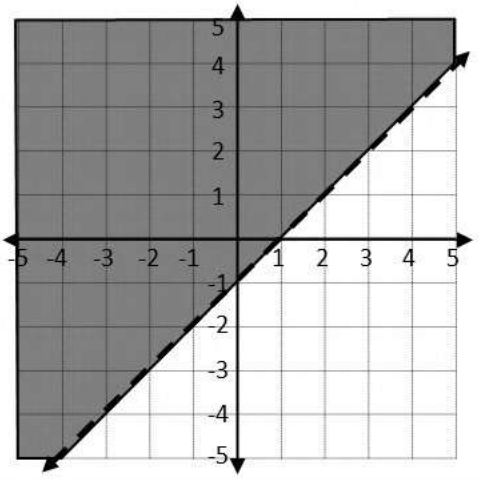
6) (-3, 0) Yes No



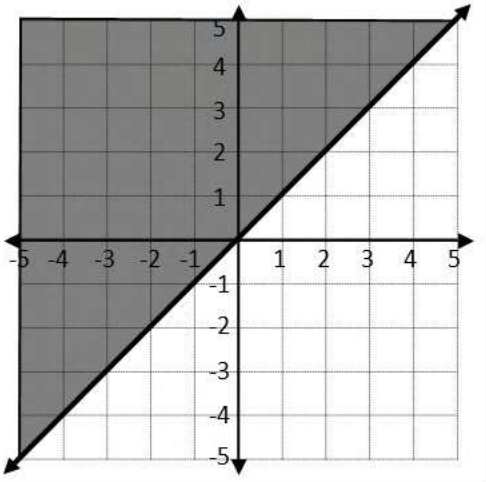
7) (0, 4) Yes No



8) (-2, -4) Yes No



9) (0, 0) Yes No



Name: _____ 181

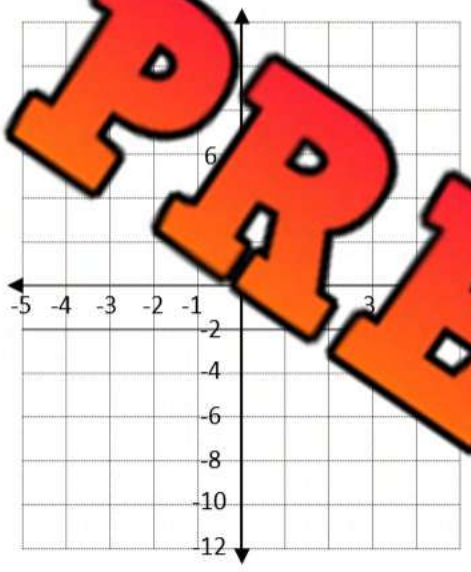
Curriculum Connection
C2.4

Graphing Inequalities – Two Variables

Questions Fill in the table of values and then graph inequalities.

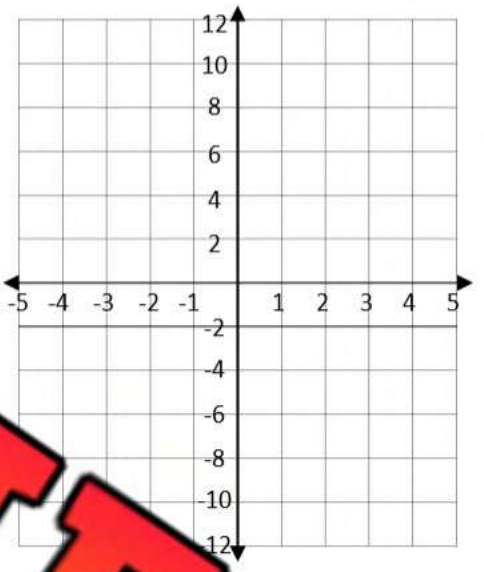
1) $y > -2x - 2$

x	0	1	2	3	4
y					



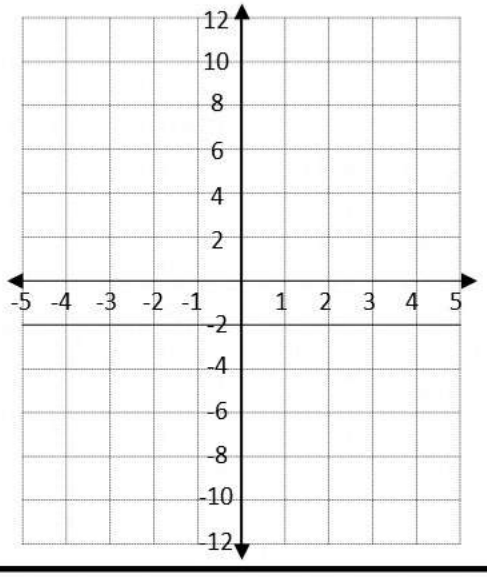
2) $y < -x + 4$

x	0	1	2	3	4
y					



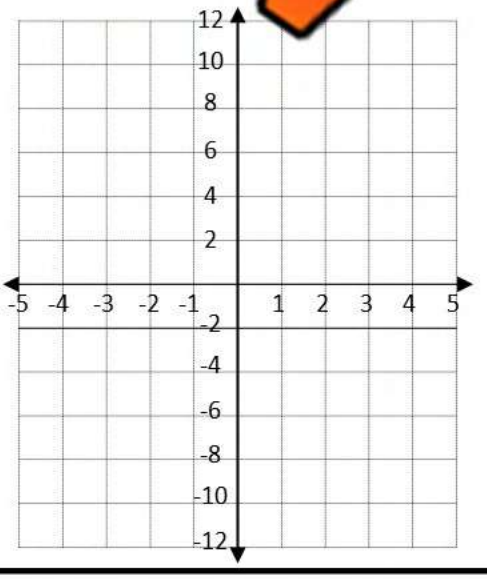
3) $y \geq -3x + 4$

x	0	1	2	3	4
y					



4) $y \leq$ 4

x		1			
y					



Name: _____ 182

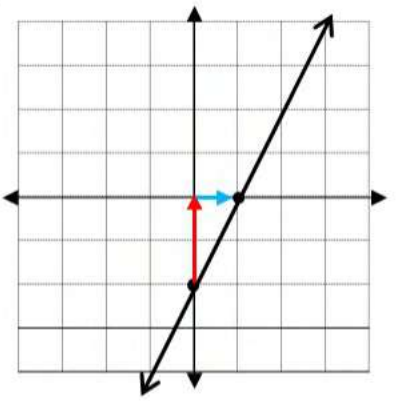
Curriculum Connection
C2.4

Rise Over Run - Slope

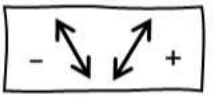
The **slope** of a line is how steep the line is. We can determine the slope of a line by remembering 'rise over run'.

$$\frac{\textbf{Rise}}{\textbf{Run}}$$

In the example to the right, we can see the rise is 2, and the run is 1. This means our slope is $\frac{2}{1}$ or 2.

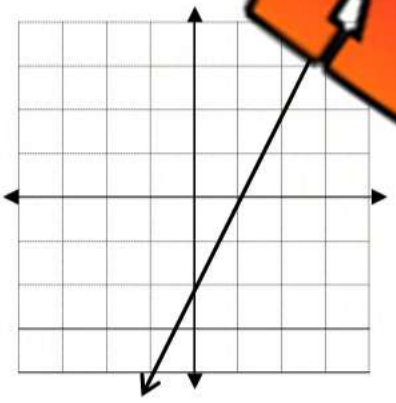


If a line increases from left to right, it is positive.
If it decrea[illegible] from left to right, it is negative.



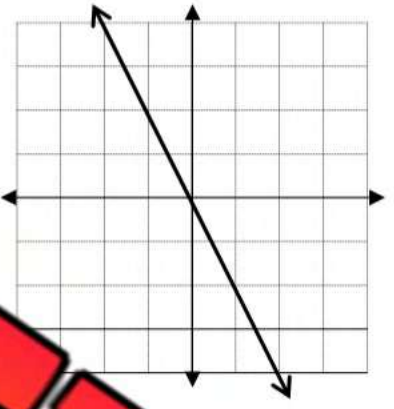
Questio[illegible]t the slope of each line? Use arrows to label the rise and run.

1

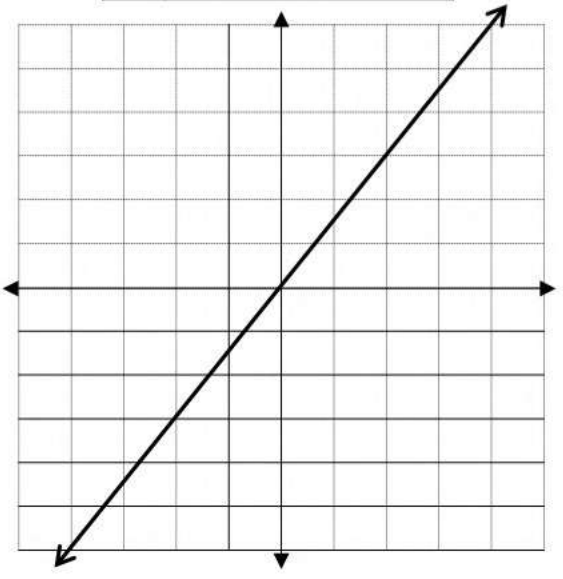


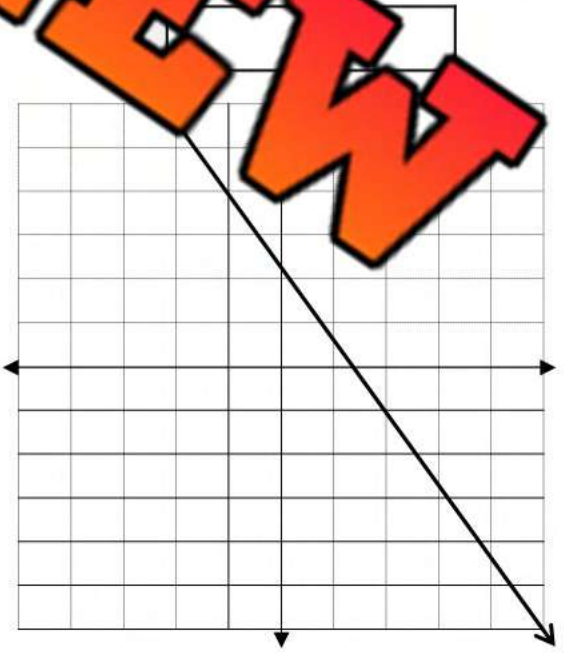
2

3



4





6) Write 4 ordered pairs from question 5.

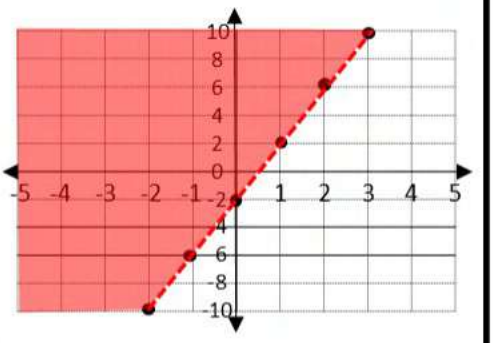
Name: _____ 183

Curriculum Connection
C2.4

Graphing Inequalities – Two Variables

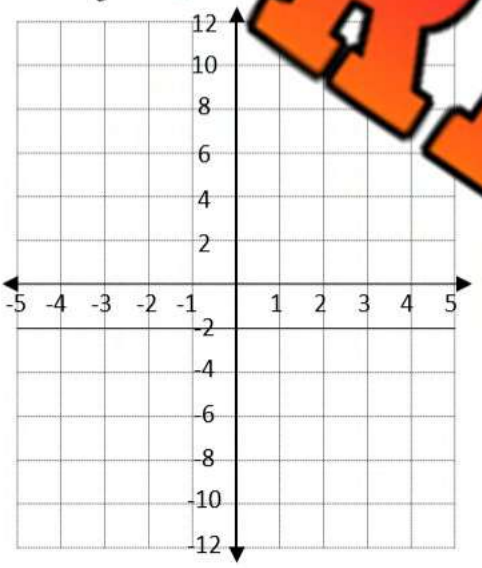
Example - $y > 2x - 2$
The slope is 2 and the constant is -2.

Steps:
1) The y-intercept is -2. Plot a dot on the y-axis at -2
2) The slope is 2. Go up 2 and right 1
3) Plot the next coordinates going up 2 and right 1
4) Once you have 3 coordinates plotted, you can draw your line using dashes if > or < and solid if ≥ or ≤.

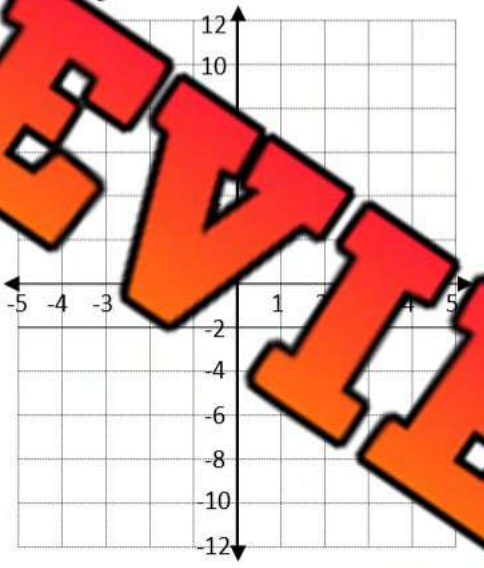


Question: Graph the inequalities on the cartesian planes below.

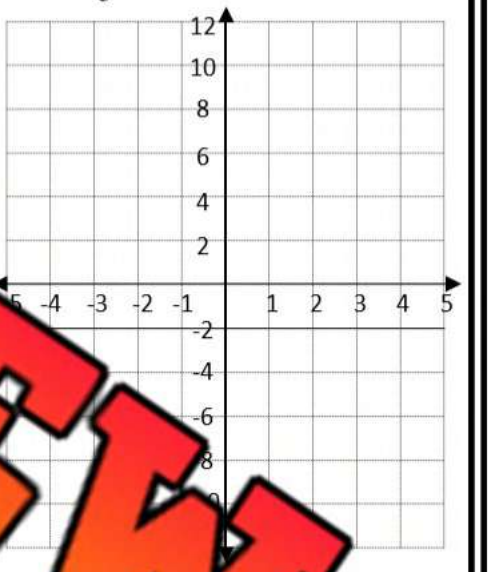
1) $y \leq \frac{1}{2}x - 3$



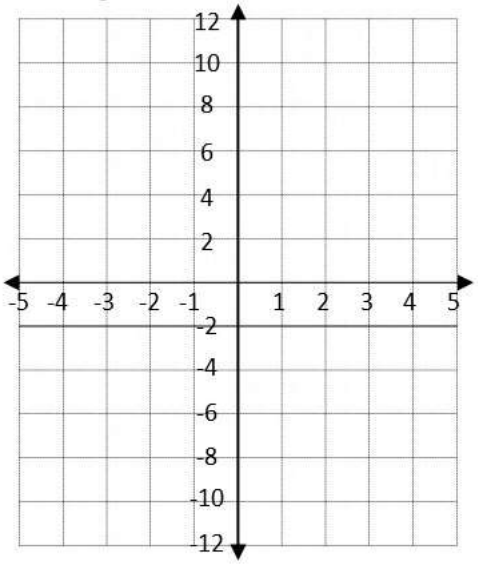
2) $y < 2x + 4$



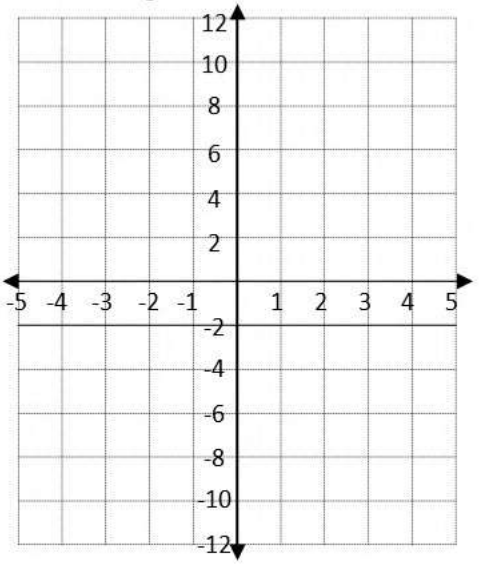
3) $y \geq 3x - 2$



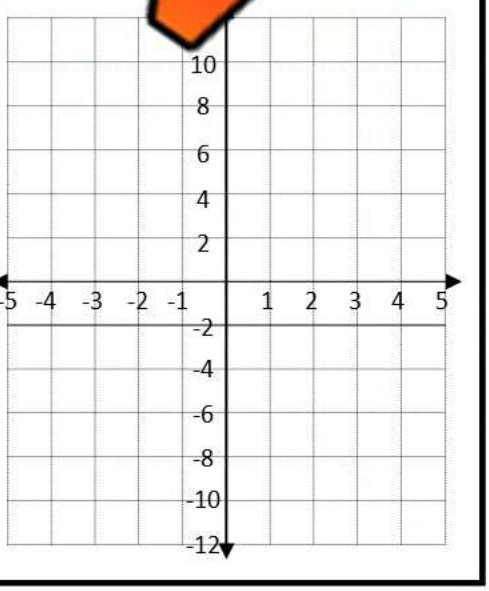
4) $y > -2x - 2$



5) $y > -x + 5$



6) $y \leq \frac{1}{3}x - 6$



Name: _____ 185

Algebra Quiz - Equations

Part 1 Solve

1) 8n + 4n = _____n	2) 11p + 7p = _____p	3) (-25c) + 33c = _____c
4) 15n + 32n + 11p + 38p = _____n _____p	5) 12p - 4p = _____p	6) 15s + r – 14s - 13r = _____s = _____r
7) 18r – 24 = _____s _____r	8) 32n - 43c - 33n + 21c n = _____c	9) 42n + y - 13y - 23c + 46c = _____n = _____c = _____y

Part 2 Write the letter from column 2 of the equivalent expression from column 1.

Answer	Column 1	Letter	Column 2
	5(7 – t)		5t + 35
	-5(7 + t)		-5t
	5(t + 7)	c	35
	-5(*t* - 7)	d	

Part 3 Add and subtract the binomials below.

1) (8*y* + 9) + (5y + 6)	2) (11*m* - 14*y*) - (*y* - 4*m*)
3) (33*y* – 16*u*) - (14*u* + 18*y*)	4) (22*y* – 15*u*) + (7*u* – 15*y*)

Part 4 — Evaluate the following expressions for x = 5 and p = -7

1) $(x) + (p) - 11$	2) $17 + x + (p)$	3) $(19 - x) - (p)$	4) $x + (26 + p)$
5) $54 \div (p + 5x)$	6) $22 + 8x - (p + 5)$	7) $12 - \frac{7x}{p} + 5p$	8) $9x + (2p - x)$

Part 5 — Put the correct sign (=, ≠) if it is not balanced.

1) $(-9) + 7 = 2$	2) $13 \; ? \; -5$	3) $(-21) + 13 = -8$
4) $\frac{50}{10} = -10$	5) $\frac{}{-9} = (-4)$	6) $\frac{48}{-8} = 6$

Part 6 — Find out the value of the variables.

1) $12 + n = 23$ n =	2) $n + 15 = 29$ n =	3) n =
4) $12.5 - 3.1 = p$ p =	5) $9.2 - p = 6.4$ p =	6) $-3.5 + r = -7.8$ r =
7) $(-3n) = (-18)$ n =	8) $6n = (-42)$ n =	9) $\frac{n}{8} = -9$ n =

Part 7 Find out the value of the variables using BEDMAS.

1) $9 + (4 \times 5) = n$	2) $31 - (7 \times p) = 10$	3) $(9 \times 6) + (12 \div n) = 58$
4) $n + (32 \div 8) = 12$	5) $5(2 + p) = 45$	6) $9n \div 2 = 27$

Part 8 W[illegible] situations below and answer the questions.

1) Parker takes som[illegible] before leaving to go trick-or-treating on Hallowee[illegible] more candies at the houses in his neighbourhood. If he trip[illegible] end of the night, he will have 90 candies. How many candies d[illegible] house?

a) Write an equation that represents the prob[illegible]

b) How many candies did he take from his house?

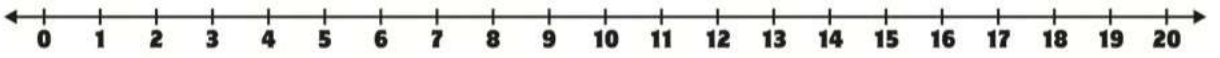
2) A group of 8 friends went to an amusement park. Tickets to enter the park cost $9. Each friend purchased the all-inclusive pass that allowed them to go on as many rides as they wanted to. In total, the 8 friends paid $176 for the ticket and all-inclusive pass.

a) Write an equation that represents the problem.

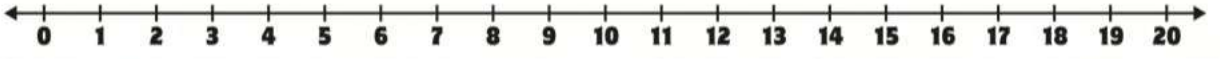
b) How much did the all-inclusive pass cost?

Part 9 Graph the inequalities on the number line.

1) $4 + x > 12$



2) $17 - x \leq 9$



Part 10 Simplify the inequalities below. Make sure the variable is on the left.

2) $x \leq 24 \div 6 \times (-5)$

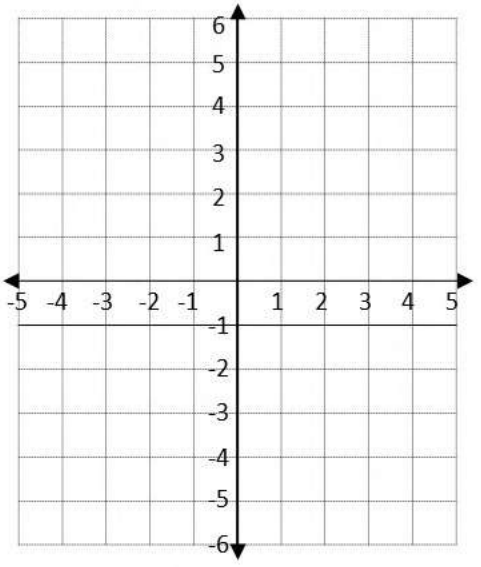
3) $48 < x$ [illegible]

4) $x + (3 \times 4) \leq 60 \div (-10)$

Part 11 Fill in the table of values and then [illegible] the i[illegible]

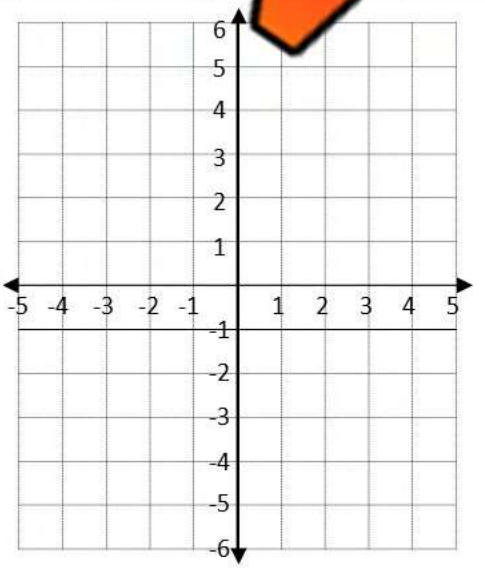
1) $y > -x + 2$

x	0	1	2	3	4
y					



[illegible] 6

x	[illegible]	1	[illegible]	[illegible]	[illegible]
y					



Grade 7
C3. Coding

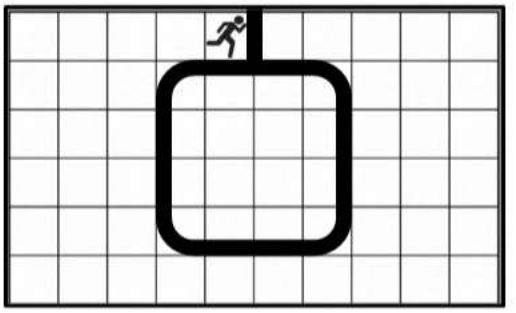
	Curriculum Expectations	Pages That Cover the Expectations
C3.1	solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves the analysis of data in order to inform and communicate decisions	190 – 193, 195 – 201, 203 – 205, 207 – 214
C3.2	read and alter existing code involving the analysis of data in order to inform and communicate decisions, and describe how changes to the code affect the outcomes and the efficiency of the code	191, 194, 202 – 206

Name: _____ 190

Curriculum Connection
C3.1

Writing Code - Loops

Writing Code – Code Bank
go right (# of spaces)
go left (# of spaces)
go down (# of spaces)
go up (# of spaces)
loop ___ times

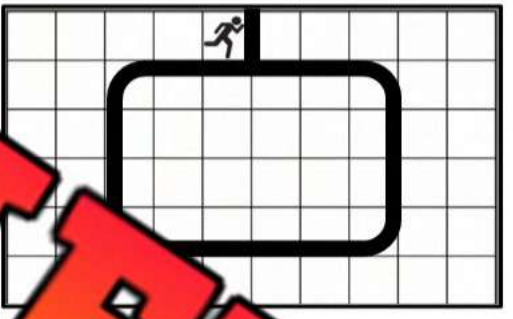


Example
loop 5 times
    go right 3
    go down 5
    go left 5
    go up 5
    go right 2
go right 1

Question ite code that sends the runner around the track.

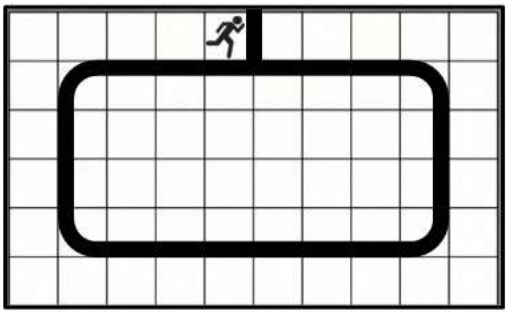
1. Use r around the track 9 times. (Don't forget to cross the finish line!)

Line 1: _____
Line 2: _____
Line 3: _____
Line 4: _____
Line 5: _____
Line 6: _____
Line 7: _____



2. Use a loop to send the runner around the track 5 times. (Don't forg nish line!)

Line 1: _____
Line 2: _____
Line 3: _____
Line 4: _____
Line 5: _____
Line 6: _____
Line 7: _____



Name: _____ 194

Curriculum Connection
C3.2

Introduction to If/Then Statements

An if/then statement is a *conditional* that is an action that could occur if something specific happens.
For example – If the bell goes at school, then the students go to class.

Questions Fill in the If/Then Statements with outcomes that make sense.

1)	If [illegible] into the	then _____
2)	If they [illegible]	then _____
3)	If player 1 pushes	then _____
4)	If a key is pushed on a piano,	then _____
5)	If you answer correctly,	then _____
6)	If the song ends,	then _____
7)	If user presses the shuffle song button,	then _____
8)	If player 1 has more points than player 2 at the end of the game,	then _____
9)	If the password entered is incorrect,	then _____
10)	If the play button is pushed,	then _____

Name: _____ 195

Curriculum Connection
C3.1

If Statements – Conditional Coding

An if statement allows a code to be run if an event has happened. If the event does not happen, the code is not run. All interactive games use if statements. For example, when a game has a button in it, the button will have an if code. This means that if the button is pushed, then a code will run that causes something to happen.

Example Code - If player gets 50 points, then print "Great Job!"

Question: Calculate the answer to the question and then run the code.

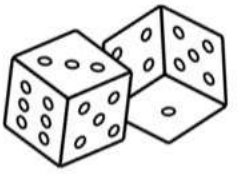
Code Written	The Computer Prints...
If answer is ≥90, then print "[illegible]" If answer is <90, then print "[illegible]" run 5 x 12 + 32	
If y is <150, then print "Better luck next time!" If y is ≥150, then print "Wow, great job!" run y = 6 x 15 + 55	
If player has ≥500 points (p), then print "You win" If player has <500 points (p), then print "You lose" run p = 100 ÷ 2² x 10 x 2 – 10	
If student mark (m) is ≥80%, then print "Genius!" If student mark (m) is <80%, then print "Good effort!" run m = 21/25	
If student mark (m) is ≥50%, then print "You passed" If student mark (m) is <50%, then print "You failed" run $m = \frac{8+9+6}{50}$	

Name: _____ 196

Curriculum Connection
C3.1

If Statements – Dice Game

The object of the game is to get as many points as you can. Follow the if/then statements to get points.



Instructions:
1. Start at question 1. Read the if/then statement to get points
2. Go through all 10 questions and add up your points at the end

Questions Use a dice to play the game below. Follow the if/then codes.

If/Then Code	Point Total
1) If you roll an [illegible] you get +10 points If you roll a [illegible] get -10 points	
2) If you roll a 6, then [illegible] If you don't roll a 6, then [illegible]	
3) If you roll a 3 or 4, then you get +1[illegible] If you don't roll a 3 or 4, then you [illegible] points	
4) If you roll a 2, then you start over at 0 poi[illegible] If you roll any other number, then you get [illegible]ints	
5) If you roll 3 or less, then you get +10 points If you roll 4 or more, then you get -10 points	
6) If you roll a 1 or 6, then you get +15 points If you don't roll a 1 or 6, then you get -5 points	
7) If you roll 2 or more, then you get +5 points If you roll a 1, then you get -20 points	
8) If you roll an odd number, then you get +10 points If you roll an even number, then you get -10 points	
9) If you roll a 3, then you get +20 points If you don't roll a 3, then you get 0 points	
10) If you roll a 5 or less, then you get +10 points If you roll a 6, then you get -25 points	

Name: _____ 197

Curriculum Connection
C3.1

If Statements – Dice Game

The object of the game is to get as many points as you can. Follow the if/then statements and solve any equation from the list you are sent to. Cross out the equation once you have used it because you can only use each equation once. You earn the answer from the equation as points. Record your points in the column on the right.

Instructions Follow the if/then codes to solve equations and earn points.

If/Then Code	Points
1) If you mber, then solve an equation from list 1 If then solve an equation from list 2	
2) If you a 3 o solve an equation from list 3 If you roll a equation from list 4	
3) If you roll a 6, th ve an m list 3 If you roll a numbe an equation from list 2	
4) If you roll an even numbe lve from list 5 If you roll an odd number, the ve list 6	
5) If you roll a 1 or a 6, then solve an eq from a If you roll a 2, 3, 4, or 5, then solve an equation fr st 1	
6) If you roll a 2 or 5, then solve an equation fro list If you roll a 1, 3, 4, or 6, then solve an equation fr	
7) If you roll a 3 or 4, then solve an equation from list 5 If you roll a 1, 2, 5, or 6, then solve an equation from list 1	
8) If you roll a 6, then solve an equation from any list If you roll a 1, 2, 3, 4, or 5, then solve an equation from list 1	
9) If you roll a 1 then solve an equation from any list If you roll a 2, 3, 4, 5, or 6, then solve an equation from list 1	
Total Points	

List 1	List 2	List 3	List 4	List 5	List 6
5 + 5	15 - 5	3 x 2	25 ÷ 5	12 + 12	3 x 3
12 + 6	14 - 6	7 x 5	30 ÷ 10	23 + 5	4 x 6
13 + 8	40 - 32	3 x 6	20 ÷ 4	15 + 13	7 x 3
21 + 13	32 - 21	4 x 5	12 ÷ 2	41 - 13	40 ÷ 4
14 + 22	45 - 15	9 x 4	15 ÷ 3	50 - 10	48 ÷ 8
30 + 20	50 – 21	6 x 6	36 ÷ 6	40 - 15	9 ÷ 3

Name: _____ 198

Curriculum Connection
C3.1

If Then Conditional Statements – Activity

Instructions Follow the if/then statements and move the bike around the grid.

If/Then Conditional Statements		If/Then Conditional Statements	
1)	If y = >–40, then move bike right 5 $y = 25$ [illegible] $2 + 14$	6)	If y = >400, then move bike left 5 $y = 30 \times 5 \times 2.5$
2)	If t = [illegible] move bike down 3 [illegible]	7)	If t = >100, then move bike left 4 $10^2 + 10^2 = t$
3)	If p = <200 [illegible] bik[illegible]ft 4 $p = 50 \times -2$ [illegible]	8)	If p = >–500, then move bike down 5 $p = 4 \times -200 + 250$
4)	If y = <0, then move [illegible]t 3 $3y - 18 = -3$		If y = <5, then move bike down 5 [illegible] $- 25 = -43$
5)	If b = >10, then move bike up 7 $(-5 + 80) \div b = 5$	10)	[illegible]0, then move bike right 6 [illegible] $= -10$[illegible]0) x 2

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Curriculum Connection
C3.1, C3.2

Using Programs to Analyze Data - Basketball

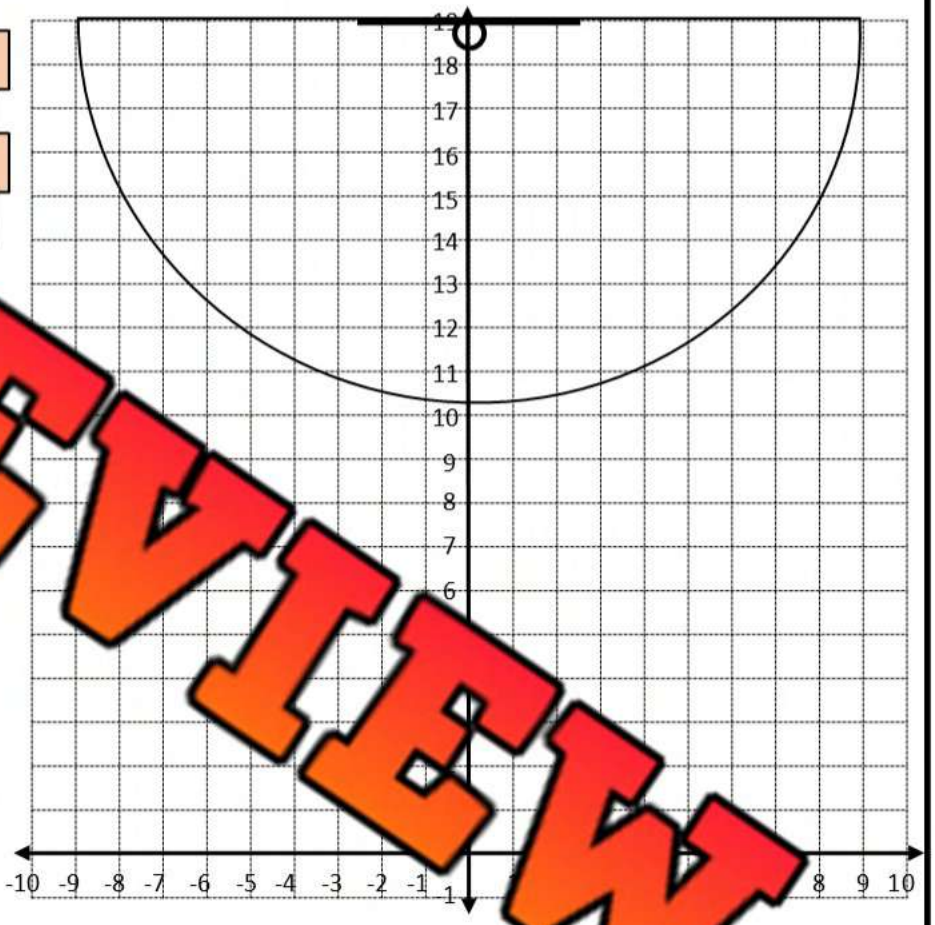
Directions Use the data to program Curry's shooting from last game.

Steph Curry is a tremendous shooter. His shot attempts and shot makes from his last game have been displayed in the table below. The coordinates for each shot show where Curry made or missed from.

Program

if the shot is (made)
then plot a gre sing the coordinates
if the shot i
then plo ates

Shot M e	
(3, 9)	2)
(-5, 10)	13)
(1, 8)	(3,
(-10, 18)	(-8, 17)
(-1,18)	(6, 10)
(4,1)	(-8, 12)
(2, 15)	(9, 15)
(-6, 11)	(6, 14)
(-2, 15)	
(1, 18)	



Questions Answer the questions below.

Questions	Answers
1) What was Curry's field goal percentage? (#Makes/#Total Shots)	
2) What was Curry's 3-point percentage? (#3-Point Makes/#Total 3-Point Shots)	
3) How many points did Curry have?	
4) Curry has asked you where he should shoot from. Use the data from the program to give him at least 2 tips.	

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Curriculum Connection
C3.1, C3.2

Using Programs to Analyze Data - Baseball

Directions Use the data to program Gausman's shooting from last game.

Kevin Gausman pitches for the Blue Jays. He only pitched 3 innings last game. His strikes and pitches that resulted in a hit are recorded in the table. Where he threw each pitch has been displayed using coordinates.

Program

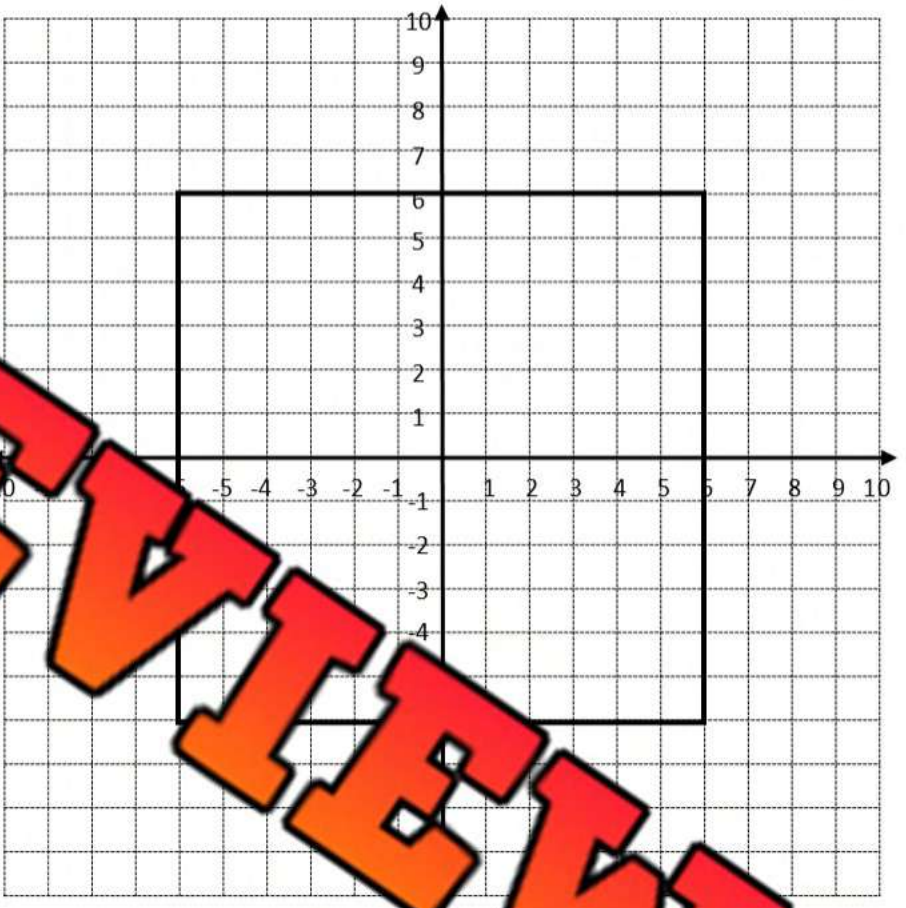
if the pitch is a (strike)

then plot a gree t using the coordinates

if the pitch is play

then plot a r dinates

St	H
(-3, 0)	
(-6, -6)	2)
(5, -5)	(
(3, 6)	(-2, 2)
(-7, 6)	(2, -1)
(6, 6)	(-3, -2)
(-5, -4)	(3, -2)
(-8, -4)	(-2, -3)
(5, 5)	(2, -2)
(-3, 5)	



Questions Answer the questions below.

Questions	Answers
1) How many strikes did Gausman throw?	
2) How many hits did he give up?	
3) How many pitches did he make in the upper part of the strike zone?	
4) How many strikes did Gausman throw out of the strike zone?	
5) Gausman has asked you where he should throw his pitches. Use the data from the program to give him at least 2 tips.	

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Curriculum Connection
C3.1, C3.2

Analyze Data – Rock, Paper, Scissors

Directions Follow the program code to analyze patterns in Rock, Paper, Scissors.

When we play rock, paper, scissors, we unintentionally follow patterns that can be used against us. Creating a program that collects data can help us find patterns that could be useful in determining which option our opponent will use next.

Directions

1) Play 20 [illegible] of rock paper scissors with [illegible]
2) E[illegible] round, follo[illegible] pro[illegible]
3) Use the dat[illegible] dec[illegible] hich option to play

```
loop (20) times
if opponent shows (rock)
then place a checkmark in rock column

loop (20) times
if opponent shows (paper)
then place a checkmark in paper column

loop (20) times
if opponent shows (scissors)
then place a checkmark in scissors column
```

Round	Rock	Paper	Scissors
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Questions Answer the questions below.

1) Describe a pattern you found in your opponent's choice during the game.	_____ _____ _____
2) Based on the way the game ended, which option do you think your opponent will play next?	
3) If a computer program automated this data collection, how would it help you in winning rock, paper, scissors?	_____ _____ _____

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Curriculum Connection
C3.1

Using Subprograms in Coding

A **subprogram** is a small set of instructions that does one specific job. You can reuse it whenever you need that job done again. It helps keep your code neat and saves time.

For example, if you're programming a robot to turn around, you could make a subprogram called **TurnAround**. Then, instead of writing the turn steps every time, you just call **TurnAround** whenever the robot needs to spin.

Instructions

Use subprograms to write efficient code that gets the robot to pick up the toys and return them to the toy bin. The robot can only handle one toy at a time. There may be more than one toy at each location (x2, x3, etc.).

1) Pick up 2 guitars and 3 drums and return them to the toy bin.

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Curriculum Connection
C3.1

2) Pick up 2 cars, 4 dice, and 2 yo-yos and return them to the toy bin.

3) Pi[illegible] sp[illegible]pment in the room (including the trophies) and return them to the toy [illegible]

4) Pick up all the remaining things in the room and return th[illegible] the[illegible]

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Curriculum Connection
C3.1

Using Subprograms in Coding

In this activity, you'll write a simple program that:

- Collects data about heartbeats and time (in minutes)
- Plots that data as coordinate points
- Calculates the average number of heartbeats per minute using a subprogram

You will record your heart rate each minute for 10 minutes. Then you'll write a program with subprograms to collect this data and translate it onto a graph.

How-To-Gu Follow the guide below to write your computer program.

Step	W	Suggestions / Hints
1	Create a ram t **each point** raph	Use inputs like **numBeats** and **numMinutes**. Call r subprogram something like **plotPoints**. Plot (minutes, beats).
2	Create a subprogram **calculate the average bea per minute**.	ide the total by 10. You could s **cal atsPerMinute**.
3	In the main program, **set up a loop to repeat 10 times**.	Use a re time r command to collect d tim m r.
4	Inside the loop, **ask the user to input two values**.	Ask for beats a . Sto m as variables like **numB** nd **r**
5	**Run the point-plotting subprogram** each time.	Call your **plotPoints** subprog m i e loop.
6	**Keep track of the total beats per minute** as the loop runs.	Each time, calculate **numBeats** / **numMinutes** and add it to a total variable (e.g. **totalBeatsPerMinute**). You can then divide it by 10 as this was done over 10 minutes.
7	After the loop, **run the average calculation subprogram**.	This should calculate the average from the total. Use your **calcAvgBeatsPerMinute** subprogram here.
8	**Display the average beats per minute**.	Use an output command. Show something like: "The average heartbeat per minute is" followed by your answer.

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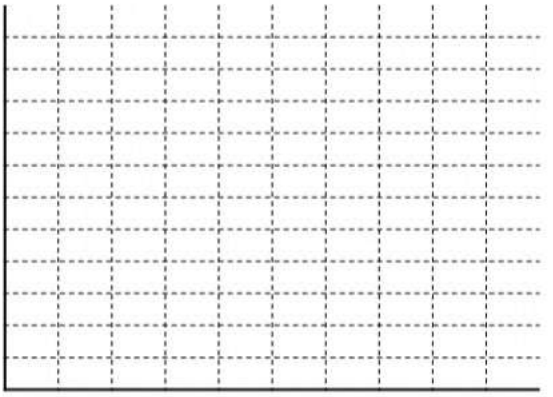
C3.1

Instructions Collect your heart rate every minute for 10 minutes. Record it below and graph it after you finish writing your code.

Minutes	Heart Rate
1	
2	
3	
4	
5	

Minutes	Heart Rate
6	
7	
8	
9	
10	



Instructio ...ode below in the blank space.

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Curriculum Connection
C3.1

Using Subprograms in Coding

In this activity, you're going to create a program that calculates how much a group will pay for concert tickets. You'll ask the user to enter how many people are going, how much each ticket costs, and then use subprograms to calculate the total price, apply tax, and display the final amount.

How-To-Guide Follow the guide below to write your computer program.

Step	What to Do	Suggestions / Hints
1	Create a subprogram that calculates the total before tax.	This should multiply two values the user provides. Think about what those values represent.
2	Create a subprogram that applies a tax to the total.	The rate for Ontario is 13%.
3	Ask the user to input two different values related to the purchase.	Consider what information you would need if you were buying tickets for a group.
4	Use the first subprogram to calculate the total based on user input.	Store the result when user enters.
5	Use the second subprogram to apply tax to the total.	The new result should represent the amount the user needs to pay.
6	Display the final result to the user in a clear message.	Include helpful wording so the user understands what the total means.
7	Test your program with different numbers to check if it works.	Try it with small and large values to make sure the logic still makes sense.
8	Review your subprograms to make sure they're reusable and named clearly.	Could you use them again in a different situation, like buying snacks or shirts?

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C3.1

Instructions Write your code below in the blank space.

Test Test your program by explaining what would happen at each st[illegible] the program using values you make up - # of tickets, cost, total cost [illegible]th tax.

Name: _____ 215

Unit Test - Coding

Part 1 Write code that sends the runner around the track.

Use a loop to send the runner 5400 metres.

Line 1: _____

Line 2: _____

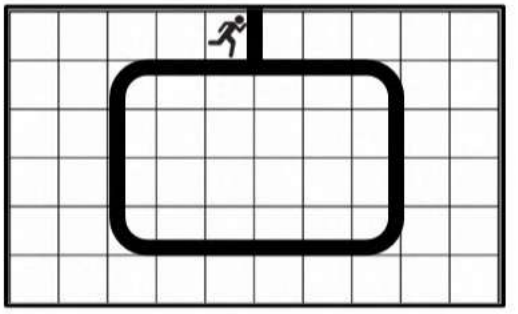
Line 3: _____

Line 4: _____

Line 5: _____

Line 6: _____

Line 7: _____



1 lap = 450 metres

Part 2 Write what the computer would reply based on the code written.

Code Written	The Computer Replied
y = 45 $x + y$ = 92 print (x)	— —
x = 150 $x \div y$ = 11 - 5 print (y)	— —

Code Written	The Computer Replied
$3y$ print (x)	—
x = 48 $x \div y + 20$ = 32 print (y)	—

Part 3 Calculate the answer to the question and then run the code.

Code Written	The Computer Prints...
If student mark (m) is ≥50%, then print "You passed" If student mark (m) is <50%, then print "You failed" run $m = \frac{15 + 15 + 12}{85}$	
If player has >50 points (p), then print "You win" If player has <50 points (p), then print "You lose" run p = 15 x 3 - (– 10)	

Directions | Use the data to program Ronaldo's shots on goal.

Cristiano Ronaldo is a professional soccer player. His shots on goal that were saved and his shots on goal that went in for his last 10 games are displayed in the table below. The coordinates show where his shots were aimed.

Program

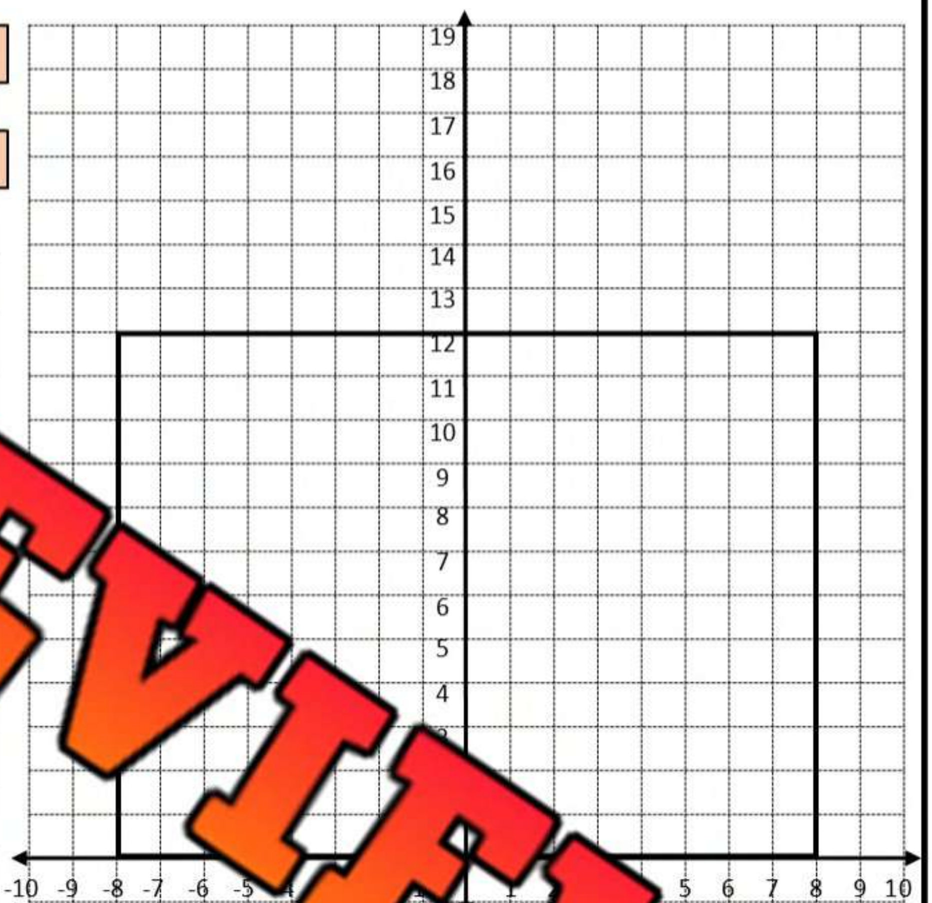
if the shot is (scored)

then plot a green dot using the coordinates

if the shot is (saved)

then plot a red [illegible] using the coordinates

Shots Sc[illegible]	Shots Saved
(-[illegible]	[illegible])
(-6,[illegible]	[illegible]
(7, 11)	[illegible])
(6, 1)	[illegible], 5)
(-7, 1)	[illegible]
(-6 ,11)	(4, 5)
(7, 1)	(0, 4)
(-6, 10)	(5, 7)
	(-4, 5)
	(2, 2)



Questions | Answer the questions below

1) How many goals did Ronaldo score in the 10 games?	
2) Ronaldo plays tomorrow, do you think he will score in the game? Is it likely, unlikely, certain, or impossible?	
3) What patterns did you notice from Ronaldo's shots? List at least 2.	
4) Ronaldo has asked you where he should shoot on goal. Use the data from the program to give him at least 2 tips.	

