Grade 7
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 patterns on the basis of their constant rates and initial values	5 – 7, 10, 44 – 53, 55 - 59
C1.2		, 46,
C1.3	determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating, growing, and shrinking patterns involving whole numbers and decimal numbers, and use algebraic representations of the pattern rules to solve for unknown values in linear growing patterns	8 – 9, 11 – 32, 36, 40 – 43, 54 - 59
C1.4	create and describe patterns to illustrate relationships among integers	61 - 75

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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 (functional relationship). To do this, we look <u>across</u> the table from the term number to the term value.

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

Term Number	Term Value
1	5
2	10
3	15
4	20
5	25
8	

<u>5*n*</u>

Term Number	Term Value
1	1
2	4
3	7
4	10
5	13
9	

<u>3*n* - 2</u>

Term Number	Term Value
1	6
2	12
3	18
4	24
5	30
11	

_____

Term Number	Term Value
1	4
2	6
3	8
4	10
5	12
9	

_____

Term Number	Term Value
1	5
2	15
3	25
4	35
5	45
10	

_____

Term Number	Term Value
1	6
2	9
3	12
4	15
5	18
11	

_____

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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	5
2	12
3	19
4	26
5	
8	

_____

Term Number	Term Value
1	16
2	17
3	18
4	19
5	20

_____

Term Number	Term Value
1	11
2	17
3	23
4	29
5	35
11	

_____

Term Number	Term Value
1	17
2	24
3	31
4	38
5	45
11	

_____

Term Number	Term Value
1	
2	
3	
4	30
5	40
11	

_____

Term Number	Term Value
1	5
2	14
3	23
	32

_____

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Word Problem Use a table of values and find the nth term.

Dennis won 8 points for beating level 1 in a video game. He got 18 for beating level 2 and he received 28 points for beating level 3.

a) If the pattern continues, how many points will he get for beating level 4?

b) How many points will he get for beating level 10?

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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	

$4x + 1$

Term Number	Term Value
1	
2	
3	
9	

Term Number	Term Value
1	
2	
3	
4	
5	
11	

$t + 8$

Term Number	Term Value
1	
2	
3	
4	
5	
11	

$6n - 7$

Term Number	Term Value
1	
2	
4	
5	
10	
20	

$20 \div x + 5$

Term Number	Term Value
5	
11	

$8x - 6$

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Part 2 Write 4 algebraic expressions using:
Variable = n Constant term = 6 Numerical coefficient = 3

1	
2	

3	
4	

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Pattern Rule – Input/Output Tables

Instructions Fill in the input/output tables below by using the expression provided.

In n	Out $2n$
1	
2	
4	
5	

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

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

In x	Out $3x - 3$
10	
20	
30	
40	
50	

In x	Out
4	
6	
8	
10	

In x	Out $20 + x$
1	
9	

In p	Out $3p + 10$
20	
40	
60	
80	
100	

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

In p	Out $7p + 20$
5	
10	
15	
20	
25	

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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 activ

1) Cut out the input/output tables provided. T ll be e 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 r
4) Explain the game: each team will hunt for a card, solve the problem o as quickly 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.

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Instructions Cut out the cards below.

In j	Out $34j \div 2$	In f	Out $f \div 2 + 17$	In c	Out $14c \div 2$	In p	Out $10p - 12$
3		12		3			
	102		29				8
9		36		7		3	
12			41			4	
15		60					38

In k	Out $k + 20$	In i	Out $22i$	In x	Out $52e - 3$	Out $12x$
100		1		2		
150		2			777	48
200		3		6		
250		4				96
300		5		10	1557	

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Instructions Cut out the cards below.

In h	Out $h \div 4 + 3$	In f	Out $3f - 45$	In e	Out $15e + 3$	In b	Out $b \div 2 - 1$
8		15		2		10	
16		20		4		20	
24		25		6		30	
32		30		8		40	
40		35		10		50	

In k	Out $k \div 5 - 3$	In g	Out $2g + 1$	In d	Out $d \div 3 - 2$	In c	Out $4c + 25$
	0	1		3		3	
20		2		6		5	
25		3		9		7	
30		4		12		9	
35		5			3	11	

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Increasing Patterns

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

A)



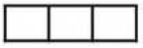
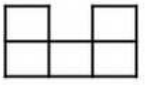
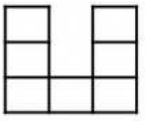
1) Describe the pattern rule in your own words.

2) Represent the pattern using an algebraic expression:

3) How many blocks will the 15th term have?

4) How many blocks will the 30th term have?

B)

1) Describe the pattern rule in your own words.

2) Represent the pattern using an algebraic expression:

3) How many blocks will the 25th term have?

4) How many blocks will the 50th term have?

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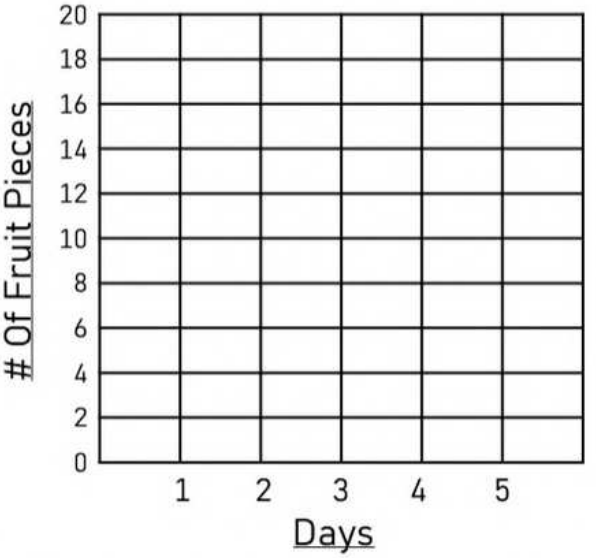
C1.2

Graphing Increasing Patterns

Questions Translate the increasing patterns into a table of values and a line graph.

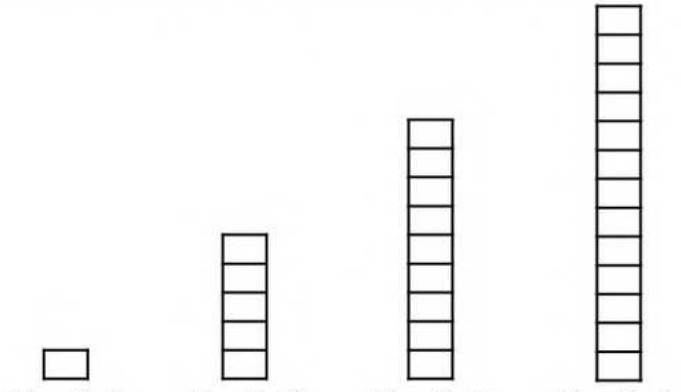
1) Stacy marks an x each day for how many pieces of fruit she eats.

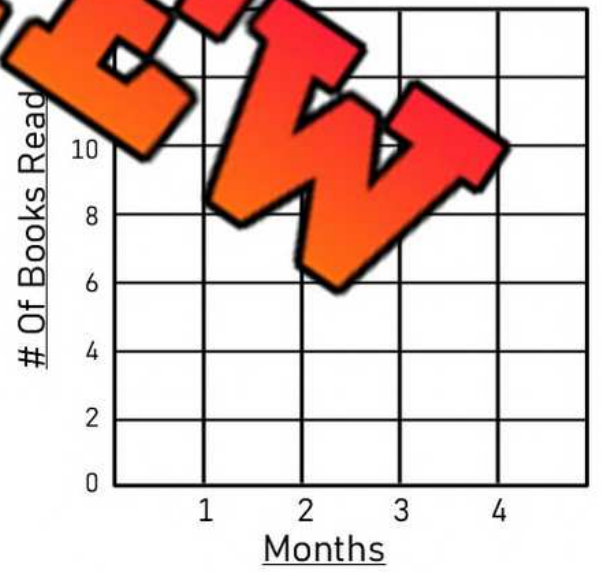




Term Number (Day)	1	2	3	4	5	8	15
Term Value (Fruit Pieces)							

2) Chris puts a rectangle for every book he reads in the first 5 months of school.





Term Number (Month)					7	20
Term Value (Books Read)						

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Increasing Patterns

Questions How many shaded blocks are in each term? Sketch the next 2 terms.

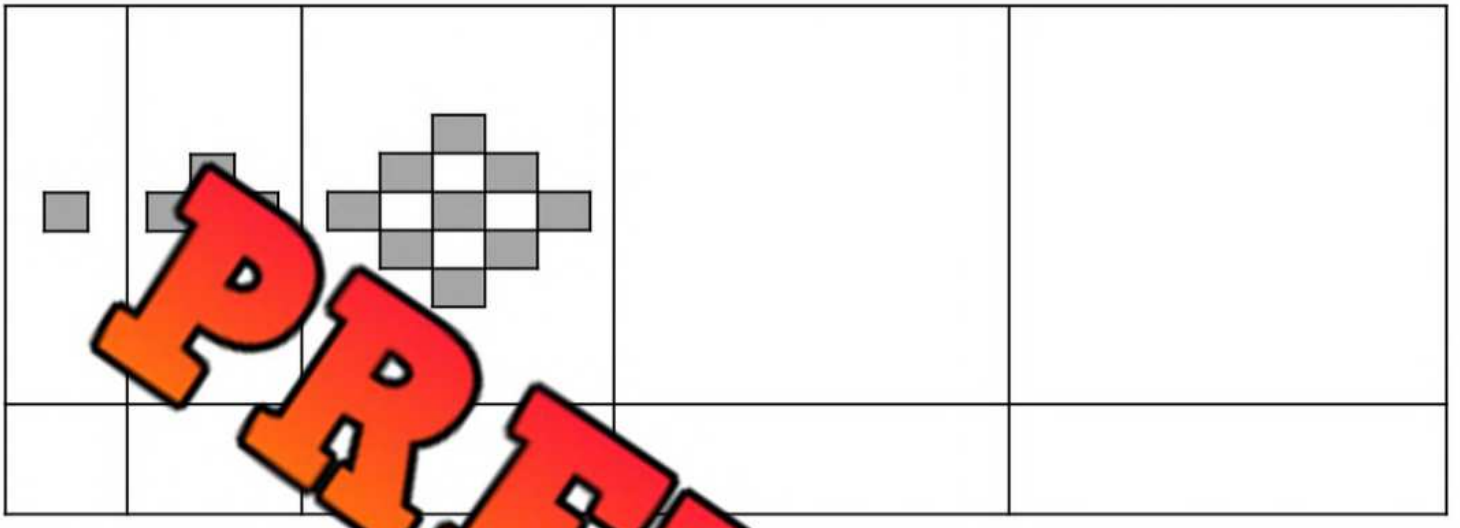

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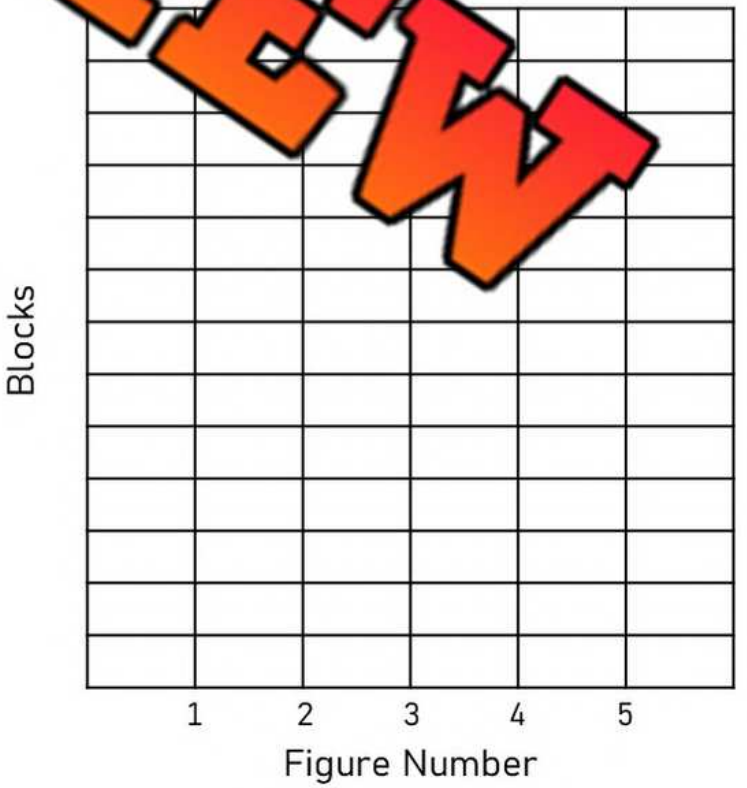
Figure Number	1				5	7	10
Number of Grey Blocks							

1) Describe the pattern rule:

2) How many blocks will the 7th term have?

3) How many blocks will the 10th term have?



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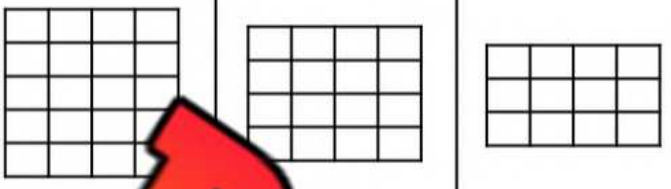
Decreasing Patterns

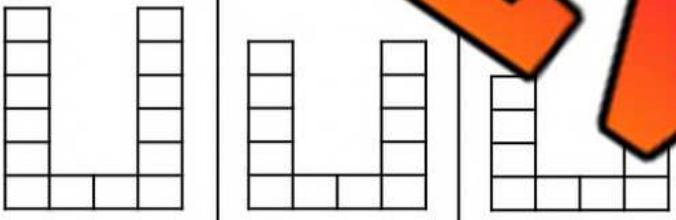
Questions How many blocks are in each term. Sketch the next 3 terms.

1)



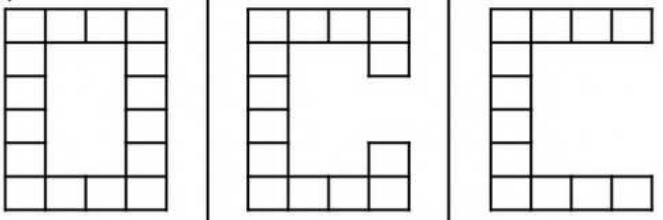
Describe the pat

2)



Describe the pattern rule.

3)



Describe the pattern rule.

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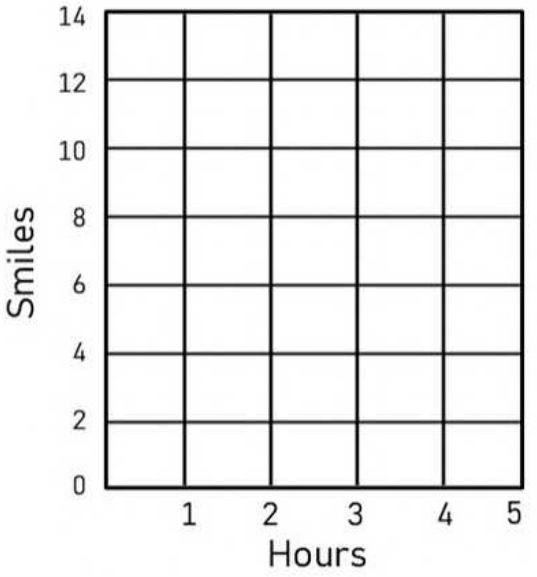
Graphing Shrinking Patterns

Questions Translate each decreasing pattern into a table of values and a line graph.

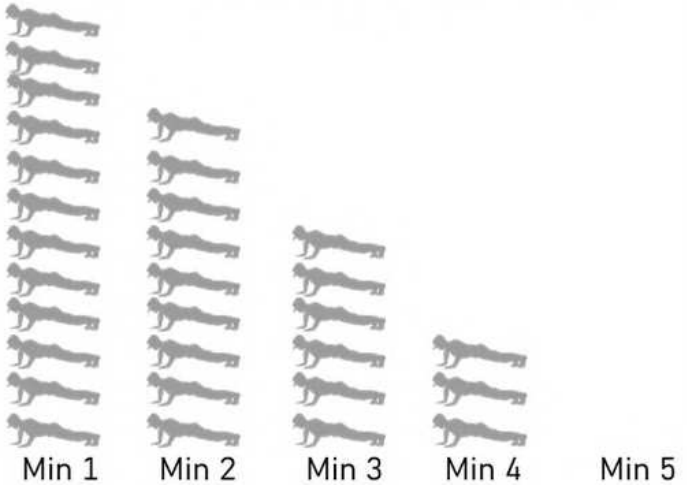
1) Jane kept track of how many times she smiled in an hour.

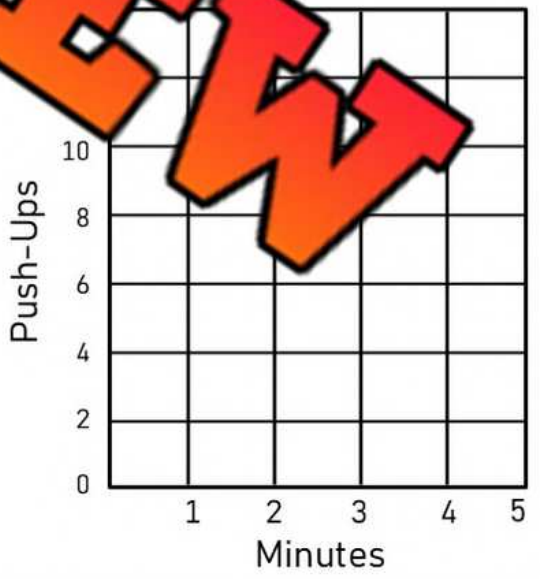




Term Number					
Term Value					

2) Sam counted how many push-ups he could do every minute for 5 minutes.





Term Number					
Term Value					

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Decreasing Patterns

Questions How many total blocks are in each term. Sketch the next 2 terms.

1)

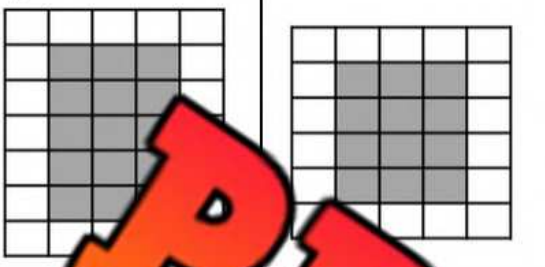
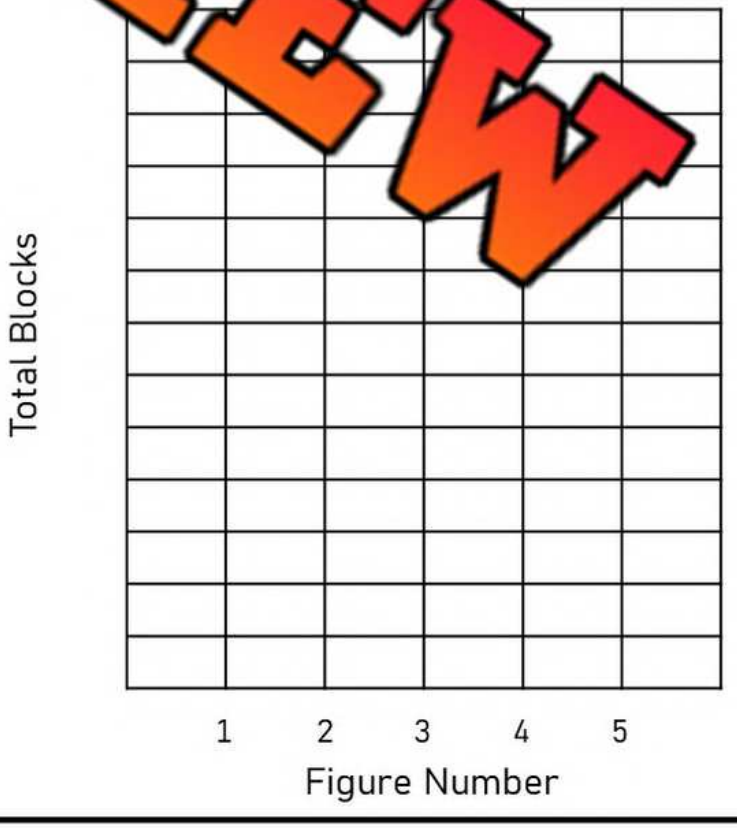


Figure Number			3	4	5	6
Number Of Grey Blocks						
Number Of White Blocks						
Number Of Total Blocks						

1) Describe the pattern rule for the total blocks.

2) Describe the pattern rule for the white blocks.

3) Describe the pattern rule for the grey blocks.



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Writing Algebraic Expressions



Practice Answer the question below.

1)	Situation	Expression/Answer
a)	Blake sells lemonade at his stand. For every sale (s), he earns $5. Write the expression.	
b)	Blake 12 sales Monday. How much money did he mak expression and the answer.	
c)	old 22 the week, how much money did he make? Writ ion d the answer.	
d)	Blake earned $ este monade. How many cups (c) did he sell	

2)	Situation	Expression/Answer
a)	Sandy earns $14 for every hour ($h$) she works has spend $2 each time she works to take the b te th expression.	
b)	Sandy worked 8 hours yesterday. How much money take home? Write the expression and the answer.	
c)	Sandy worked 12 hours today. How much money did she take home? Write the expression and the answer.	

3)	Situation	Expression/Answer
a)	Jake is driving across Alberta to visit a friend. For every hour (h) he drives, he travels 110km. Write the expression.	
b)	Jake drove 8 hours today. How far did he go? Write the expression and the answer.	
c)	Jake needs to drive 1430km. How many hours does he need to drive? Write the expression.	

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Uncovering the Relation Between Variables

When we discover a pattern between two things (variables), we need to identify the term number and the term value.

Example: determine the number of students and adults in a school, if there are 20 times more students than adults.

Clues

- There are two terms to quantify – students and adults
- There are 20 times more students than adults, so the number of students to adults is x 20
- We ca lts as the term number. The letter *a* will represent the number of adults.
- The nts is the term value. The letter *s* will represent the number of s
- Th tion is or 20a = s

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Scenarios

the r r each of the scenarios below.

	Scenari	Relation
Ex.	The number of chairs pr th ( ) for every 1 student (s)	c = s
1)	The number of wheels present in a llection y ca each car has 4 wheels	
2)	The number of pencils there are in class if e stu class has 3 pencils each	
3)	The number of shoes that are in your class if each stu as 2 shoes	
4)	How many total cans collected for a food drive in a school if each class brings on average 25 cans	
5)	The number of students absent today if there is always 1 person absent for every 10 students in a class	

Your Turn

Write your own scenarios and the relation that solves the problem.

	Scenario	Relation
1)		
2)		

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Constant Rate of Change

A **constant rate** is a rate of change that remains the same and does not go up or down. For example, when you are paid $20 an hour, the rate of change is constant because for every hour you work, your pay goes up by the same amount - $20.

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

1) Phil's [illegible] today has been represented in the table below



[illegible]	1	2	3	4	5	6	7	8
Money Earned		42	63					

What is the rate [illegible]ge? Is the rate of change constant? Yes No

2) Laura sells cars. She e[illegible]om[illegible]n she sells a car. Her earnings for last week are represe[illegible]d in [illegible]. There were some days she did not earn commission.

Days Worked	1	2	[illegible]	4	[illegible]	6	7
Money Earned ($)	105	210	315	[illegible]	[illegible]61	[illegible]15	1300

a) Is the rate of change constant? Yes No

b) What day do you think Laura sold the most cars? _____

c) How much did she earn that day? _____

d) How much do you think Laura made if she didn't sell a car? _____

3) Kim sells necklaces that she made. Her sales have been represented in the table.

Necklaces Sold	10	20	30	40	50	60	70	80
Money Earned ($)	30	60	90					

a) What is the rate of change? _____ Is the rate of change constant? Yes No

b) How much would Kim sell 1000 necklaces for? _____ 5000 necklaces: _____

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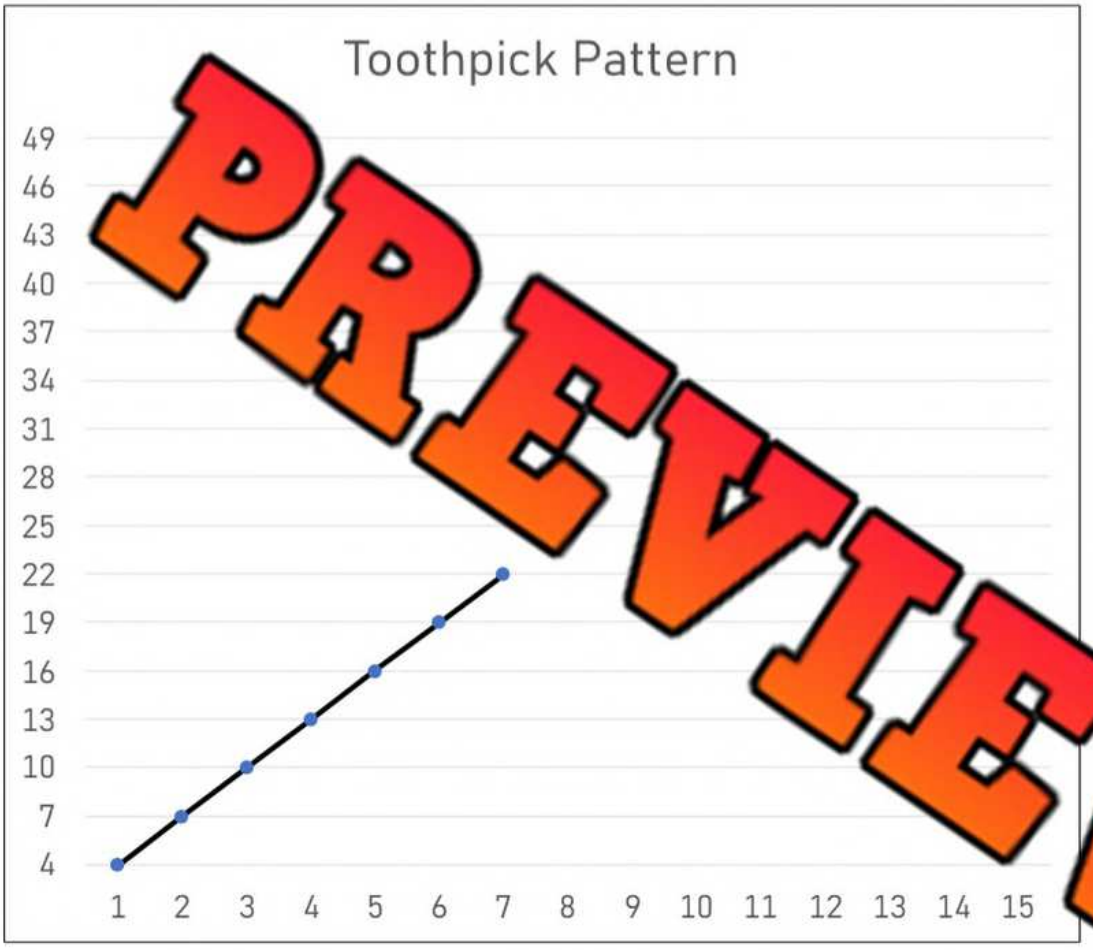
Reading a Linear Pattern - Graph

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	

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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?

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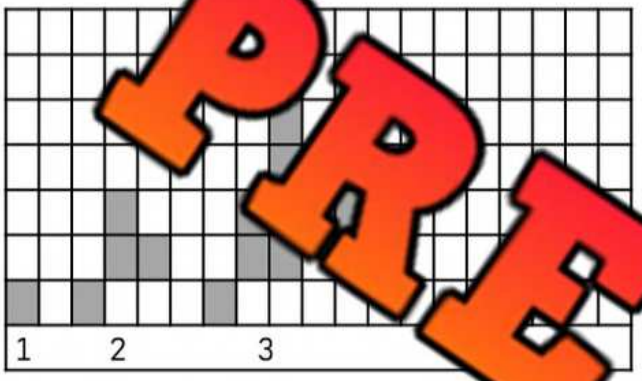
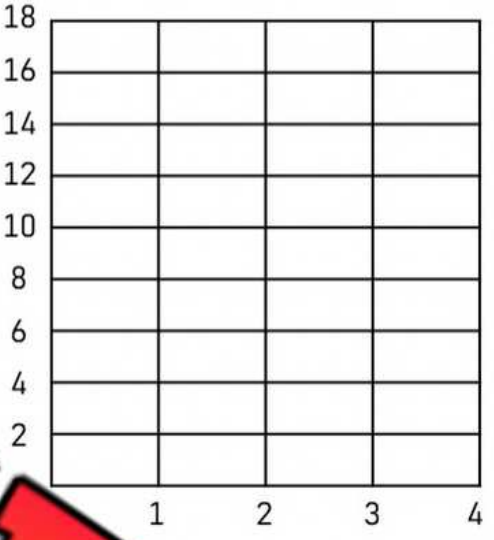
Linear and Non-Linear Patterns

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.**

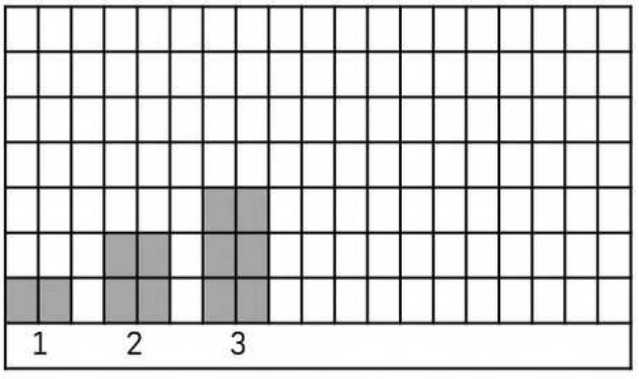
Instruction Look at the patterns below and fill in the table of values. Then complete the graph. Is the line straight?



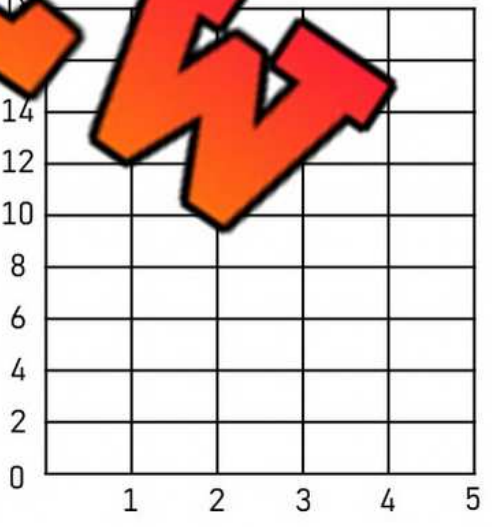
Term Number	Term Value
1	
2	
3	



1) Is this pattern linear or non-linear?



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?

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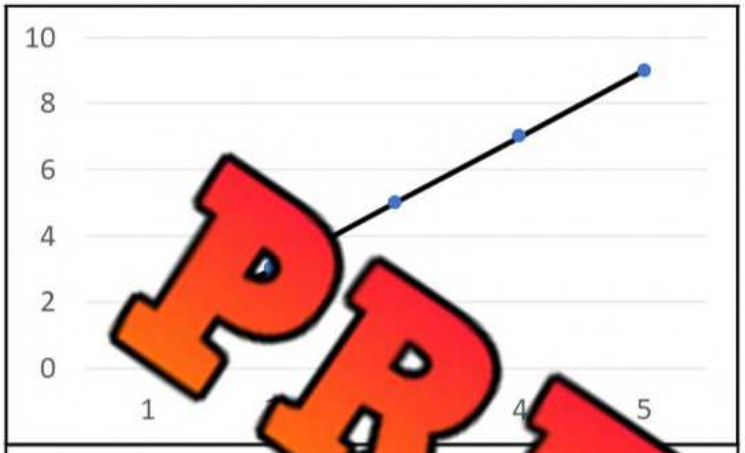
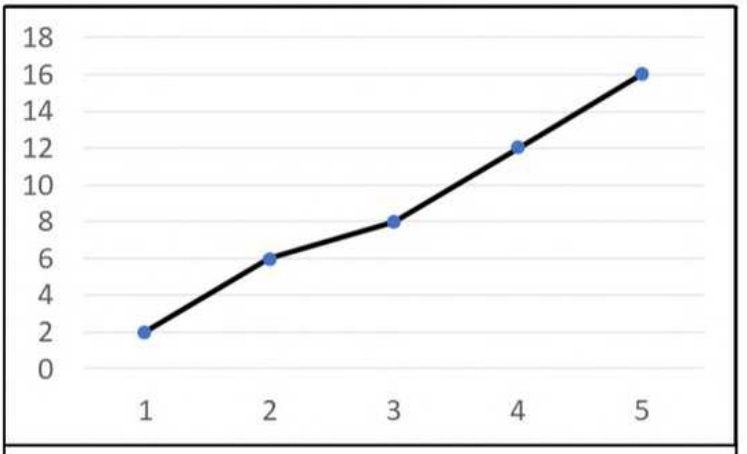
Increasing Linear Patterns – Yes or No?

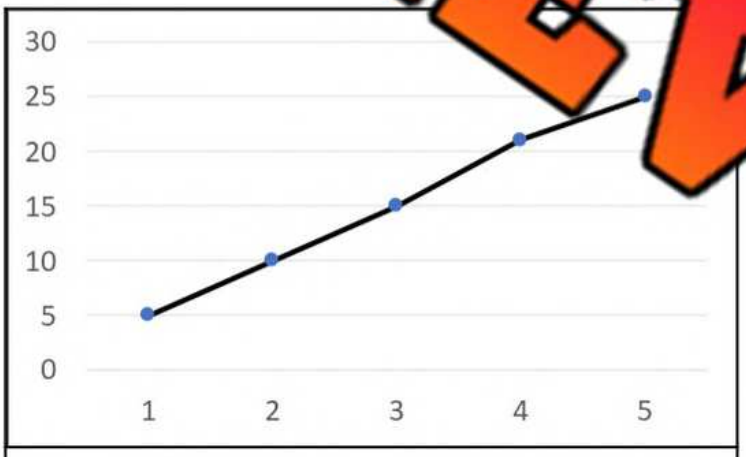
Instructions Circle if the pattern displayed on the graph is linear.



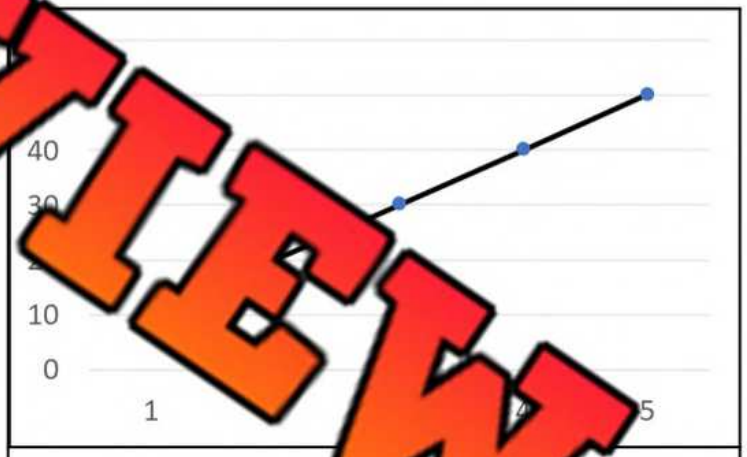
1) Linear Non-Linear



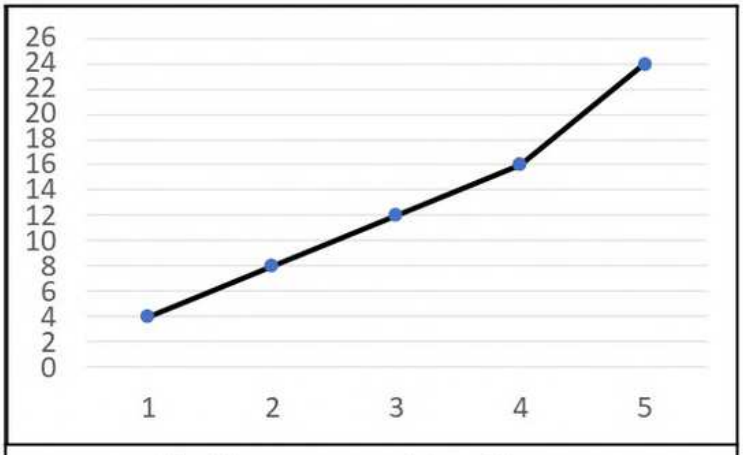
2) Linear Non-Linear



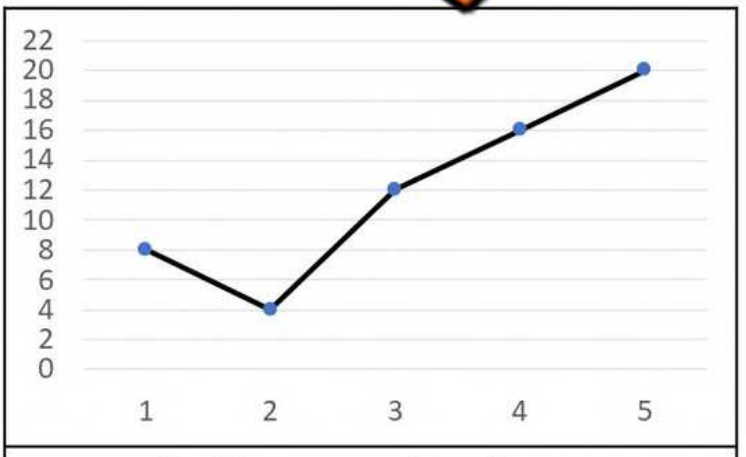
3) Linear Non-Linear



4) Linear Non-Linear



5) Linear Non-Linear



6) Linear Non-Linear

PREVIEW

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Name: _____ 48

Curriculum Connection
C1.1

Increasing Linear Patterns – Yes or No?

Instructions Circle if the pattern is linear, based on the table of values.

Term Number	Term Value
1	2
2	6
3	10
4	
5	
Linear	Non-Linear

Term Number	Term Value
1	10
2	16
3	20
4	26
5	32
Linear	Non-Linear

Term Number	Term Value
1	15
2	18
3	21
4	25
5	28
Linear	Non-Linear

Term Number	Term Value
1	14
2	19
3	24
4	29
5	34
Linear	Non-Linear

Term Number	Term Value
1	
2	
3	
4	60
5	74
Linear	Non-Linear

Term Number	Term Value
1	25
2	75
3	125
4	175
5	
Linear	Non-Linear

Term Number	Term Value
1	112
2	126
3	138
4	152
5	166
Linear	Non-Linear

Term Number	Term Value
1	210
2	260
3	310
4	360
5	410
Linear	Non-Linear

Term Number	Term Value
1	500
2	650
3	700
4	850
5	1000
Linear	Non-Linear

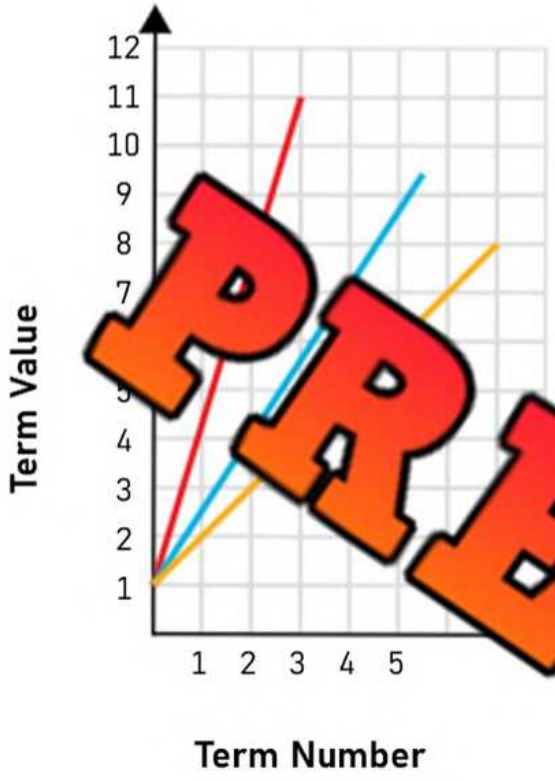
PREVIEW

Name: _____ 50

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?

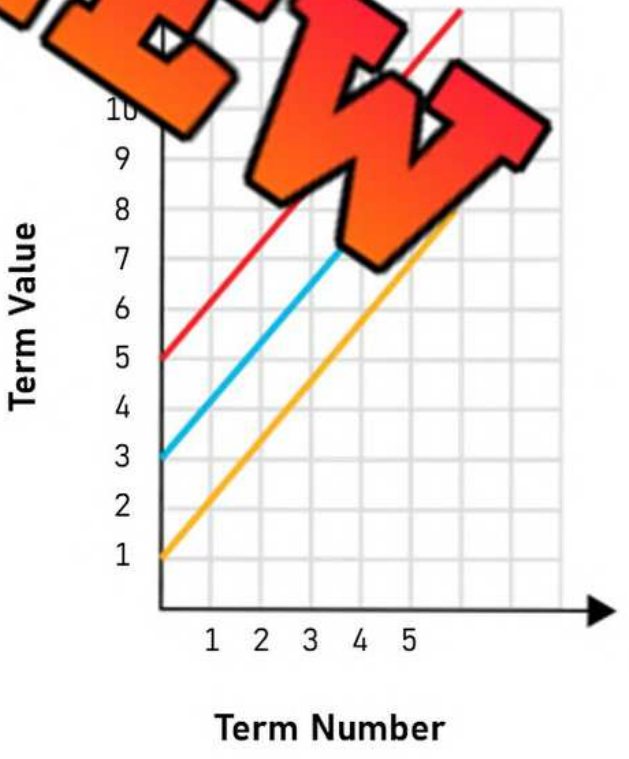
3) What could these three lines represent?

PREVIEW

1) How are the lines the same?

2) How are the lines different?

3) What could these three lines represent?



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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	15	30	45	60	75
y	5	25	45	65	85
		x	or	y	

2) Te	1	2	3	4	5
	35	70	105	140	175
y	50	80	110	140	170
			or	y	

3) Term Number			3	4	5
x	22		340	400	460
y	125			275	325
		x	or	y	

4) Term Number	1	2			5
x	612	635	6		704
y	548	575	602		
		x	or	y	

5) Term Number	1	2	3	4	5
x	315	450	585	720	855
y	438	579	720	861	1002
		x	or	y	

6) Term Number	1	2	3	4	5
x	530	715	900	1085	1270
y	655	829	1003	1177	1351
		x	or	y	

PREVIEW

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Name: _____ 52

Curriculum Connection
C1.1

Comparing Rates of Change - 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?

W	0	1	2	3	4	5	6	7
Colton' s ($)	750	1000	1250	1500	1750			
Spe gs	0	400	800	1200	1600			

a) Who will er 7 s? _____

b) How much is s ea ek? _____

c) How much is Spence gs per _____

d) Whose earnings increase grea rate? _____



Weeks	0	1	2			5	6	7
Jacob's Earnings ($)	1550	2000	245	00				
Jeremy's Earnings ($)	0	650	1300	50				

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 ($)	0	600	1200	1800	2400			
Raven's Earnings ($)	250	825	1400	1975	2550			

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? _____



PREVIEW

Curriculum Connection
C1.1

Exit Cards

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

Name: _____

Who will plant more trees over time?

Ethan and Mia are planting trees in a community park. They each plant a certain number of trees each month.

Month	0	1	2	3	4	5	6	7
E	360	620	880	1140	1400			
M	0	400	800	1200	1600			

Who will have planted more trees after 7 months? _____

How many trees does Ethan plant per month? _____

How many trees does Mia plant per week? _____

Name: _____

Who will plant more trees over time?

Ethan and Mia are planting trees in a community park. They each plant a certain number of trees each month.

Month	0	1	2	3	4	5	6	7
E	360	620	880	1140	1400			
M	0	400	800	1200	1600			

Who will have planted more trees after 7 months? _____

How many trees does Ethan plant per month? _____

How many trees does Mia plant per week? _____

Name: _____

Who will plant more trees over time?

Ethan and Mia are planting trees in a community park. They each plant a certain number of trees each month.

Month	0	1	2	3	4	5	6	7
E	360	620	880	1140	1400			
M	0	400	800	1200	1600			

Who will have planted more trees after 7 months? _____

How many trees does Ethan plant per month? _____

How many trees does Mia plant per week? _____

Name: _____

Who will plant more trees over time?

Ethan and Mia are planting trees in a community park. They each plant a certain number of trees each month.

Month	0	1	2	3	4	5	6	7
E	360	620	880	1140	1400			
M	0	400	800	1200	1600			

Who will have planted more trees after 7 months? _____

How many trees does Ethan plant per month? _____

How many trees does Mia plant per week? _____

PREVIEW

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Name: _____ 54

Curriculum Connection
C1.3

Writing Algebraic Expressions – Growing Pattern

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

				
Ter	rm 2	Term 3	Term 4	Term 5

PREVIEW

1) Questions	Expression
a) Write an expr at rep w many shapes are in the pattern.	
b) How many shapes will 0th te	
c) How many shapes will be in th 0th t	
d) How many **rectangles** will be in the erm?	
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.	
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?	

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Name: _____ 56

Curriculum Connection
C1.1, C1.3

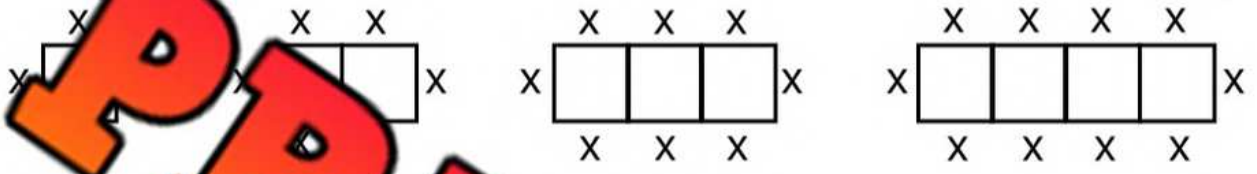
Picnic Word Problem – T-Tables

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.





PREVIEW

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.

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Name: _____ 57

Curriculum Connection
C1.1, C1.3

Hockey Tickets – Challenge Problem

Challenge Answer the word problem below.

Nathan is organizing a trip to see a hockey game with his friends. The cost for the bus rental is $200. The cost per person is $20.

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



b) How [illegible] trip cost Nathan if 5 people go?

c) How much [illegible] trip c[illegible]n if 20 people go?

d) Nathan wants to offer food as we[illegible] Suppos[illegible] fo[illegible]cts $10 per person. Write an algebraic expression that repr[illegible] the c[illegible]e bus, food, and ticket if p people go.

e) Suppose 20 people attend the hockey game and get food. How [illegible]will it cost Nathan?



f) How much will Nathan charge each person if 20 people go?

PREVIEW

Name: _____ 58

Curriculum Connection
C1.1, C1.3

Ice Cream Sundae – Challenge Problem

Challenge Answer the word problem below.

At Ivy's Ice Cream Shop, a plain ice cream sundae costs $5.00. Each extra topping costs $0.50.

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



b) A ants t ndae with 5 toppings. How much will it cost?

c) Warren ordered a s th 8 t . How much will it cost Warren?



d) Warren paid with a $20 bill. How much rece nge?

e) On Thursdays, sundaes are half price! Write an algebraic expres hat represents the cost of a sundae with *e* extra toppings.

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



PREVIEW

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Name: _____ 65

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 playing football. He plays defense, so he is often running backwards. He decides to track his steps forwards and backwards. For every step forward, he adds 1. For every step backward, he adds -1.

a) Each quarter he plays takes 50 steps forwards, and -100 steps backwards. If every step forward is represented by 1 step forward, how many steps did Richard take in the 4 quarters of the game?



b) Fill in the table of values that represents how many steps Richard takes in two games (8 quarters).

1	2	3	4	5	7	

c) Write an algebraic expression to help you solve how many steps Richard 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?

PREVIEW

Name: _____ 66

Curriculum Connection
C1.4

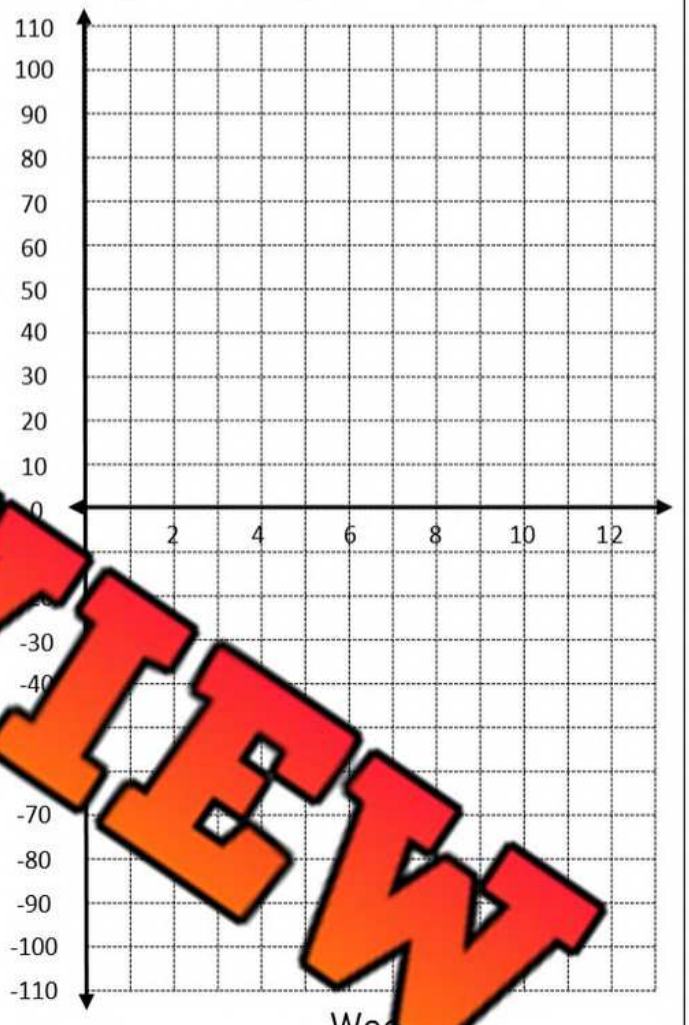
Pattern Using Negative Integers – Olivia's Money

Instructions Answer the problems below.

Olivia owes her sister $100, and she has no other money. Therefore, she has -$100. Luckily, she gets an allowance of $15 a week.

Fill in the table of values below to learn more about how long it will take Olivia to pay back her sister.

Term Number	Term Value (Money)



PREVIEW

a) Graph the table of values.

b) How many weeks will it take for Olivia to pay back her sister?

c) Is this a linear pattern? Explain how you know.

d) Use the graph to determine how much money Olivia will have in 12 weeks.

e) Use an algebraic expression to determine how much money Olivia will have in 26 weeks.

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Name: _____ 68

Curriculum Connection
C1.4

Integer Patterns – Writing Subtraction Rules

-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 Write a subtraction pattern rule and complete the pattern.

1)

3		-3	-6			

2)

-2			7			

3)

-5	-7	-9				

4)

10	7	4	1			

5)

18	13	8	3			

6)

-19	-13	-7	-1			

7)

-3	-6	-9	-12			

8)

12	9	6	3			

PREVIEW

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Name: _____ 70

Curriculum Connection
C1.4

Integer Patterns – Average Temperatures

Instructions Fill in the blanks below using the pattern rule.

In one of the coldest cities in Canada, the average temperature in January is -32. Every month after January until August, the temperature warms +8° C. In September, the pattern reverses, with the temperature decreasing each month by -11° C. From December to January, the temperature drops -12° C.

Mo[illegible]	Temperature
[illegible]	-32
Fe[illegible]ary	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

a) Fill in the table to display the average temperatures each month.

b) What is the difference in temperatures between January and August?



c) [illegible] pattern rule from January to [illegible].

d) What is [illegible] September to December?

PREVIEW

e) What is the difference in temperatures between February and July?



f) Which month has the biggest change in temperature?

g) If you wanted to escape the coldest winter months, which months would you travel south for?

Name: _____ 71

Curriculum Connection
C1.4

Task Cards: Patterning – All Operations

Objective

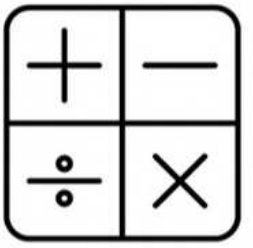
What are we learning about?

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

Materials

What will you need for the activity?

- 24 t
- S ets er 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 eir p on finding solutions.
5. Allow students to select any task card to begin with, emphasiz tha 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.

PREVIEW

Name: _____ 72

Curriculum Connection
C1.4

Task Cards | Cut out the task cards below.

Card 1:
Start with 60. Add 20 and then divide by 4 for the next number. What is the second number?

a) 20
b) 15
c) 25

Card 5:
Begin with 25. Subtract 5 and then divide by 2 for the next number. What is the third number?

a) 7.5
b) 10
c) 12.5

Begin with 1[illegible] 25 [illegible] then multiply by 2 [illegible] next nu[illegible] What is the th[illegible]umb[illegible]

a) 75
b) 150
c) 50

Card 6:
Start at 50 and subtract 10 each time. What is the fourth number?

a) 10
b) 20
c) 30

Card 3:
Start with 30. Divide by 3 and then add 10 for the next number. What is the second number?

a) 20
b) 15
c) 30

[illegible] 2 and then subtrac[illegible]e nex[illegible]ber. What is th[illegible]ond[illegible]

a)
b) 20
c) 32

Card 4:
Start at -10, add 5 each time. What is the third number?

a) 0
b) 5
c) 10

Card 8:
Begin with 200. Divide by 5 and then subtract 15 for the next number. What is the third number?

a) 5
b) 10
c) 20

PREVIEW

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Name: _____ 74

Curriculum Connection
C1.4

Task Cards | Cut out the task cards below.

Card 17:
Start with -32. Divide by 8 and then subtract 2 for the next number. What is the second number?

a) -2
b) 6
c) -6

Card 21:
Start with 36. Divide by 6 and then add 7 for the next number. What is the second number?

a) 13
b) 12
c) 15

Start at -20, [illegible] is the [illegible]ber?

a) -4
b) 0
c) -8

Card 22:
Begin with 120. Subtract 40 and then divide by 4 for the next number. What is the third number?

a) 20
b) 10
c) 15

Card 19:
Begin with 45. Subtract 15 and then multiply by 2 for the next number. What is the second number?

a) 30
b) 15
c) 60

Card [illegible]:
[illegible] 2 and then subtract [illegible] ber. What is [illegible]

a) [illegible]
b) -30
c) -42

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

a) 75
b) 50
c) 100

Card 24:
Start at 100, subtract 25 each time. What is the fourth number?

a) 25
b) 0
c) 50

PREVIEW

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Name: _____ 75

Curriculum Connection
C1.4

Integer Patterns - Exponents

Part 1 Investigate patterns when squaring integers.

1^2	2^2	3^2	4^2	5^2	6^2	7^2	8^2	9^2	10^2

Part 2 Investigate the use of powers of 10.

		10^3	10^4	10^5

10^6	10^7		10^9	10^{10}

Part 3 What happens when we multiply by powers of 10?

Number	x 10	10^1	10^3		10^7
3					
5					
9					
15					
22					
52					
103					

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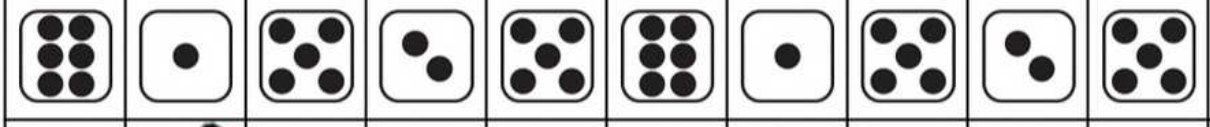
Name: _____ 76

Algebra Quiz - Patterning

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

1)

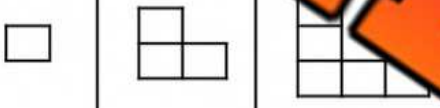


1) What [illegible] 8th term in the pattern be?

2) W[illegible] 30[illegible]n in the pattern be?

Part 2 H[illegible]ock[illegible]in each term? Sketch the next 3 terms.

1)



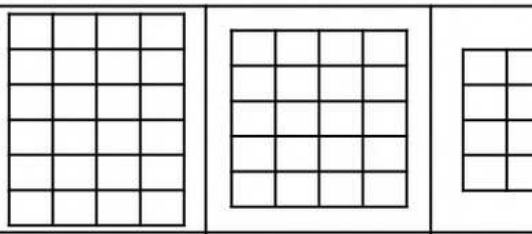
1) Describe the recursive relationship betwee[illegible]

2) Represent the pattern using an algebraic expression:

3) How many blocks will the 15th term have?

4) How many blocks will the 30th term have?

2)

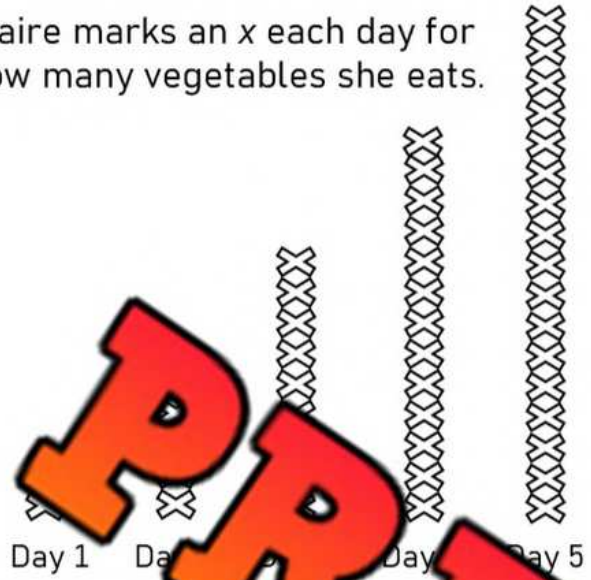


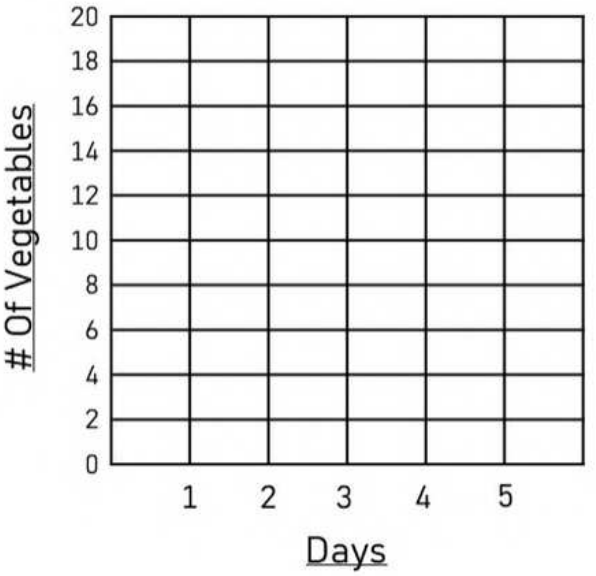
Describe the recursive relationship between the number of blocks.

PREVIEW

Part 3 Translate the growing patterns into a table of values and a graph.

Claire marks an *x* each day for how many vegetables she eats.





Term Number (Day)					10	25
Term Value (Vegetables)						

PREVIEW

Part 4 Fill in the input/output tables below.

Rule: add 7

In	Out
135	
142	
163	
178	

Rule: multiply by 4

In	Out
3	
5	
8	
11	

Rule: subtract 8

In	Out
[illegible]	
453	
488	

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

In *n*	Out $2n + (-3)$
5	
10	
15	
20	
25	

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

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Part 5 Answer the word question below.

Admission to Fun Haven is $10. For each ride in Fun Haven, it costs an additional $2.

a) Write an algebraic expression that represents the cost to enter Fun Haven and ride extra *e* rides.

b) Claire entered the park and has gone on 8 rides. How much did it cost her?



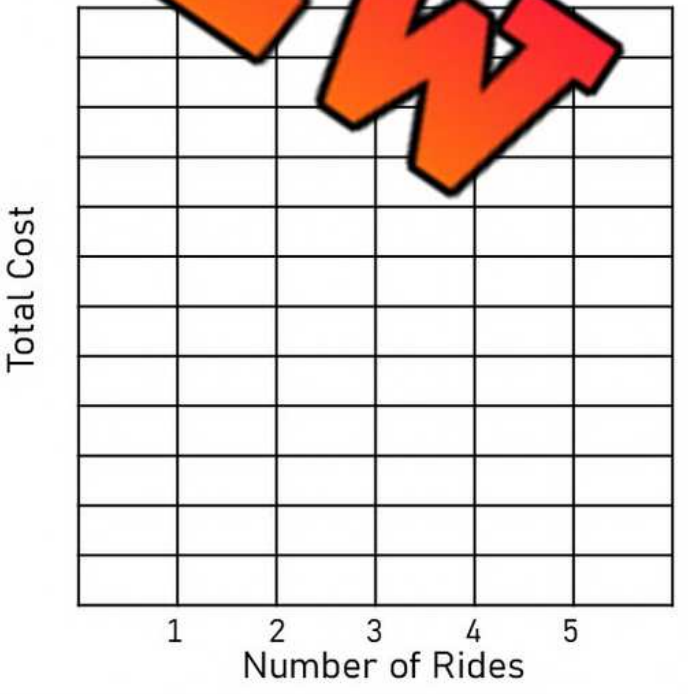
c) Claire has $ d at the park. How many rides can she go on?

PREVIEW

d) Fill in the table below t pre ts related to going to Fun Haven.

Number of Rides	0	1	2		4	5	6
Total Cost							

e) Translate the table of values into a line graph.



f) Is the rate of change constant?

YES NO

g) What is the rate of change?

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Part 6 — Who will get paid more money over time?

Weeks	0	1	2	3	4	5	6	7
Sam's Earnings ($)	500	650	800	950				
Logan's Earnings ($)	0	250	500	750				



a) Who will earn more after 7 weeks? _____

b) How Sam's earnings per week? _____

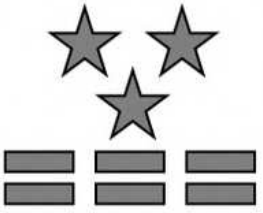
c) earnings per week? _____

d) Whose e ease greater constant rate? _____

e) Who received t without working? _____

PREVIEW

Part 7 — Draw the 4 and 5 swer the questions.

Term 1	Term 2	Term 3	Term 4	Term 5
				

Questions	Expression
a) Write an expression that represents how many shapes are in the pattern.	
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 100th term?	
e) How many stars will be in the 1000th term?	

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Grade 7
C2. Equations and Inequalities

	Curriculum Expectations	Pages That Cover the Expectations
C2.1	add and subtract monomials with a degree of 1 that involve whole numbers, using tools	81 - 88
C2.2	evaluate algebraic expressions that involve whole numbers and decimal numbers	89 - 102
C2.3	solve equations that involve multiple terms, whole numbers, and decimal numbers in various contexts, and verify solutions	103 - 159
C2.4	solve inequalities that involve multiple terms and whole numbers, and verify and graph the solutions	160 - 178

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Name: _____ 81

Curriculum Connection
C2.1

Adding Monomials



Questions Add the monomials together.

1) 5n + 2n = _____n	2) 7p + 2p = _____p	3) 16t + 11t = _____t
4) 17b + 1 = _____	5) 27n + 34n = _____n	6) 24p + 39p = _____p
7) 5y + 11y + 13y = _____y	8) 15 23n = _____n	9) 27x + 36x + 34x = _____x
10) n + n + 91n = _____n	11) 14y + 9y + 18y = _____y	12) 4 24p + 21p
13) 15y + 14y + 29y = _____y	14) 22n + 34n + n + 9n = _____n	15) 8y + 12y + 7y + 23y = _____y
16) 17y + 24y + 35y + 25y = _____y	17) 33t + 27t + 13t + 7t = _____t	18) a + 94a + 15a + 21a = _____a

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Curriculum Connection
C2.1

Adding Monomials



Multiple Choice Circle the correct answer.

1) 10s + 6s	6) 22p + 7p
a) 16s	a) 29
b) 15s	b) 28
c) 16	c) 29p
d) 16s²	d) 29p²
2) [illegible]	7) 65n + 37n
a) 59x	a) 97n
b) 59b²	b) 102n
c) 59b	c) 102n²
d) 59	d) [illegible]
3) 12y + 9y + 8y	8) [illegible] + 15n
a) 28y	a) [illegible]
b) 28y²	b) [illegible]
c) 29y	c) 67n²
d) 29y²	d) 67n
4) n + 63n + 46n	9) 18y + 19y + 14y +
a) 110	a) 59y
b) 111n	b) 58y
c) 110n	c) 59y²
d) 111	d) 58y²
5) 22y + 13y + 28y + y + y	10) 27n + 22n + 11n + 8n
a) 64y	a) 68n
b) 65y²	b) 68n²
c) 65y	c) 67n²
d) 66y	d) 67

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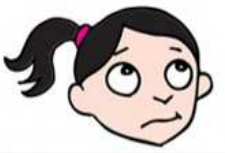
Curriculum Connection
C2.1

Adding Monomials



Questions Add the monomials together.

1) 6n + 2c + 3c + 5n	2) 9s + 2r + 7s
[illegible] = _____c	= _____s = _____r
[illegible] 18[illegible] 22p	4) 15n + 11c + 13c + 15n
= _____n = _____	= _____n = _____c
5) 15s + 21r + 13s	[illegible]3s + 11r + 15s + 8r
= _____s = _____r	= _____s
7) 9n + 14c + 11c + 25n	8) 21n + 2[illegible]
= _____n = _____c	= _____n = _____c
9) 32y + 54b + 41b + 35y	10) 48n + 63c + 71c + 85n
= _____y = _____b	= _____n = _____c

PREVIEW

Name: _____ 85

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) 15s + (2r + 9r) + 7s
= _____m + 17y	= _____s = _____r
3) 8n + 1 + 28p)	4) (19n + 11n) + 14c + 21c
= _____n = _____	= _____n = _____c
5) 25s + 22s + (21r + 16r)	6) + (21r + 18r) + 8r + m
= _____s = _____r	= _____s m
7) 11y + 13n + 17c + 13c + 28n + 3y	8) 26n + (31y + 16 22n
= _____n = _____c = _____y	= _____n = _____c = _____y
9) c + 41y + 36b + 31b + 35y + c	10) 51n + (65c + 51c) + 35n + (11y + 9y)
= _____y = _____b = _____c	= _____n = _____c = _____y

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Curriculum Connection
C2.1

Adding Monomials – Missing Addend

Part 1 What is the value of the missing addend?

1)	3y + 6y = 9y	11)	32y + ☐ = 46y
2)	8m + ☐ = 15m	12)	41t + ☐ = 59t
3)	+ ☐ = 23t	13)	57b + ☐ = 66b
4)	14b = 29b	14)	43k + ☐ = 75k
5)	☐ = 2	15)	72y + ☐ = 89y
6)	15r + ☐	16)	87n + ☐ = 109n
7)	18t + ☐ = 27t	17)	105b + ☐ = 129b
8)	46y + ☐ = 52y		☐ = 115y
9)	19n + ☐ = 35n	19)	r + ☐ 107r
10)	33b + ☐ = 59b	20)	134t +

PREVIEW

Part 2 Write an addition equation using the monomials provide

1)	9y	23y	14y	2)	24n	16n	8n
3)	22b	35b	13b	4)	19c	26c	45c
5)	54y	73y	19y	6)	41n	33n	74n

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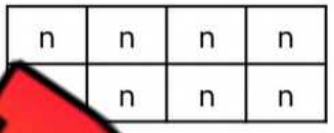
Name: _____ 87

Curriculum Connection
C2.1

Subtracting Monomials - Tiles

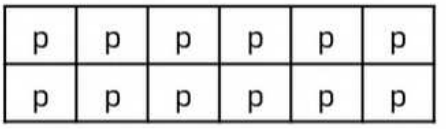
Questions Subtract the monomials by crossing out the tiles you've subtracted.

1) 8n – 4n – 3n



= _____n

2) 12p – 5p – 4p



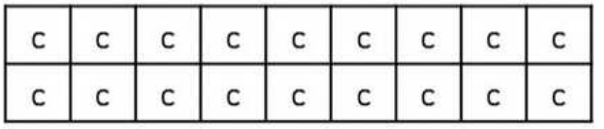
= _____p

3) 15s – 4s



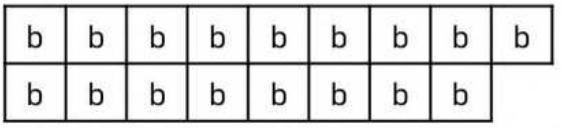
= _____s

4) 18c – 12c – 3c



= _____c

5) 17b – 9b – 3b



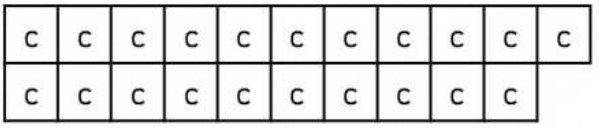
= _____b

6) 20y – 5y – 3y



= _____y

7) 21c – 7c – 11c



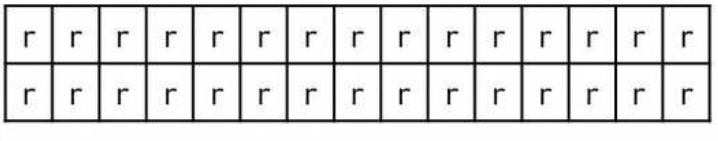
= _____c

8) 24n – 9n – 11n



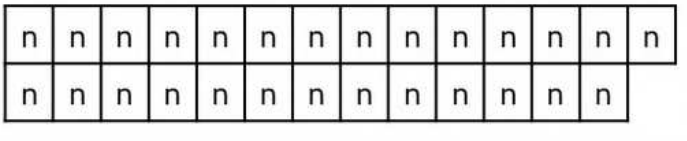
= _____n

9) 30r – 5r – 3r



= _____r

10) 27n – 17n – 8n



= _____n

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Name: _____ 88

Curriculum Connection
C2.1

Subtracting Monomials

Questions Subtract the monomials.

1) 7n - 2n = _____n	2) 9p - 4p = _____p	3) 15t - 10t = _____t
[illegible] = _____	5) 28n - 14n = _____n	6) 34p - 19p = _____p
7) 21y - 11y - y = _____y	[illegible] = _____n	9) 29x - 16x - 4x = _____x
10) 33n - 11n - 11n = _____n	11) 39y - 7y - 8y - [illegible] = _____y	12) [illegible] 24p - 24p
13) 65y - 24y - 15y = _____y	14) 52n - 34n - n - 11n = _____n	15) 57y - 12y - 7y - 9y = _____y
16) 77y - 24y - 25y - 25y = _____y	17) 63t - 17t - 13t - 7t = _____t	18) 94a - 25a - 21a - a = _____a

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Name: _____ 90

Curriculum Connection
C2.2

Equation or Expression?

Questions Is the number sentence an expression or equation?

1) Paul has 5 cookies but needs enough for 10 people. $5 + c = 10$	Equation	Expression
2) The pa[illegible]s the following rule: [illegible]$3n - 1$	Equation	Expression
3) Maria want[illegible]n t[illegible]eek. She has already run 22km. [illegible]22 + [illegible]0	Equation	Expression
4) The cost to enter an a[illegible]t pa[illegible]er ticket. $20t$ or $(t \times 20)$	Equation	Expression
5) Jeff works at a garden centre and earns $1[illegible]hour. He can figure out his pay by using the follow[illegible] $15h$ or $(h \times 15)$	[illegible]tion	Expression
6) Bailey made $200 last week working with her mom. She worked 10 hours. $10 \times w = 200$	Eq[illegible]	[illegible]sion
7) Jane had 150 candies to give away on Halloween. She has 30 left. $150 - c = 30$	Equation	Expression
8) Ashley had 200 candies to give away on Halloween. She will give 2 candies to each kid. How many kids can she give candy to? $200 \div 2 = k$	Equation	Expression
9) Candy bags come in 30 packs. The total number of candies is represented below: $30b$	Equation	Expression

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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: _____

Is the number sentence an expression or equation? Circle the answer:

1) The total cost of bananas at $0.30 per banana can be calculated using the following: $0.30b$

Expression Equation

2) Jake has 48 marbles and wants to divide them equally among his 6 friends. The number of marbles each friend will get is represented by:
$48 \div 6 = m$

Expression Equation

Name: _____

Is the number sentence an expression or equation? Circle the answer:

1) The total cost of bananas at $0.30 per banana can be calculated using the following: $0.30b$

Expression Equation

2) Jake has 48 marbles and wants to divide them equally among his 6 friends. The number of marbles each friend will get is represented by:
$48 \div 6 = m$

Expression Equation

Name: _____

Is the number sentence an expression or equation? Circle the answer:

1) The total cost of bananas at $0.30 per banana can be calculated using the following: $0.30b$

Expression Equation

2) Jake has 48 marbles and wants to divide them equally among his 6 friends. The number of marbles each friend will get is represented by:
$48 \div 6 = m$

Expression Equation

PREVIEW

Name: _____ 92

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) 7 – t

Seven su[illegible]number

2) n [illegible]

3) 8 + b

4) 9r

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

Part 2 Write an algebraic expression for eac[illegible]nt.

1) Nineteen add a number

2) Divide a number by three

3) A number is subtracted by nineteen

4) Triple a number and add seven

5) Subtract 19 from a number, then multiply by four

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Name: _____ 93

Curriculum Connection
C2.2

Writing Algebraic Expressions - Treats

A mathematical expression is similar to an equation, but it does not have an equal sign. We use expressions to describe a mathematical situation.

Instructions Write the expressions for the situations below.

1) Lindsay has *y* amount of cookies. She gives 27 cookies away to the students i[illegible] class.

Expressi[illegible]



2) Co[illegible]th[illegible]nies into *b* pieces. She eats 3 brownies.

Expression:



3) Alyse makes [illegible]kes t[illegible]ually with her 5 friends.

Expression:



4) Hani gives 3 candies to ea[illegible]his [illegible]friends.

Expression:



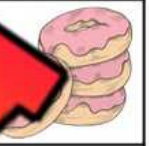
5) Scott has 14 sodas in his fridge and buys [illegible] soda

Expression:



6) Dan buys 3 dozen donuts and eats *d* number of don[illegible]bre[illegible]s

Expression:



7) Steve buys *x* number of cookies and gives 31 to his staff.

Expression:



8) Alexa has 100 suckers that she shares equally with her *f* number of friends.

Expression:



9) Brian has 250 gummy worms and takes *n* number of gummies from his brother.

Expression:



10) Howard gives 4 books each to *s* number of students.

Expression:



PREVIEW

Name: _____ 94

Curriculum Connection
C2.2

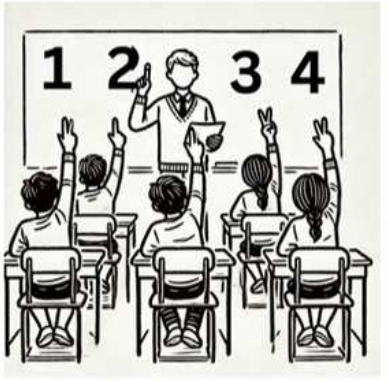
Finger Signals Quiz - Understanding Algebraic Expressions

Objective What are we learning about?

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

Materials What will you need for the activity?

- A list of questions



Instructions How will the activity be completed?

1. Prepare a list of questions with answer choices labeled A, B, C, and D.
2. Explain the finger signals for each answer choice: one finger for A, two fingers for B, three fingers for C, and four fingers for D.
3. Inform the students they will show their answer using the finger signals 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.

PREVIEW

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Curriculum Connection
C2.2

Question	A	B	C	D
A teacher has s students and divides them evenly into 5 groups. How many students are in each group?	$5s$	$5 - s$	$s \div 5$	$5 \div s$
A gardener plants f flowers in each of 8 rows. What is the total number of flowers planted?	$8+f$	$8-f$	$8f$	$f \div 8$
A farmer has c cows and buys 14 more. How many cows does he have now?	$c-14$	$c+14$	$c \div 14$	$14c$
A painter us litres of paint each day for 10 days. Ho paint does he use in total?	$p+10$	$p-10$	$10p$	$p \div 10$
A pain int each day, for 10 day then sp s. How much paint is us d?	$10p-2$	$10+p-2$	$10p+2$	$p \div 10-2$
A cyclist rides b s and more kilometres. What is tal di e	$b+10$	$b-10$	$10b$	$b \div 10$
A baker uses b cups of flou n adds more cups. How much flour	$b+7$	$b-7$	$7b$	$b \div 7$
A writer types w words each min for minutes. What is the total number of wo	$w+3$	$w-30$	$30w$	$w \div 30$
An artist splits a litres of paint into 6 containers and then uses 2 more litres in each container. How much paint is used in each container?	2	÷	÷ 6 + 2	$6a + 2$
A factory produces p parts and then packages them into 4 boxes. How many parts are in each box?	$p \div 4$	$4p$		p
Lily has m marbles. She buys 5 more and then gives away 2. How many marbles does she have now?	$m+5-2$	$m-5+2$	-2	$m \div 2+5$
A baker bakes b batches of cookies, each with 12 cookies. What is the total number of cookies?	$12+b$	$12-b$	$12b$	$b \div 12$
Sam has p pencils. He buys 3 packs of pencils with 4 pencils each and then loses 2 pencils. How many pencils does he have now?	$p+3\times4-2$	$p+3-2\times4$	$p-3+2\times4$	$p \div 3\times4-2$
A gardener plants g flowers in each of 7 rows. He then plants 3 more flowers in each row. How many flowers are there in total?	$7g+3g$	$g\times7+3$	$g\times7+3g$	$7g-3g$

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Name: _____ 96

Curriculum Connection
C2.2

Evaluating Algebraic Expressions - Addition

Part 1 Evaluate the following expressions for $x = 8$

1) $x + 12$	2) $8 + x$	3) $23 + x$	4) $x + 24$
5) 41	6) $63 + x$	7) $82 + 13 + x$	8) $92 + x + 11$

Part 2 Evalu[illegible] ssions for $y = 8$ and $n = -2$

1) $y + (n)$	2) $5 + ( ) + y$	[illegible] $+ (n)$	4) $y + 12 + (n)$
5) $43 + y + (n)$	6) $(n) + y + 20$	7) [illegible]	[illegible] $53 + (n) + y$

Part 3 Evaluate the following expressions for x = -5 and p = 5[illegible]

1) $(x) + (p) - 10$	2) $10 + (x) + (p)$	3) $15 + (x) + (p)$	4) $(x) + 11 + (p)$
5) $(p) + 20 + (x)$	6) $(x) + 18 + (p)$	7) $(x) + 5 + (p)$	8) $22 + (p) + (x)$

PREVIEW

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Curriculum Connection
C2.2

Evaluating Algebraic Expressions - Subtraction

Subtraction Integers Rule

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

PREVIEW

Part 1

Evaluate the following expressions for $x = 5$

1) $x - 12$	2) x	23 - x	4) $x - 24$
5) $41 - x$	6) $63 - x$	- 12	92 - x - 11

Part 2

Evaluate the following expressions for $y = 10$ and n =

1) $y - (n)$	2) $11 - (n) - y$	3) $15 - y - (n)$	4) $y - 6 - (n)$
5) $21 - y - (n)$	6) $(n) - y - 13$	7) $y - (n) - 3$	8) $32 - (n) - y$

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Curriculum Connection
C2.2

Evaluating Algebraic Expressions - Cafe

Whitney works at a café selling muffins, coffee, tea, and scones. She uses algebraic expressions to determine the cost of her customer's orders.



Menu	
Scone (s)	$3.50
Muffin (m)	$2.25
Tea (t)	$2.00
Coffee (c)	$2.50

Solve Write t[illegible]ic expression and then evaluate using the menu prices.

Customer Order	Expression	Answer
1) 2 coffees, 1 muffin	[illegible] $c + m$ [illegible] + 2.25	$7.25
2) 3 teas, 1 scone		
3) 4 coffees, 2 teas		
4) 2 coffees, 2 teas, 2 muffins		
5) 3 teas, 4 muffins, 2 scones		
6) 10 coffees, 10 muffins		
7) 5 teas, 3 muffins, 2 scones		
8) 3 coffees, 3 scones		

PREVIEW

Name: _____ 100

Curriculum Connection
C2.2

Evaluating Algebraic Expressions - Canteen

Brad works at a canteen selling chips, drinks, and gummies. He calculates the cost of orders (o) and subtracts it from the payment (p) he is given - to determine how much change to give his customers.

Menu	
Chips	$1.50
Drinks	$2.50
Gummies	$1.00

Evaluate Solve the subtraction expressions below.

le Values		Expression - Customer's Change
	p	*p* − *o*
$ 0	20.00	
$17.50	$2	
$9.25	$	
$35.65	0	

PREVIEW

Evaluate Calculate the order and [illegible] tomer's change.



Order			Expression	Pay	Change (*c*)
c	*d*	*g*			
1	0	2	*c* + (2 x *g*) 1.50 + (2 x 1.00) 1.50 + 1.00 $2.50	$5.	[illegible]
3	1	0		$10.00	
1	2	1		$10.00	
2	2	2		$20.00	
3	3	5		$20.00	

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Name: _____ 105

Curriculum Connection
C2.3

Addition – Are They Equal?

Are the equations equal? Put a slash through the equal sign for any equations that are not equal.

8 + 4 = 12 23 + 15 ≠ 36 47 + 13 = 50

Part 1

Put a slash through the equal sign (≠) if it is not balanced.

[illegible]	2) 51 + 15 = 67	3) 47 + 13 = 50
4) 65 + [illegible]	[illegible]74 + 13 = 87	6) 92 + 11 = 103
7) 95 + 25 = 110	[illegible]	9) 144 + 17 = 171
10) 155 + 26 = 181	11) [illegible]144 = [illegible]	12) 212 + 12 = 224

Part 2

Fill in the missing number to bala[illegible]e equatio[illegible]

1) ☐ + 12 = 95	2) ☐ + 25 = 50	3) ☐ [illegible]
4) 72 + 14 = ☐	5) 64 + ☐ = 80	6) ☐ + 50 = 65
7) 68 + ☐ = 82	8) 83 + 15 = ☐	9) 89 + ☐ = 102
10) 105 + ☐ = 116	11) 121 + 14 = ☐	12) 145 + ☐ = 160

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Name: _____ 106

Curriculum Connection
C2.3

Addition – Find the 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.

1) … = 18 *n* =	2) *n* + 15 = 22 *n* =	3) 32 + *n* = 41 *n* =
4) 45 + *p* = … *p* =	5) 41 + *p* = 62 *p* =	6) *p* + 63 = 81 *p* =
7) 77 + *y* = 96 *y* =	8) *y* … 115 *y* =	9) 132 + 15 = *y* *y* =
10) 157 + *t* = 192 *t* =	11) … + *t* = 21 *t* =	12) 236 + *t* = 248 *t* =
13) 123 + *a* = 243 *a* =	14) 165 + *a* = … *a* =	15) … + *a* = 308 …
16) 238 + 449 = *s* *s* =	17) 311 + *n* = 445 *s* =	…

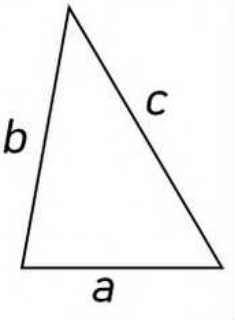
PREVIEW

Part 2 The formula for calculating the perimeter of a shape is to add the side lengths.

Use the following equation to find the perimeter of a triangle: $p = a + b + c$

1) *a*=6 *b*=12 *c*=10	p=
2) *a*=7 *b*=15 *c*=19	p=
3) *a*=9 *b*=17 *c*=23	p=

4) *a*=22 *b*=15 *c*=41	*p*=
5) *a*=19 *b*=32 *c*=49	*p*=
6) *a*=25 *b*=23 *c*=46	*p*=



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Name: _____ 110

Curriculum Connection
C2.3

Adding Decimals – Solve The Variable

Practice Find the value of the variables below.

1) $4.5 + n = 6$ $n =$	2) $n + 5.5 = 7$ $n =$	3) $s + 5.3 = 8$ $s =$
4) [illegible] $p =$	5) $9.2 + p = 11$ $p =$	6) $10.1 + r = 11.5$ $r =$
7) $15.3 + n =$ [illegible] $n =$	8) [illegible] $5 = 20.5$	9) $t + 14.4 = 18$ t =
10) $24.6 + n = 28.2$ $n =$	11) [illegible] $28.6 + 4$ $t =$	12) $31.6 + 5 = p$ [illegible]

PREVIEW

Word Problem Write the equations below and find the [illegible]

1) Jake has 1.25 pizzas left over from last night. His friend brings over some more pizza. They now have 4.25 pizzas. How much pizza did his friend bring?



2) Kelly is 1.5 meters tall. She hopes to grow to be 1.75 metres tall. How much will she have to grow?

3) Carter has $1.33 but needs $1.88 to buy a bag of chips. How much more does he need?



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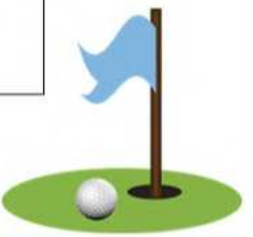
Curriculum Connection
C2.3

Addition Equations – Golf Tournament

Zack hosted a 2-round golf tournament. He has the results and needs to find out who won the tournament. The leaderboard is below but is missing numbers.



Instructions Fill in the leaderboard.

Pl	Round 1	Round 2	Final Score
[illegible]	-2	-5	
Charlie			-5
Dominic		-2	-6
Kayden		-1	
Silas			-1
Lillian	3		
Brooklyn	-2		-5
Natalie			-1
Andrew	-4	6	
Santiago		5	

PREVIEW

Results Who won the golf tournament?

1) Who won the golf tournament?	
2) The entry fee for the tournament was $100. 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 $1400. Write an equation that determines how many golfers (g) participated in the tournament.	

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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.



Instructions Fill in the leaderboard.

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

PREVIEW

Results Who won the golf tournament?

1) Who won the golf tournament?	
2) The entry fee for the tournament was $100. 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 $1400. Write an equation that determine how many golfers (g) participated in the tournament.	

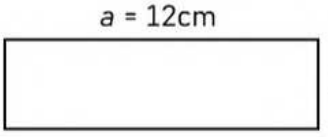
Name: _____ 114

Curriculum Connection
C2.3

Addition Equations – Perimeter of a Rectangle

When we calculate the perimeter of a rectangle, we need to add all the sides together. The order of how we decide to add the sides together will not affect the answer due to the communitive property of addition.

Formula 1 – $p = a + b + a + b$
$p = 12 + 4 + 12 + 4$
$p = 32$



Formula 2
$p = 2(a + b)$
$p = 2 \times (12 + 4) = 32$

PREVIEW

Part 1 Write equations for the side lengths below.

#	Side length *a*	Side length *b*	Equation 1	Equation 2
1	5			
2	7			
3	11			
4	15	12		
5	17	15		
6	23	21		
7	28	31		
8	41	46		
9	55	24		
10	35	43		

Part 2 Using multiplication and addition, write two equations for the side lengths.

#	Side Length *a*	Side Length *b*	Equation 1	Equation 2
1	7	3	2 x (7 + 3) = 20	2 x (3 + 7) = 20
2	6	8		
3	9	4		
4	5	7		

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Curriculum Connection
C2.3

Subtraction – Are They Equal?

Are the equations equal? Put a slash through the equal sign for any equations that are not equal.

16 - 8 = 8 95 - 11 ≠ 86 105 - 12 = 93

Part 1 Put a slash through the equal sign (≠) if it is not balanced.

[illegible]	2) 56 - 11 = 45	3) 59 - 16 = 42
4) 72 - [illegible]	[illegible]66 - 27 = 49	6) 79 - 16 = 64
7) 126 - 20 = 109	[illegible]	9) 174 - 13 = 161
10) 181 - 15 = 166	11) 126 - 20 = [illegible]	12) 195 - 30 = 165

PREVIEW

Part 2 Fill in the missing number to balan[illegible]uati[illegible]

1) 36 - 6 = ☐	2) 53 - 7 = ☐	3) ☐ = 71
4) 58 - ☐ = 45	5) 48 - ☐ = 39	6) 65 - ☐ = 55
7) 105 - ☐ = 99	8) 146 - 15 = ☐	9) 91 - ☐ = 75
10) 158 - ☐ = 136	11) 185 - 17 = ☐	12) ☐ - 12 = 67

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Curriculum Connection
C2.3

Subtraction – Find the Variable

A **variable** is a letter that represents an unknown number. When we don't know a number, we can use a letter to take the place of the unknown number.
Example: 39 – n = 25
We can figure out the unknown number by balancing the equation. In this equation, n = 14.

Part 1 Find out the value of the variable.

1) 32 – *n* = [illegible] *n* =	2) *n* – 21 = 35 *n* =	3) 52 – *n* = 41 *n* =
4) 73 – 16 [illegible] *p* =	5) [illegible]4 – *p* = 53 [illegible]	6) *p* – 32 = 50 *p* =
7) 87 – *y* = 61 *y* =	8) [illegible] [illegible]	9) 102 – 13 = *y* *y* =
10) 109 – *t* = 94 *t* =	11) 124 – [illegible] *t* =	[illegible]) 143 – *t* = 129 [illegible] =
13) 158 – *a* = 127 *a* =	14) 174 – *a* = 142 *a* =	15) [illegible] *a* [illegible]75

PREVIEW

Part 2 Calculate the change a customer gets when they buy something.

When a customer buys something, the formula for calculating their change (*c*) is money given (*m*) subtracted from the price (*p*) of the item. Therefore, <u>*c* = *m* – *p*</u>

m = 20 *p* = 12	*c* = <u>20</u> – <u>12</u>	*c* = <u>8</u>
m = 40 *p* = 19	*c* = ___ – ___	*c* =
m = 60 *p* = 27	*c* = ___ – ___	*c* =

m = 80 *p* = 61	*c* = ___ – ___	*c* =
m = 100 *p* = 68	*c* = ___ – ___	*c* =
m = 100 *p* = 44	*c* = ___ – ___	*c* =

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Name: _____ 123

Curriculum Connection
C2.3

Integer Patterns – Average Temperatures

Instructions Answer the questions below.

The table below shows the average temperatures in four Canadian cities. We can use the table to compare the average temperatures in February and October.

City	October (o) Temperature	February (f) Temperature	Temperature Difference (d)
C… (…B)	6	-7	
…(ON)	10	-3	
Victoria (…)	12	6	
Yellowkn…		-21	
Winnipeg (MB)		-14	
Ottawa (ON)		-8	
Eureka (NU)	-21		
Quebec City (QC)	7		

PREVIEW

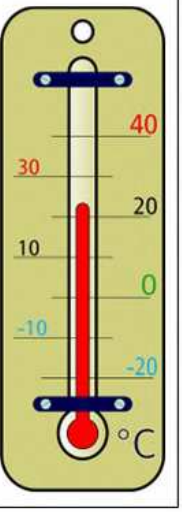
a) Fill in the table with the temperature di… ce fr… …to February.

b) Write an equation using the variables: f, o, and … …nds th… …rence between the temperatures in each city from Oct… …ebr…

c) Which city had the largest difference between their October and … …ary months?

d) What is the difference between Victoria's February temperature and Eureka's February temperature?

e) What is the difference between Yellowknife's October temperature compared with Eureka's October temperature?



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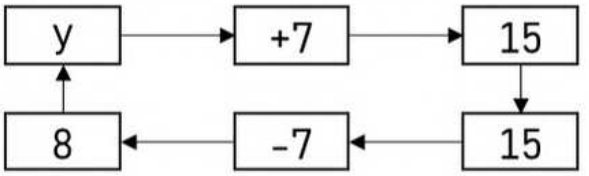
Name: _____ 124

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

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

PREVIEW

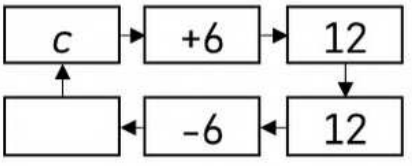
1) $t - 3 = 10$



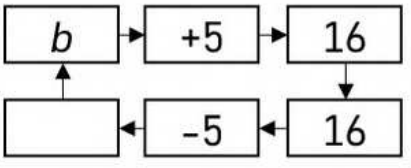
2) $r - 5 = 8$



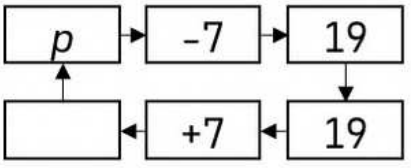
3) $c + 6 = 12$



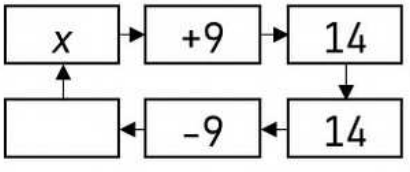
4) $b + 5 = 16$



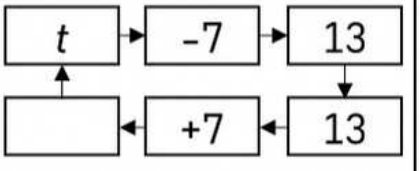
5) $p - 7 = 19$



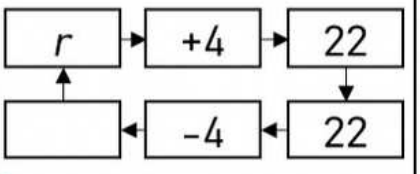
6) $x + 9 = 14$



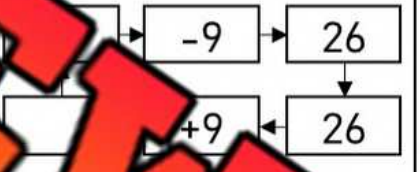
7) $t - 7 = 13$



8) $r + 4 = 22$



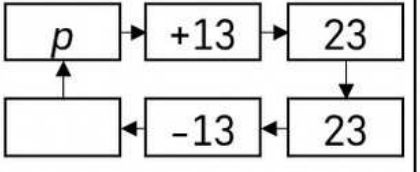
9) $c - 9 = 26$



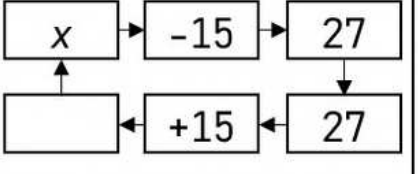
10) $b + 11 = 31$



11) $p + 13 = 23$



12) $x - 15 = 27$



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Curriculum Connection
C2.3

Multiplication – Find the 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 $7 \times n = 14$

We can figure out the unknown number by balancing the equation – $n = 2$.

PREVIEW

Part 1

Find out the value of the variable.

1) 3 $n =$	2) $4n = 16$ n	3) $8(s) = 48$ $s =$
4) $9 \times 4 = p$ $p =$	5	6) $7k = 21$ $k =$
7) $3n = 21$ $n =$	$n =$ n	9) $n \times 7 = 77$ $n =$
10) $5n = 45$ $n =$	11) $8 \times 7 = t$ $t =$	$9 \times 4 = p$
13) $8n = 96$ $n =$	14) $10n = 100$ $n =$	$7d$
16) $9(s) = 27$ $s =$	17) $8 \times 8 = s$ $s =$	18) $t =$

Part 2

Calculate the area using the variables for length and width.

The formula for calculating area is: $A = L \times W$
Calculate the area in the questions below using the values for the variables L and W

L = 3 W = 9	A =
L = 8 W = 7	A =
L = 10 W = 11	A =

L = 5 W = 9	A =
L = 11 W = 7	A =
L = 4 W = 13	A =

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Name: _____ 130

Curriculum Connection
C2.3

Writing Multiplication Equations – Bakery

Jasmine works at a bakery. She sells bread, muffins, cakes, and donuts. When a customer orders from Jasmine, she uses an equation to figure out their total (t) – how much they owe for their order.

Bread (b)	Muffin (m)	Cake (c)	Donut (d)
$5.00 	$3.00 	$14.00 	$2.00 

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

#					Equation	Answer
	b	m	c	d		
1	1	2	0	3	$t = 5 + 2m$	$t = 5 + 6$ $t = 11$
2	1	0	0	1		
3	0	2	1	0		
4	1	1	0	2		
5	2	2	0	0		
6	3	1	1	0		
7	0	2	1	2		
8	2	0	1	3		
9	1	2	1	4		

PREVIEW

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Name: _____ 131

Curriculum Connection
C2.3

Multiplying Decimals – Solve the Variable

Practice Find the value of the variables below.

1) $2.5n = 12.5$ $n =$	2) $5.5n = 11$ $n =$	3) $2.2s = 8.8$ $s =$
4) [illegible] p $p =$	5) $6.3p = 18.9$ $p =$	6) $11.1r = 55.5$ $r =$
7) 7.6 [illegible] $n =$	8) $10.1s = 50.5$ [illegible]	9) $6.7n = 20.1$ $n =$
10) $6.5n = 45.5$ $n =$	11) [illegible] [illegible]	12) $7.5s = 45$ $s =$

PREVIEW

Word Problem Write the equation using the v[illegible] [illegible]he equation.

1) It rained 4.1mm every hour. In total, it rained 28.7mm. How [illegible] did it rain?



2) Parker earns $13.50 per hour working on a farm. He made $81 today. How many hours (h) did he work?



3) River bought 3 cookies. The 3 cookies have a total of 9.9 grams of sugar. How much sugar (s) is in each cookie?



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Name: _____ 132

Curriculum Connection
C2.3

Math Basketball: Multiplication Equations Challenge

Objective

What are we learning about?



To reinforce students' understanding and application of multiplication of decimals through engaging word problems and a fun basketball shooting game.

Materials

What will you need for the activity?

- Index cards with problems
- Recording sheets (one per team)
- Paper balls (one per team)
- Bins or baskets (one per team)
- Desks (one per team)

Instructions

How will you complete the activity?

1. Arrange the classroom so that there is enough space for multiple teams to work simultaneously. Place a desk about 6 feet away from the designated spot.
2. Place a stack of index cards with problems on each desk.
3. Provide each team with a recording sheet and a pencil.
4. Divide the students into teams of about five members each.
5. Each team stands in a line behind their respective desk.
6. The first student in line flips over an index card and solves the problem.
7. Once the answer is recorded, the student attempts to shoot the paper ball into the bin.
8. If the student makes the shot, they place a tally mark on the team's tally sheet for a point. If they miss, no tally is given.
9. The student then goes to the end of the line, and the next student steps up to the desk to repeat the process.
10. The activity continues until all index cards have been solved.
11. Once all index cards are completed, the teacher collects the recording sheets and reviews the answers with the class.
12. For each incorrect answer, the team loses one point.
13. The team with the highest number of points after deductions is declared the winner.

PREVIEW

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Name: _____ 134

Curriculum Connection
C2.3

Index Cards | Use the following table for the game.

A machine produces 9.3 parts per minute and produced a total of 74.4 parts. How many minutes (*m*) did the machine run?
A delivery truck travels at a speed of 10.2 kilometers per hour and travelled a total distance of 71.4 kilometers. How many hours (*h*) did it travel?
A worker [illegible]7.8 per hour and earned a total of $62.4. How many hours (*h*) did the work[illegible]
A stud[illegible]eads [illegible]er minute and read a total of 37.6 pages. How many minutes (*m*) d[illegible]t r[illegible]
A train travels at a [illegible]d of [illegible] hour and traveled a total distance of 92 miles. How many hours [illegible]e trai[illegible]?
A farmer plants 5.6 seeds per r[illegible]w an[illegible]f 44.8 seeds. How many rows (*r*) did the farmer plant?
A construction worker lays 3.9 bricks per mi[illegible]nd la[illegible]f 31.2 bricks. How many minutes (*m*) did the worker lay bricks?
A hairdresser cuts 2.4 heads of hair per hour and cut a t[illegible]of 1[illegible] many hours (*h*) did the hairdresser work?
A dog drinks 1.7 litres of water per day. It drank a total of 13.6 litres[illegible] many days (*d*) did it take for the dog to drink that much water?
A bus travels at a speed of 12.6 miles per hour and travels a total distance of 88.2 miles. How many hours (*h*) did the bus travel?
A cook prepares 4.2 dishes per hour and has prepared a total of 33.6 dishes. How many hours (*h*) did the cook work?
A scientist measures 3.8 grams of a substance per sample and measured a total of 30.4 grams. How many samples (*s*) were measured?

PREVIEW

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Name: _____ 136

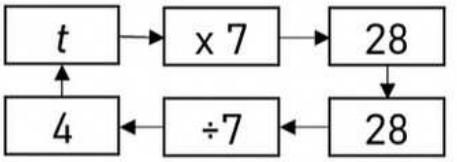
Curriculum Connection
C2.3

Multiplying Equations – Flow Chart

Steps to fill in a flow chart:

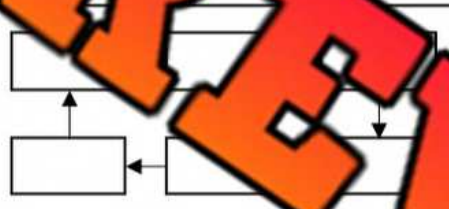
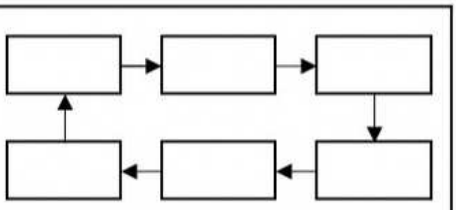
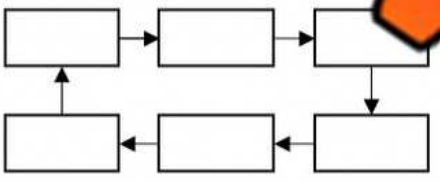
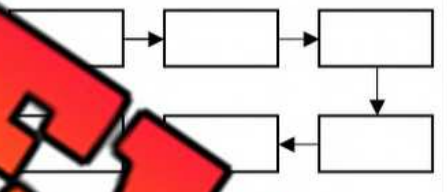
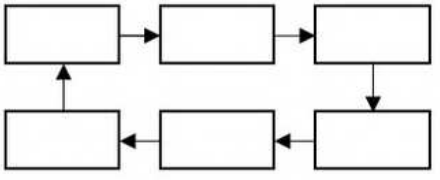
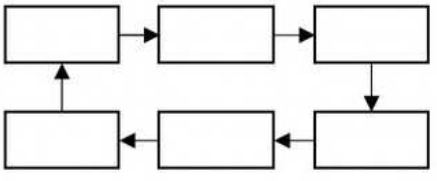
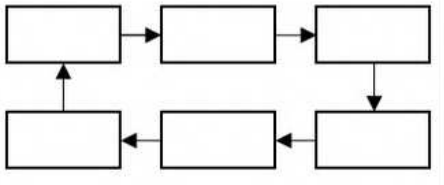
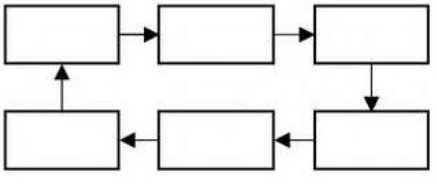
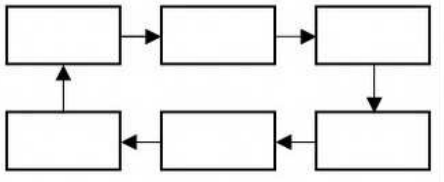
1) Write the variable in the first box.
2) Write the second value in the second box.
3) Write the answer in the third box.
4) We are working in reverse now. Write the answer in the first box.
5) We d opposite to the next box as we did with the second box.
6) Fill i t box to find the value of the variable,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

Example: $7t = 28$



PREVIEW

Instruc s in the blank in the flow chart.

1) $4t = 12$		$11t = 77$	
2) $8r = 48$		$= 48$	
3) $5c = 35$		8) $7c = 56$	
4) $6b = 42$		9) $12b = 144$	
5) $9p = 72$		10) $9n = 63$	

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Curriculum Connection
C2.3

Division – Are They Equal?

Are the equations equal? Put a slash through the equal sign for any equations that are not equal.

$8 \div 2 \neq 5$ $9 \div 3 = 3$ $15 \div 3 \neq 3$

Part 1

Put a slash through the equal sign (≠) if it is not balanced.

[illegible]	2) $45 \div 5 = 9$	3) $36 \div 4 = 8$
4) $48 \div 4$ [illegible]	[illegible] $\div 3 = 9$	6) $35 \div 7 = 5$
7) $55 \div 5 = 11$	8) [illegible]	9) $42 \div 7 = 6$
10) $110 \div 11 = 10$	11) $18 \div$ [illegible]	12) $24 \div 6 = 4$

PREVIEW

Part 2

Fill in the missing number to balance the equation.

1) $42 \div 6 =$ ☐	2) $49 \div 7 =$ ☐	3) $24 \div 4$ ☐
4) $28 \div$ ☐ $= 4$	5) $18 \div$ ☐ $= 3$	6) $32 \div$ ☐ $= 4$
7) ☐ $\div 5 = 8$	8) ☐ $\div 8 = 7$	9) ☐ $\div 4 = 4$
10) $63 \div 7 =$ ☐	11) $48 \div$ ☐ $= 4$	12) ☐ $\div 8 = 9$

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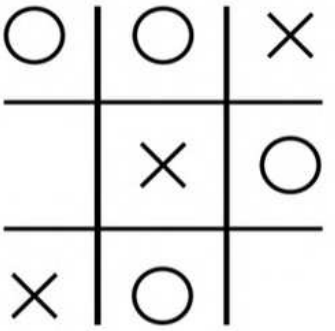
Curriculum Connection
C2.3

Math Tic-Tac-Toe: Solving Variables

Objective — What are we learning about?

To help students practice solving division equations involving variables in a fun and interactive way through a Tic-Tac-Toe game.



Materials — What will you need for the activity?

- Tic-Tac-Toe boards provided

Instructions — How will you complete the activity?

1. Find a partner to play the game.
2. The goal is to solve and balance the algebraic equations in each 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 that square to 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.

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Curriculum Connection
C2.3

Tic-Tac-Toe

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

$96 \div t = 12$	$64 \div 8 = x$	$y \div 5 = 6$
$45 \div 9 = z$	$84 \div 12 = t$	$k \div 11 = 4$
$p \div 6 =$	$\div x = 9$	$30 \div y = 5$

$120 \div p = 15$	$56 \div 8 = x$	$y \div 4 = 8$
$32 \div 8 = z$	$99 \div 11 = t$	$k \div 12 = 3$
$144 \div t = 12$	$80 \div x = 10$	$p \div 5 = 8$

$81 \div k = 9$	10 x	
$50 \div 5 = z$	$33 \div 11 = t$	$k \div 8 =$
$72 \div t = 8$	$90 \div x = 9$	$p \div 10 = 4$

$144 \div p = 12$	$63 \div 7 = x$	$y \div 9 = 7$
$36 \div$	$110 \div 10 = t$	$k \div 5 = 9$
$150 \div$	$56 \div x$	$p \div 8 = 9$

36 ÷ a + 7 = 13	90 ÷ b − 5 = 4	c ÷ 3 + 8 = 14
40 ÷ d + 6 = 14	84 ÷ e − 2 = 5	f ÷ 12 + 1 = 9
49 ÷ g − 4 = 3	75 ÷ h + 3 = 10	i ÷ 5 − 2 = 4

60 ÷ j + 4 = 10	108 ÷ k − 3 =	l ÷ 6 + 5 = 13
45 ÷ m + 7 = 14	64 ÷ n − 4 = 4	o ÷ 8 + 2 = 10
81 ÷ p − 5 = 4	100 ÷ q + 2 = 12	r ÷ 4 − 3 = 5

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Curriculum Connection
C2.3

Writing Division Equations - Sharing

Riley is the best boss! Every week, she brings in treats for her staff to share. Each week, there are different treats and a different number of staff members working at the office.



Questions Use a formula to find out how many treats (t) each person gets.

#		# of Staff	Formula	Answer
1	donu	8	$\frac{d}{s} = t$	$\frac{16}{8} = 2$
2	12 coo		$\frac{c}{s} = t$	$\frac{12}{6} = 2$
3	24 muffins (m)	4		
4	60 slices of pizza (p)	20		
5	42 bagels (b)	7		
6	36 donuts (d)	12		
7	40 cookies (c)	10		
8	56 muffins (m)	8		
9	27 pastries (p)	9		
10	54 cookies (c)	6		
11	55 slices of pizza (p)	11		
12	60 bagels (b)	15		
13	48 muffins (m)	12		

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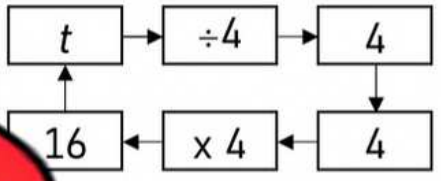
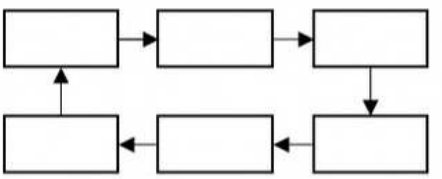
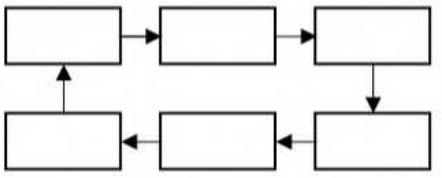
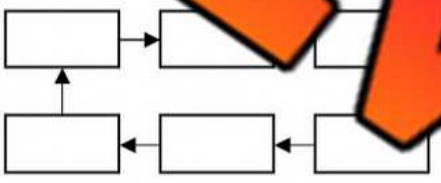
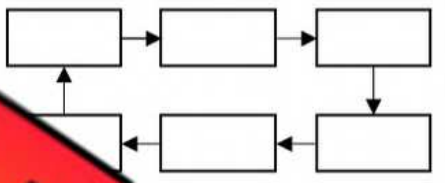
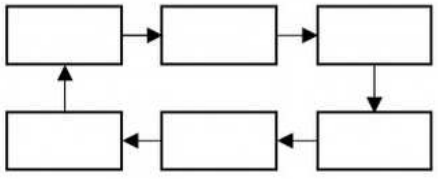
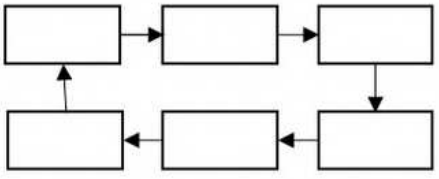
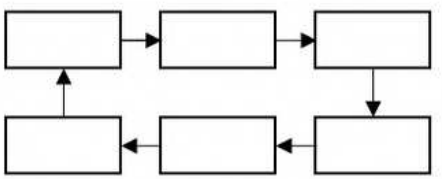
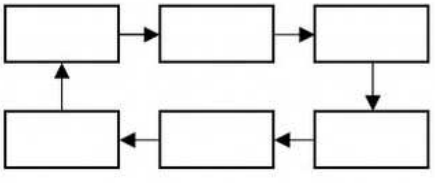
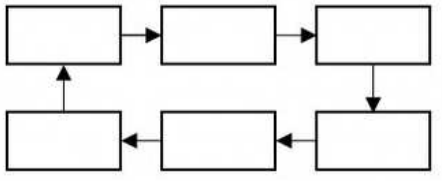
Curriculum Connection
C2.3

Division Equations – Flow Chart



Instructions Fill in the blank in the flow chart.

1) $\frac{t}{4} = 4$	
7) $\frac{t}{11} = 7$	
2) $\frac{r}{6} = 8$	
8) $\frac{r}{8} = 9$	
3) $\frac{c}{3} = 9$	
9) $\frac{c}{7} =$	
4) $\frac{b}{8} = 7$	
10) $\frac{b}{12} = 4$	
5) $\frac{p}{4} = 9$	
11) $\frac{p}{6} = 8$	
6) $\frac{n}{7} = 3$	
12) $\frac{n}{9} = 5$	

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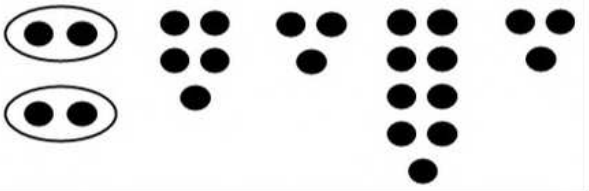
Curriculum Connection
C2.3

Equivalent Forms of an Equation

When we add or subtract the same amount from both sides of an equal sign, the equation does not change. This is called **preservation of equality.**

Instructions Draw circles to represent the equations.

#	Original Equation	Change	New Equation
1	$2n + 5 = 9$ 	Add 3	$2n + 5 + 3 = 9 + 3$ 
2	$7 + n$		
3	$13 - n = 6$	Add 3	
4	$2n + 6 = 14$	Subtract 5	
5	$5 + 3n = 17$	Add 7	

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Curriculum Connection
C2.3

Equivalent Forms of an Equation

Instructions Write four equivalent forms of the equations below.

#	Original Equation
1	$5n = 20$
Add [illegible] each side	
Subtract [illegible] side	
Multiply each [illegible]	
Divide each [illegible] by 5	

#	Original Equation
2	[illegible] $= 2 = 4$
Add 6 to each side	
Subtract 11 from each side	
Multiply each side by 2	
Divide each side by 7	

#	Original Equation
3	$7n - 8 = 34$
Add 25 to each side	
Subtract 20 from each side	
Multiply each side by 4	
Divide each side by 2	

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C2.3

Equivalent Forms of an Equation

When we change an equation by adding, subtracting, multiplying, and dividing the same amount from both sides, does the equation change? Investigate below!

Instructions Fill in the table below.

#	Original Equation	Change	New Equation
1	$n + 8 = 20$	Add 8 to each side	$5n + 8 = 20 + 8$ $n = 4$
2	$18 - n = 6$	Add 6 to each side	
3	$15 + n = 3$ $n =$	Subtract 1 from each	
4	$6n = 18$ $n =$	Multiply each side by 2	
5	$4n = 24$ $n =$	Divide each side by	
6	$52 - n = 38$ $n =$	Subtract 15 from each side	
7	$68 + n = 93$ $n =$	Add 14 to each side	
8	$5n = 50$ $n =$	Multiply each side by 5	
9	$2n = 24$ $n =$	Divide each side by 2	

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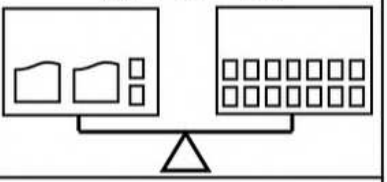
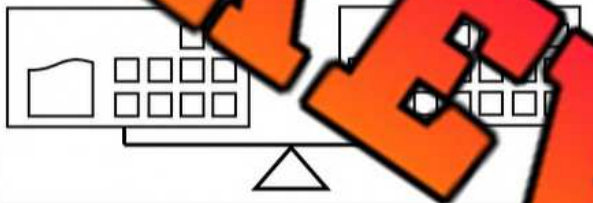
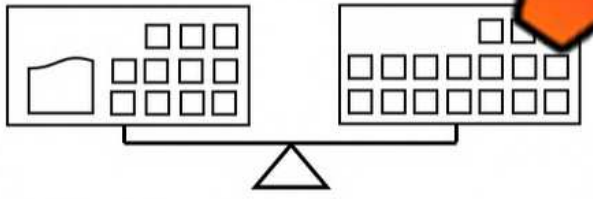
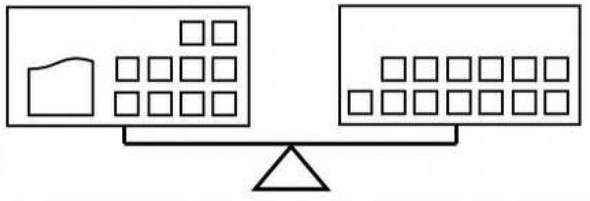
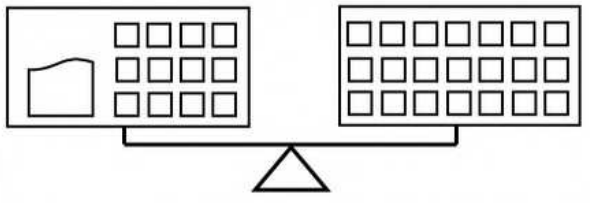
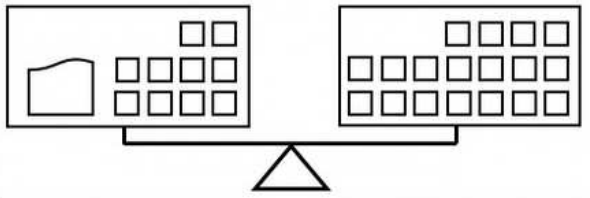
C2.3

Representing Equivalent Equations – Balance Scale

Blocks are placed on a balance scale. Some of the blocks on the left side of the scale are put in a bag before being placed on the scale. Use *b* to represent 'bag' in your equation.

Instructions Write 2 different equations for each pictorial representation.

#	Pictorial Representation	Equation # 1	Equation # 2
Ex)		$b + 8 = 14$	$2b + 2 = 14$ 
1)			
2)			
3)			
4)			
5)			

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C2.3

Matching Game: Do The Variables Match?

Objective — What are we learning about?

To enhance students' understanding of equivalent variables. Students will identify and match pairs of equations where the variable yields the same value, fostering critical th and problem-solving skills in a collaborative group setting.

PREVIEW

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 g 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.

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C2.3

Cards | Matching Game Cards

$x + 3 = 7$	$2x - 1 = 7$
$4y - 1 = 15$	$2y + 1 = 11$
$2z + 1 = 11$	$3z - 2 = 13$
$3w - 2 = 16$	$5w - 7 = 23$
$x + 6 = 20$	$2x - 4 = 24$

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Curriculum Connection
C2.3

Cards | Matching Game Cards

$4w + 1 = 37$	$3w + 10 = 37$
$x + 9 = 40$	$5x - 4 = 166$
$2y - 1 = 29$	$4y - 31 = 29$
$3z + 4 = 31$	$5z + 2 = 47$
$4w - 8 = 36$	$2w + 14 = 36$

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Curriculum Connection
C2.4

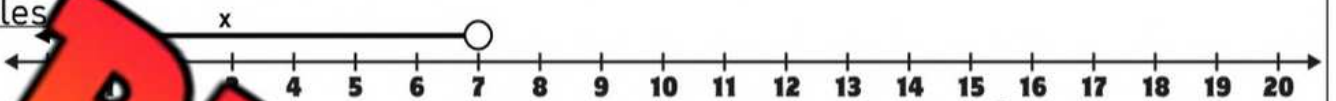
Introduction to Inequalities

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.

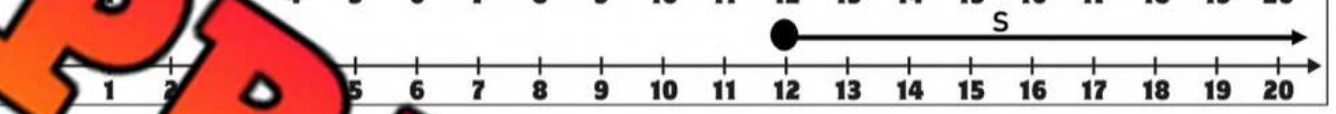
We often use a number line to graph the range of values that hold true for an inequality. An open dot on a number line is used when an inequality involves "less than" or "greater than", and a closed dot is used when it also includes "equal to".

Examples

X < 7



S ≥ 12



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Questions

[illegible] the in[illegible]y on the number line and write the word form.

1) X ≥ 9



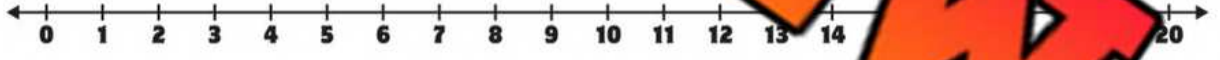
Word Form - x is greater than or equ[illegible]

2) X ≤ 13



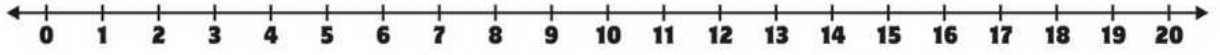
Word Form - _____

3) X < 5



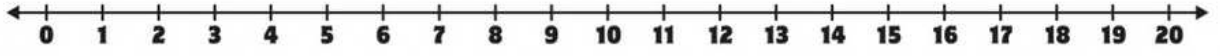
Word Form - _____

4) X > 15



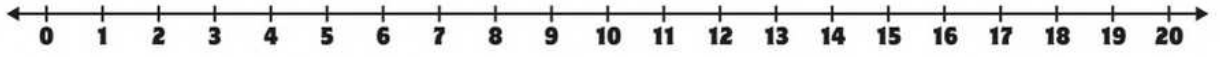
Word Form - _____

5) X ≥ 14



Word Form - _____

6) X ≤ 12



Word Form - _____

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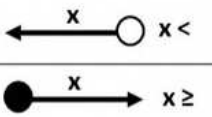
Curriculum Connection
C2.4

Solving Inequalities - Addition



Questions Graph the addition inequalities using the number line.

1) $4 + x > 11$

2) $5 + x \leq$

3) x

4) $x + 3 \leq 15$

5) $7 + x \geq 15$

6) $6 + x > 19$

7) $x + 3 > 8$

8) $13 + x \geq 19$

9) $14 + x > 20$

10) $x + 13 \leq 16$

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Curriculum Connection
C2.4

Inequalities – Multiple Choice

Questions Circle the values that satisfy each inequality.

1) $x > 32$

47 19 25 33

2) $x < 46$

45 50 61 47

3) x

72 [illegible]

4) $x > 61$

60 56 63 61

5) $x < 78$

76 79 75 78

$x \leq 92$

99 91

7) $x > 64$

62 65 64 68

8) $x <$

88 90 [illegible]

9) $x \leq 85$

91 85 86 84

10) $x > 98$

97 95 96 99

11) $x < 82$

85 87 80 82

12) $x < 99$

98 100 99 97

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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 $x + 9 \leq 19$ in the set (9, 12, 7, 16, 13, 6, 5)

Numbers that fit: _____

3) Solve the inequality $x + 9 \leq 14$ in the set (1, 5, 6, 4, 8, 9, 3)

Numbers that fit: _____

4) Solve the inequality $x + \_ < 17$ in the set (9, 8, 6, 4, 2, 7, 9, 1)

Numbers that fit: _____

5) Solve the inequality $x + 25 \leq 33$ in the set (7, 10, 13)

Numbers that fit: _____

6) Solve the inequality $x + 31 > 36$ in the set (3, 5, 7, 6, 9, 1, 4)

Numbers that fit: _____

7) Solve the inequality $48 + x > 63$ in the set (15, 14, 17, 19, 22, 12, 28)

Numbers that fit: _____

8) Solve the inequality $68 + x < 91$ in the set (18, 22, 19, 23, 25, 27, 15)

Numbers that fit: _____

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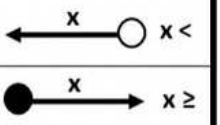
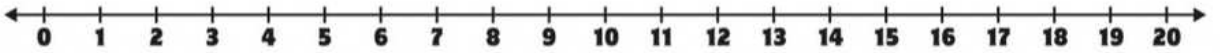
Curriculum Connection
C2.4

Solving Inequalities - Subtraction

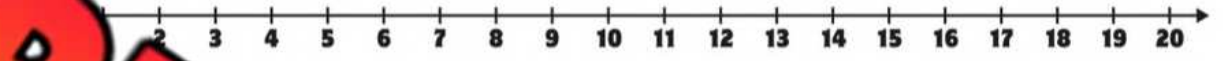


Questions Graph the subtraction inequalities using the number line.

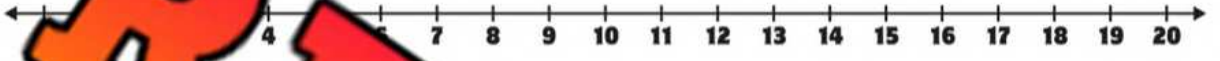
1) $15 - x > 8$



2) $19 - x$ [illegible]



3) x [illegible]



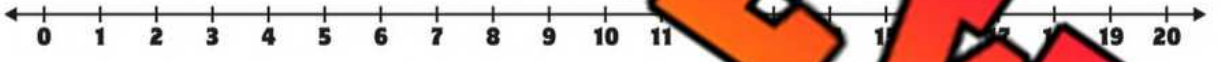
4) $x - 11 \leq 6$



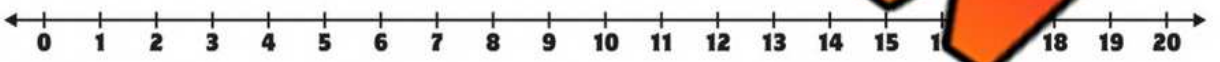
5) $15 - x \geq 4$



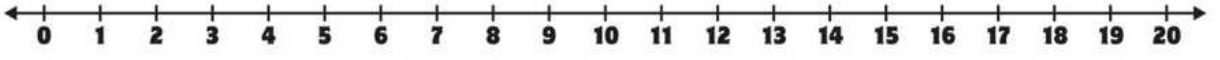
6) $14 - x > 2$



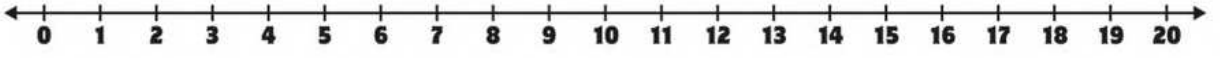
7) $x - 3 > 10$



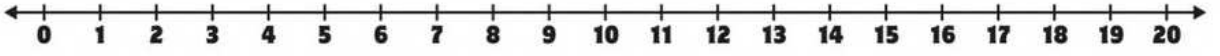
8) $13 - x \geq 5$



9) $17 - x > 8$



10) $x - 5 \leq 9$



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Curriculum Connection
C2.4

Inequalities – Adding and Subtracting

Questions Solve the inequalities below.

1) $x > 6 + 12 - 5$

x = 13

2) $x < 9 \times 3 - 8$

3) $y \leq 1$

4) $t \geq 5 - 4 + 20$

5) $x < 8 + 10 - (4 \times 2)$

$p \leq 27 - 7 + 15$

7) $x > 6 \times 5 \div 2$

8)

9) $x \leq 16 \div 4 \times 10$

10) $x > 65 - 6 + 13$

11) $x < 9 \times (4 + 6)$

12) $x < (24 \div 8) \times 6$

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Exit Cards

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

Name: _____

Solve the inequalities below

a) $x \leq 15 \div 5 \times 9$

b) $x > 80 - 5 \times 10$

Name: _____

Solve the inequalities below

a) $x \leq 15 \div 5 \times 9$

b) $x > 80 - 5 \times 10$

Name: _____

Solve the inequalities below

a) $x \leq 15 \div 5 \times 9$

b) $x > 80 - 5 \times 10$

Name: _____

Solve the inequalit

a) $x \leq$

b) $x > 80 - 5 \times 10$

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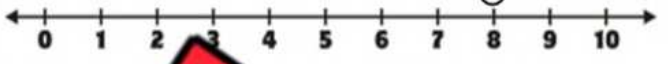
Curriculum Connection
C2.4

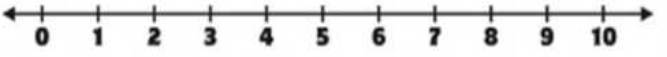
Graphing Inequalities – Multiple Operations

Questions Graph the inequalities on the number line.

1) $x > 3 + 9 - 4$



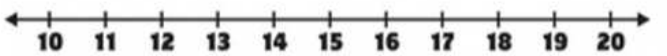
2) $x < 12 - 10 + 5$



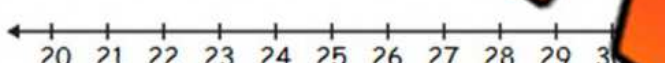
3) $x \geq 15$ [illegible] 11



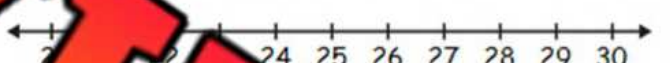
4) $x > 18 - 12 + 11$



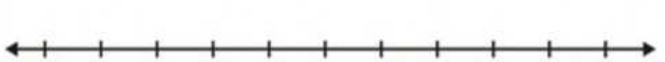
5) $x \geq 15 \times 3 - 20$



$x \leq 48 \div 6 + 15$



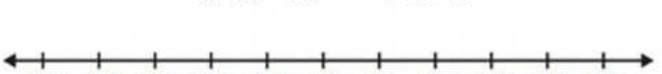
7) $x > 8 \times 7 - 3$



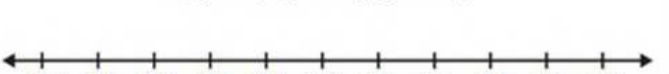
8) [illegible] 10 [illegible] 7



9) $x \leq 40 \div 4 \times 8$



10) $x > 70 + 13 - 8$



11) $4 \times 11 \times 2 + 10 < x$

12) $66 \div 6 \times 9 - 3 > x$

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Curriculum Connection
C2.4

Inequalities – Isolating the Variable

Steps to isolating 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 <.

Example:

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

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

PREVIEW

Questions

Solve each inequality below.

1) $x - 8 < 13$

2) $x + 13 < 22$

3) $x + 15 \leq 27$

4) $x - 2$

5) $7 < x + 23$

6) $21 \leq x - 11$

7) $x + 32 > 47$

8) $55 < x + 32$

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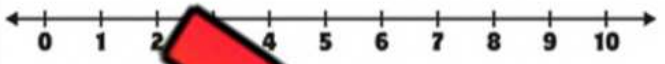
C2.4

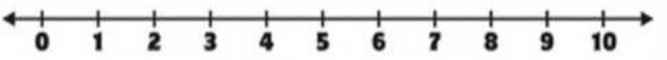
Inequalities – Isolating the Variable

Questions Graph the inequalities on the number line.

1) $4 + x > 10$



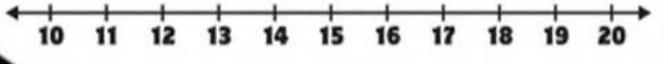
2) $x - 5 < 2$



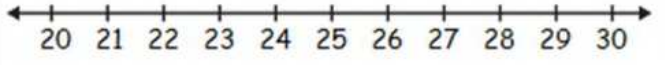
3)



4) $8 + x > 29 - 7$



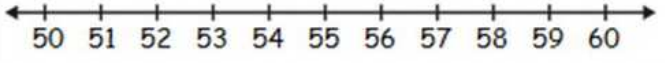
5) $4 + x \geq 11 \times 3 - 5$



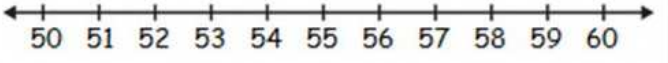
6) x [illegible] $48 \div 4 - 4$



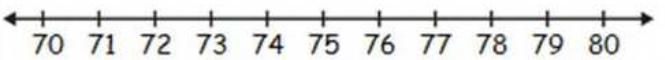
7) $x - 8 > 11 \times 5 - 6$



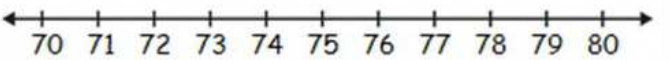
8) $x - 15 \leq 15$ [illegible] 15



9) $8 + x \leq 9 \times 8 + 13$



10) $16 + x > 68 + 20 - 3$



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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 Does the inequalities require a dashed or solid boundary line?

	Inequality	Dashed or Solid Boundary Line?
1)		
2)	≤ 9	
3)	4 <	
4)	$y - 4 \geq 11$	
5)	$y \leq 5 + 6$	

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)	$x < 6$		
2)	$y \geq 9$		
3)	$8 - 5 < x$		
4)	$7 + x > 29$		
5)	$13 - y \leq 22 + 5$		
6)	$x + 8 - 3 > 29$		
7)	$6 + 4 - y \geq 29 + 3$		
8)	$y - 8 > 11 \times 5 - 6$		

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Linear Inequalities – Boundary Line

Questions Fill in the table below.

	Inequality	Simplify (if necessary)	Dashed or Solid Line	Shade Above or Below
1)	> 11			
2)	$y \geq 7$			
3)	$13 \leq$			
4)	$7 + x \geq 12$			
5)	$9 - y > 21 + 9$			
6)	$8x < 32$			
7)	$4 + y \geq \frac{18}{2}$			
8)	$y - 7 > \frac{56}{7} \times 9$			
9)	$y \geq 20 + \frac{44}{11}$			
10)	$x + 5 - 3 < 7 \times 4$			

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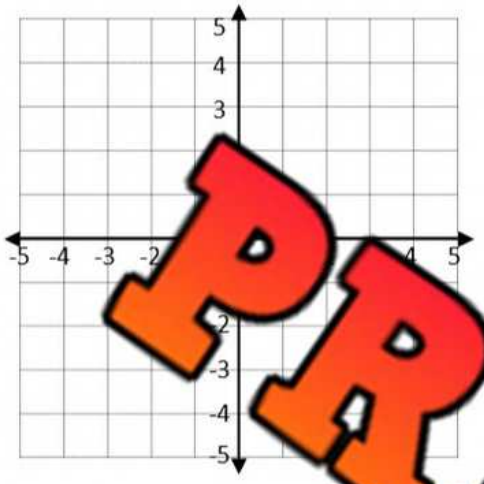
C2.4

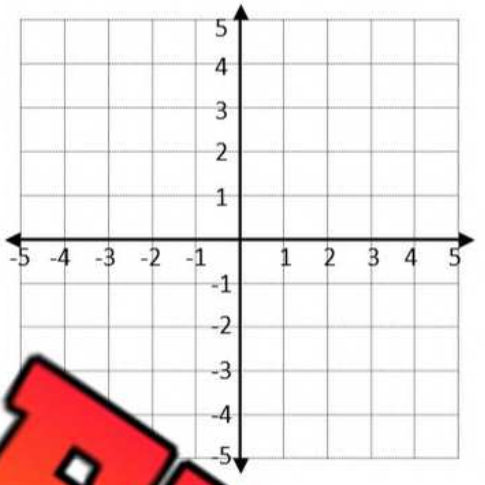
Graphing Inequalities – Cartesian Plane – One Variable

Questions Graph the inequalities on the cartesian plane.

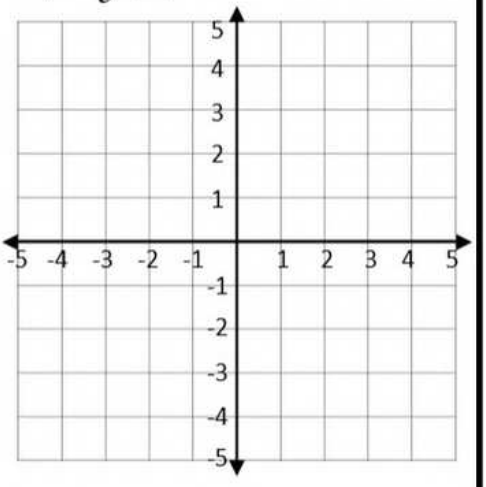
1) $x > 4$



2) $x < -2$



3) $y \leq 4$



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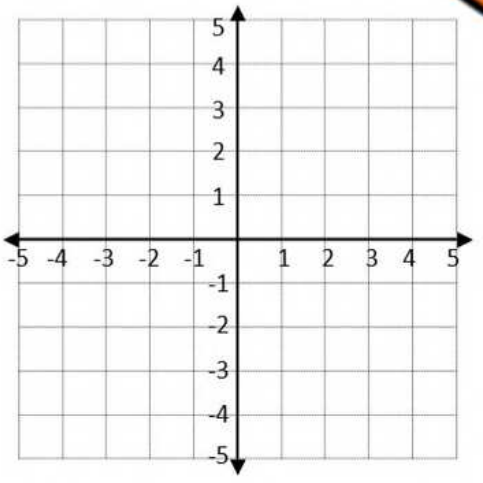
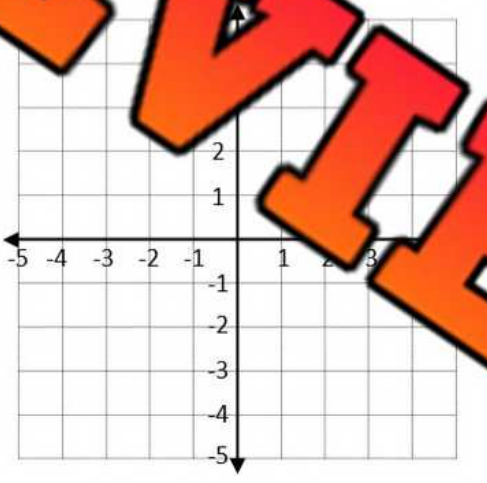
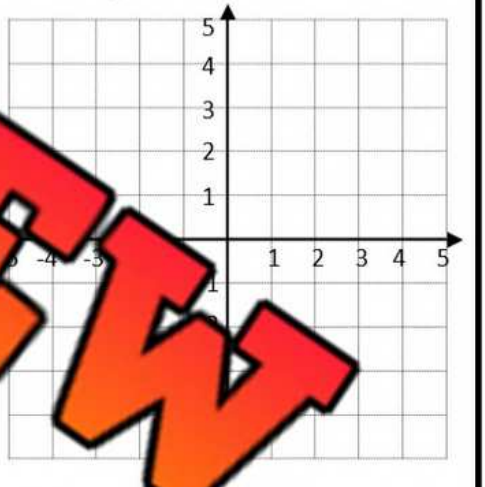
4) $3 + x > 6$



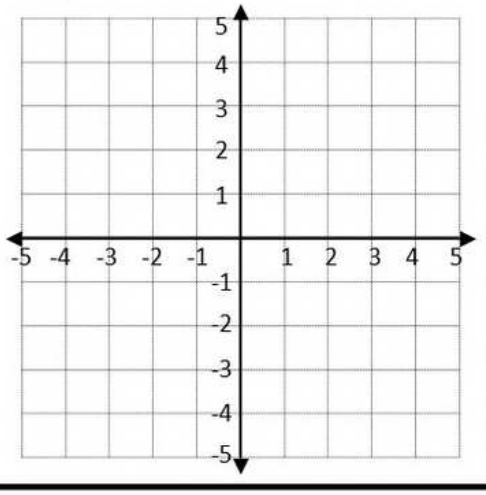
5) $x -$



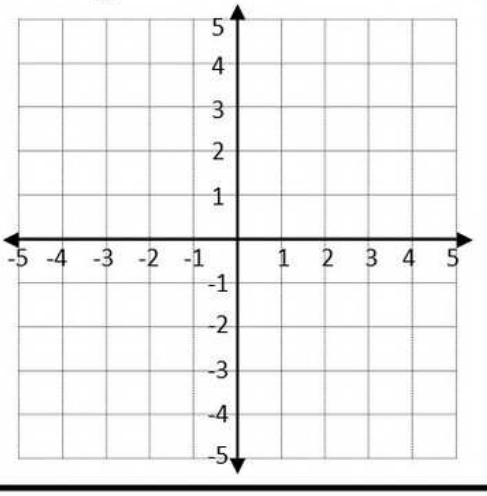
6) $y + 5 \leq 7$



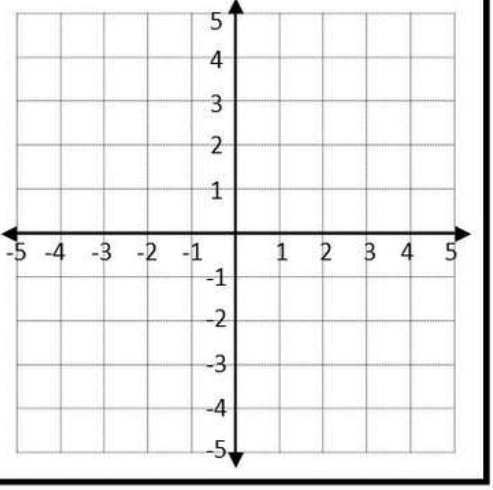
7) $9 + x \geq 11$



8) $y - 6 < -2$



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



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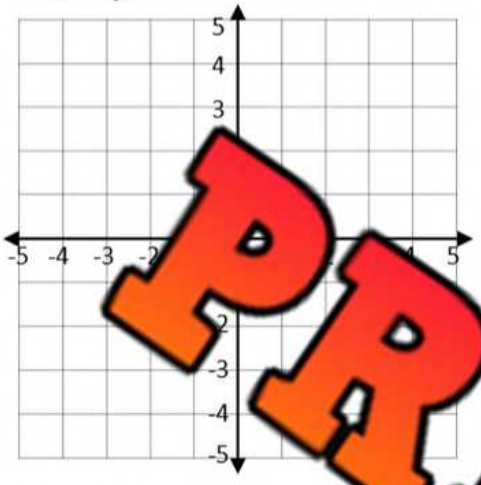
Curriculum Connection
C2.4

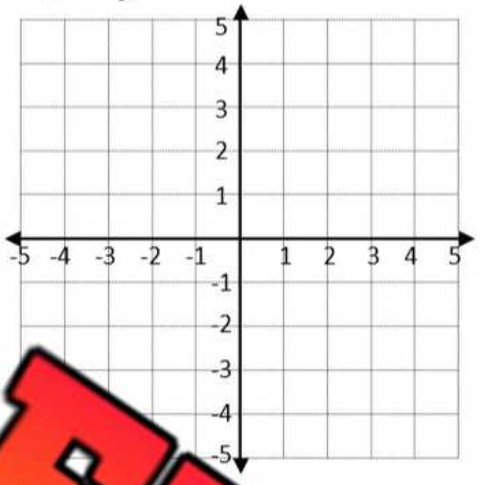
Graphing Inequalities – Two Variables

Questions Graph the inequalities on the cartesian plane.

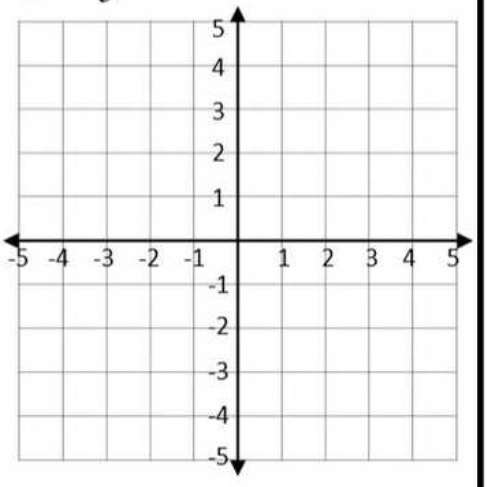
1) $y > x + 1$



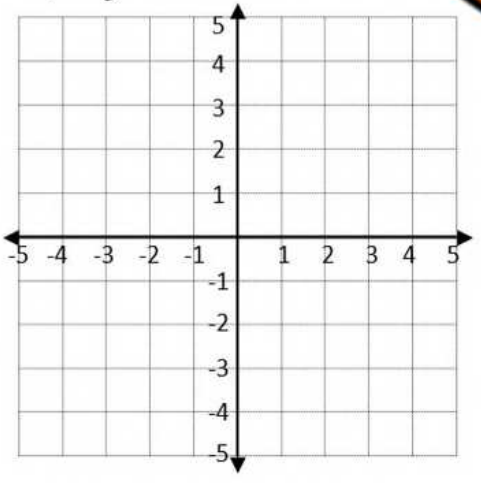
2) $y < x + 3$



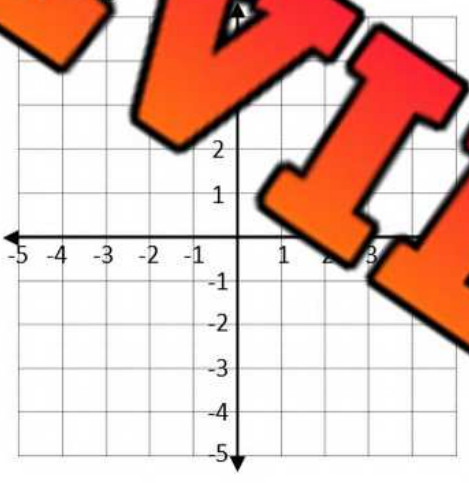
3) $y \leq x - 4$



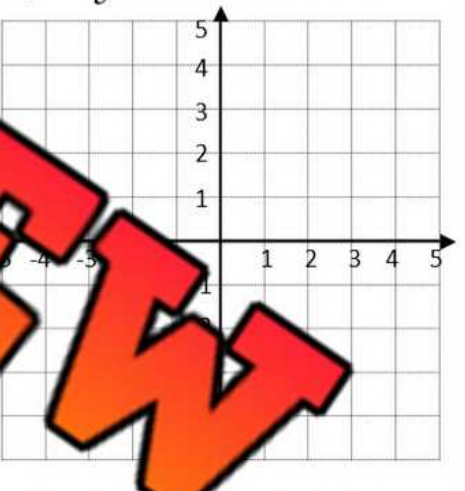
4) $y \geq 2 - x$



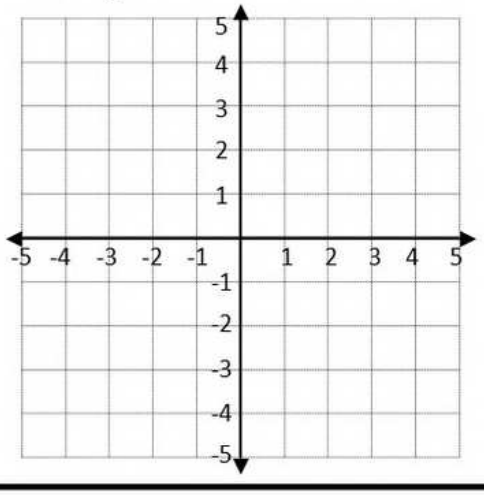
5) $y >$



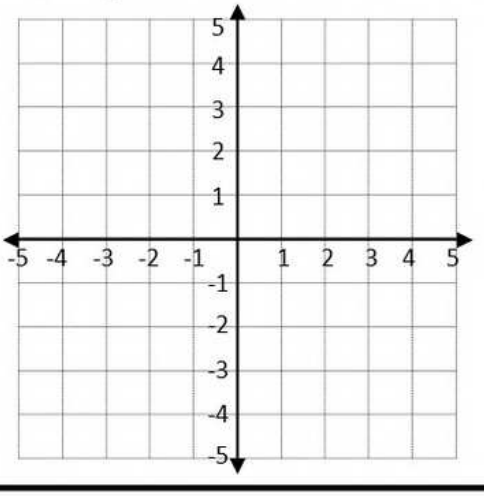
6) $y \leq x + 2 + 1$



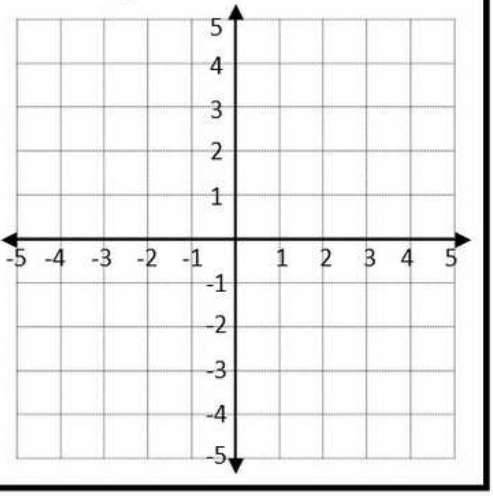
7) $y \geq x + 1 - 5$



8) $y \leq -3 + 1 + x$



9) $y < x - 6 + 3$



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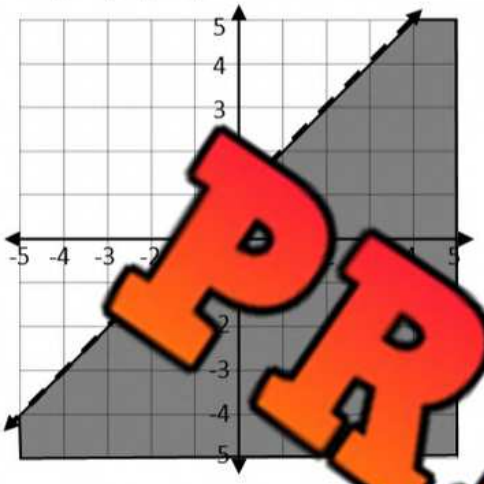
C2.4

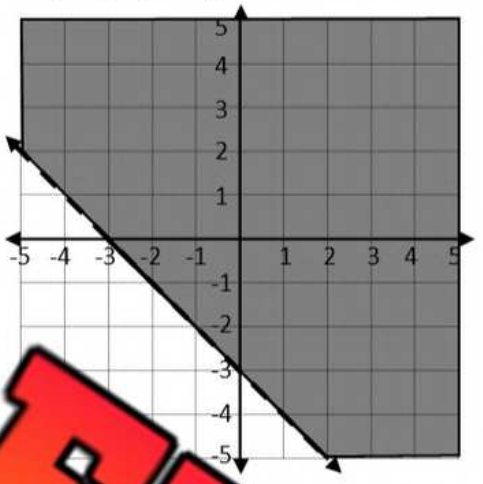
Linear Inequalities – Order Pairs

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

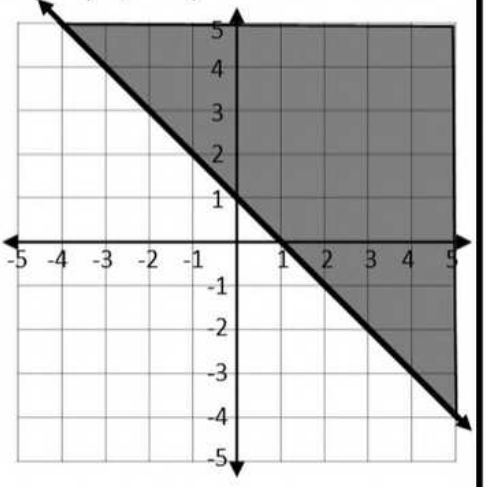
1) (2, 1) Yes No



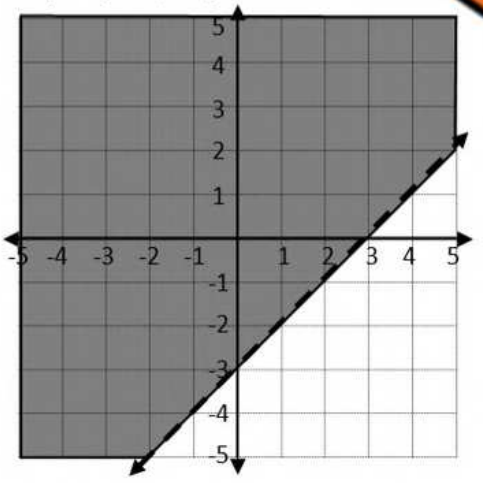
2) (4, -2) Yes No



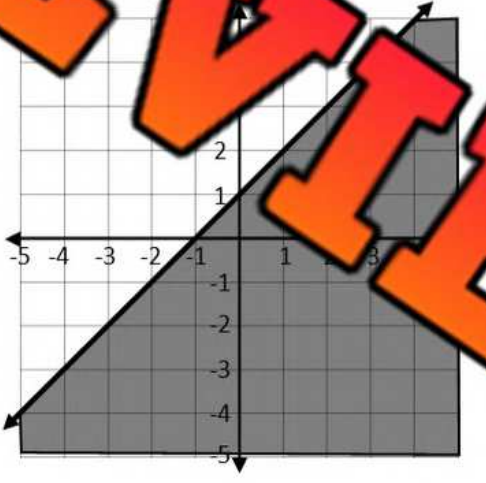
3) (3, -1) Yes No



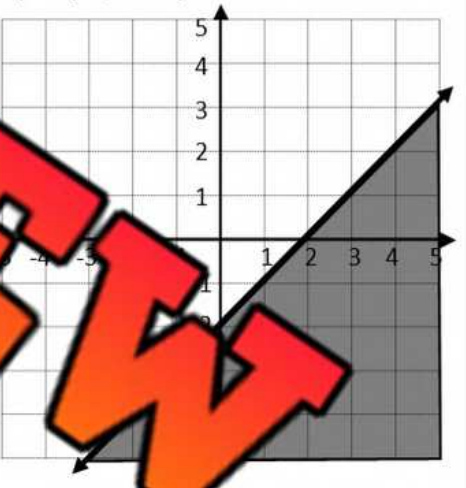
4) (-3, 4) Yes No



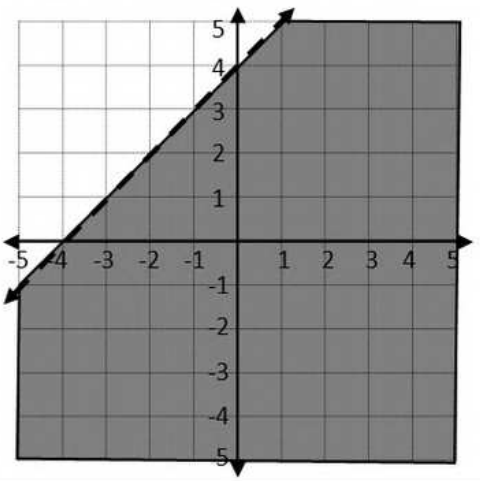
5) (-2, [illegible]) No



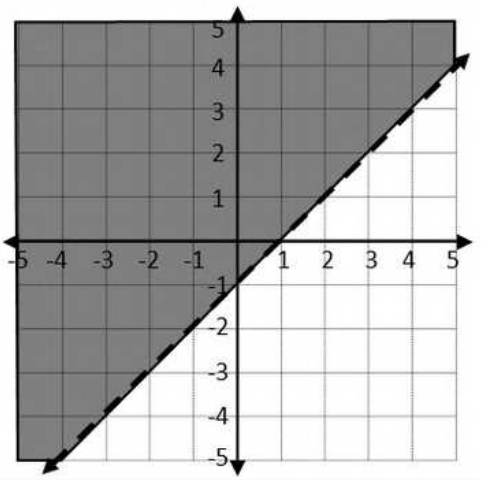
6) (1, -5) Yes No



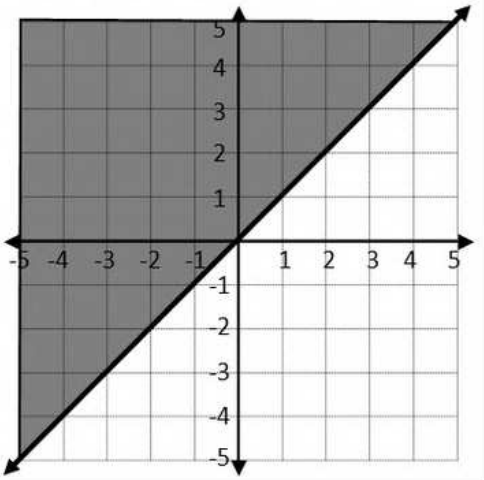
7) (-5, 5) Yes No



8) (3, -4) Yes No



9) (0, -5) Yes No



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Algebra Quiz - Equations

Part 1 Add the monomials together.

1) 5n + 6n = _____n	2) 12b + 14b = _____b	3) n + 52n + n = _____n
4) [illegible]p	5) 16p - 4p - 7p = _____p	6) 33n - 11n - 11n = _____n

Part 2 Eval[illegible] the f[illegible] ressions for x = 5

1) $x - 10$	2) 9 - [illegible]	[illegible] x	4) $x - 14$
5) $44 + x$	6) $67 + x$	7) [illegible]	[illegible] + x + 11

Part 3 Evaluate the following expressions for y = 8

1) $5y$	2) $9y - 5$	3) $3y + 5$	4) $8y + 6$
5) $\frac{32}{y} + 8$	6) $\frac{64}{y} + y$	7) $\frac{24}{y} - 9$	8) $\frac{y}{y} \times y$

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Part 4 Write the expressions using the values/operations below.

6 8 2 *n* + *x* – ÷

1) Six times a number, add two	
2) Eight divided by two, subtract a number	
3) A number multiplied by eight, add six	
4) Eight m… than six divided by of a number	

Part 5 …tions for each sentence.

	Equation	Answer
1) Seven less tha… mbe… 5		
2) Twelve more than a nu… 31		
3) Six times a number is 48		
4) Eighteen divided by a number is 3		

Part 6 Fill in the missing number to balanc… …ation.

1) ☐ + 12 = 95	2) ☐ + 25 = 50	3) ☐ = 66
4) 58 – ☐ = 45	5) 48 – ☐ = 39	6) 65 – ☐ = 55
7) 4 x ☐ = 44	8) ☐ x 6 = 30	9) 8 x ☐ = 48
10) 63 ÷ 7 = ☐	11) 48 ÷ ☐ = 4	12) ☐ ÷ 8 = 9

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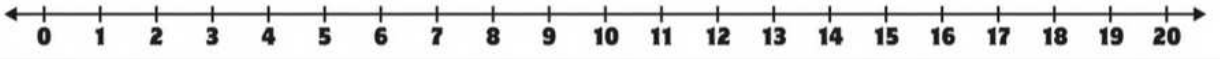
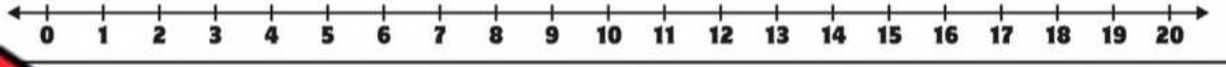
Part 9 Graph the inequalities on the number line.

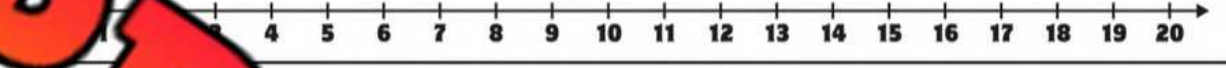
1) $4 + x > 11$



2) $19 - x \leq 12$



3) $x \leq 15$ 11



Part 10 Si ies below. Make sure the variable is on the left.

1) x 13

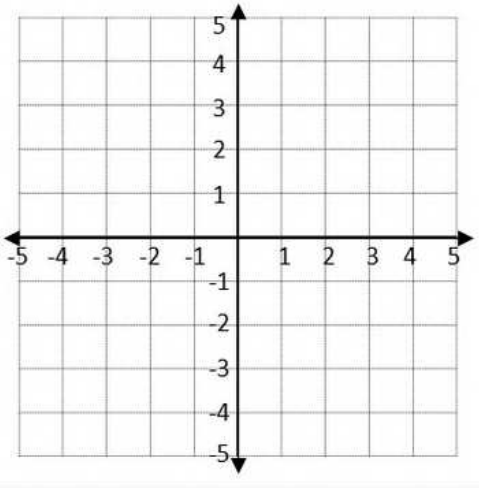
2) $x + 13 < 22$

3) $x + 15 \leq 27$

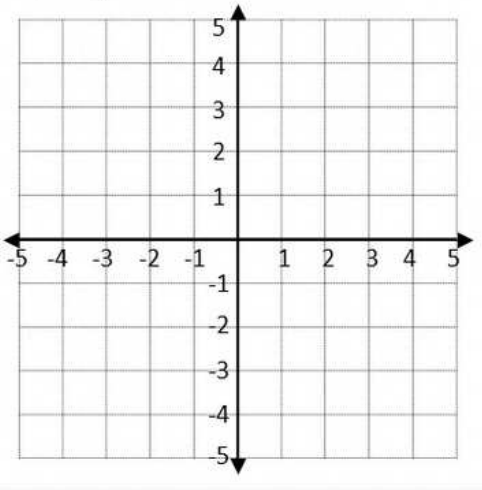
27 > 14

Part 11 Graph the inequalities on the cartesian plane.

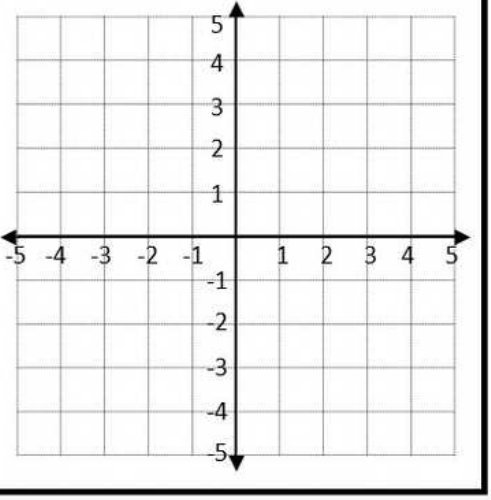
1) $x > 4$



2) $y < -2$



3) $y + x < 3$



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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 efficient code, including code that involves events influenced by a defined count and/or sub-program and other control structures	184 – 189, 191 – 198, 200 - 203
C3.2	read and alter existing code, including code that involves events influenced by a defined count and/or sub-program and other control structures, and describe how changes to the code affect the outcomes and the efficiency of the code	187, 190, 199

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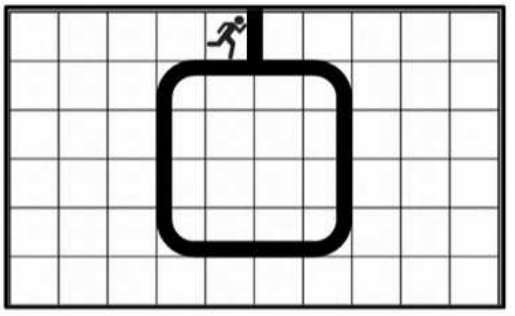
Curriculum Connection
C3.1

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

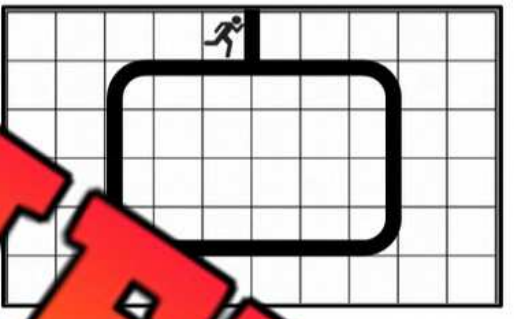


Example
loop 5 times
    go right 3
    go down 5
    go left 5
    go up 5
    go right 2
go right 1

Question ite code that sends the runner around the track.

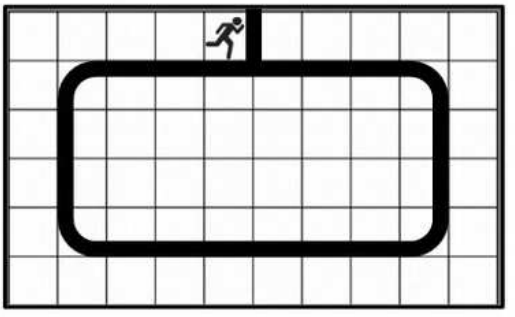
1. Use r around the track 8 times. (Don't forget to cross the finish line!)

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 4 times. (Don't forge h line!)

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



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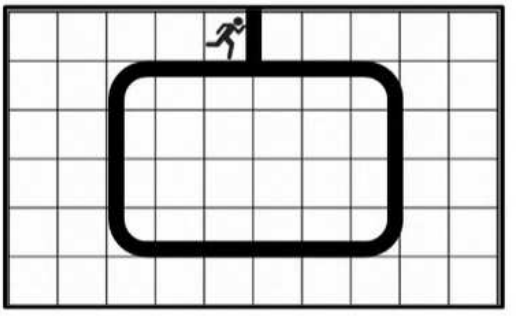
Curriculum Connection
C3.1, C3.2

3. Use a loop to send the runner 3600 metres.

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

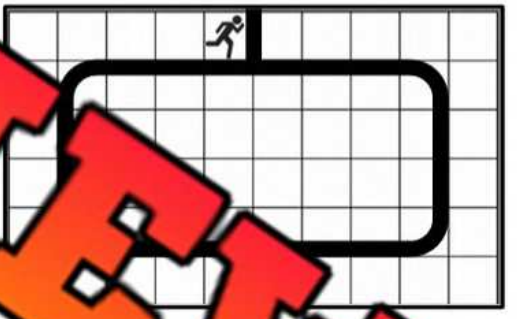


1 lap = 450 metres

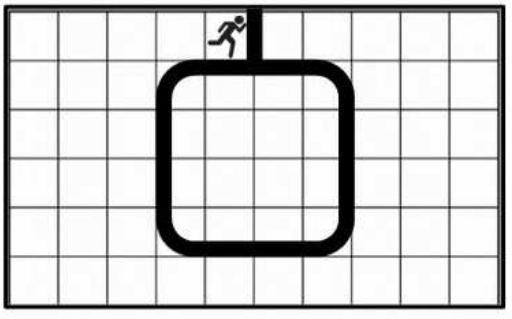
PREVIEW

4. Use a loop to [illegible] runne[illegible] metres.

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



1 lap = [illegible]



1 lap = 150 metres

5. Read the code and figure out how far the runner went.

Code

```
go right 1 space
loop 15 times
        go right 2 spaces
        go down 5 spaces
        go left 5 spaces
        go up 5 spaces
        go right 3 spaces
run program
```

My Answer

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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] ings	then _____
2)	If the re[illegible] the whistle	_____
3)	If it is hot	[illegible]en _____
4)	If the alarm clock goes off in the morning	then _____
5)	If I cross the finish line first	then _____
6)	If the traffic light is red	then _____
7)	If the phone battery is 0	then _____
8)	If the time limit is reached	then _____
9)	If the SHIFT key is pressed when typing a letter	then _____
10)	If the soccer ball goes out of bounds	then _____

PREVIEW

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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 p[illegible] try!" run 7 x 11 + 12	
If y is < 150, then print "Better luck n[illegible]time!" If y is > 150, then print "Wow, great job!" run y = 5 x 20 + 55	
If player has > 500 points (p), then print "You win" If player has < 500 points (p), then print "You lose" run p = 100 ÷ 4 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 = 15/20	
If student mark (m) is > 50%, then print "You passed" If student mark (m) is < 50%, then print "You failed" run m = 16/30	

PREVIEW

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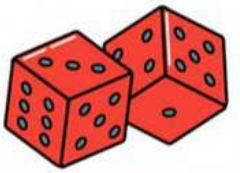
Curriculum Connection
C3.1

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.

PREVIEW

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 points If you roll any other number, then you get [illegible]	
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	

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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 ber, then solve an equation from list 1 If y then solve an equation from list 2	
2) If you l a 3 o e an equation from list 3 If you roll a quation from list 4	
3) If you roll a 6, th ve an list 3 If you roll a number n equation from list 2	
4) If you roll an even numbe ve rom list 5 If you roll an odd number, the lve ist 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 f ist 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	

PREVIEW

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

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Curriculum Connection
C3.1

Concurrent Coding

Concurrent codes are events that happen at the same time. It is the opposite of **sequential codes**, which happen one after the other.

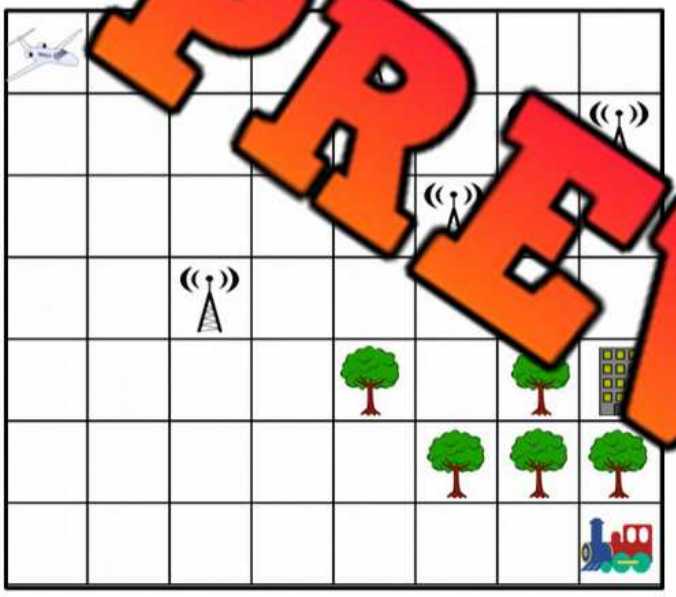
Part 1

Write two separate codes as the train and plane race to the building.

Look out for the towers and trees! Make sure you code around these obstacles.

Plane

Train



Who won?

Train = _____ spaces

Plane = _____ spaces



PREVIEW

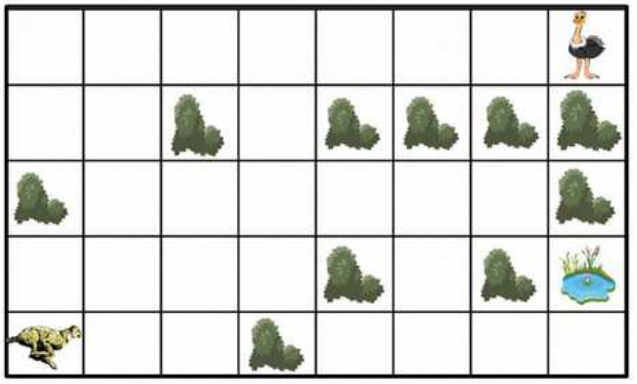
Part 2

Write two separate codes as the cheetah and ostrich race [illegible] hole.

Look out for the bushes! Make sure you code around them.

Cheetah

Ostrich



Who won?



Cheetah = _____ spaces

Ostrich = _____ spaces

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Curriculum Connection
C3.1

Coding – Defined Count

A **defined count** is the number of times instructions are repeated based on a predefined value or until a condition is met.
In the example, if the mouse is clicked, the conditional code is performed until the condition is met. The condition has been predefined - set to 5. When 5 "draw" strokes have been completed, the code ends. This conditional statement could have been set to any number, or until the circle has been coloured completely.

Example:

when mouse is clicked
set [draw] to (5)

If [draw] is clicked
colour shape [draw] times

Original	Output
	

Draw ... and draw the output pictures or answer the question.

PREVIEW

when mouse is ...
set [draw] to until pictu... d

when enter is pressed
set [colour] to (blue)

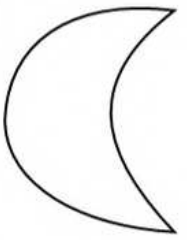
if [draw] is clicked then
colour shape [colour]

Original



Output

draw

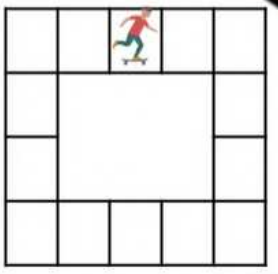


when mouse is clicked
set [lap] to (4)

if [start] is clicked
perform [lap] laps around track

Original

start



Ho... ...d the ...ove?

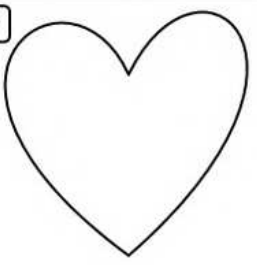
when mouse is clicked
set [draw] to (20)

when enter is pressed
set [colour] to (yellow)

if [draw] is clicked then
perform [draw] # using [colour] pen

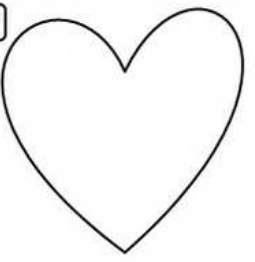
Original

draw



Output

draw



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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 a subprogram in your code that gets the truck to the foods below



PREVIEW

Example: Pickup some popcorn, a hot dog, and an apple
subprogram **move9right** move forward 9 spaces turn right
loop 3 times run **move9right** subprogram
move forward 4 spaces
turn right
move forward 1 space

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Curriculum Connection
C3.1

Instructions	Use a subprogram in your code that gets the truck to the foods below

1) From the truck's starting position, move the truck to the pineapple, then carrot, and then back to its starting position.

2) From the truck's starting position, move the truck to the cupcake, then watermelon, and then back to its starting position.

3) From the truck's starting position, move the truck to the apple, then pretzel, and then chicken drumstick.

PREVIEW

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Curriculum Connection
C3.1

Using Subprograms in Coding

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.).



PREVIEW

1) Pick up 2 yo-yo's and return them to the toy bin.

2) Pick up 4 dice and return them to the toy bin.

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Curriculum Connection
C3.1

3) Pick up 5 balloons and 2 cars and return them to the toy bin.

4) Pick up kites and balls and return them to the toy bin.

5) Pick up 4 trophies, 3 drums, and 2 guitars and return them to the

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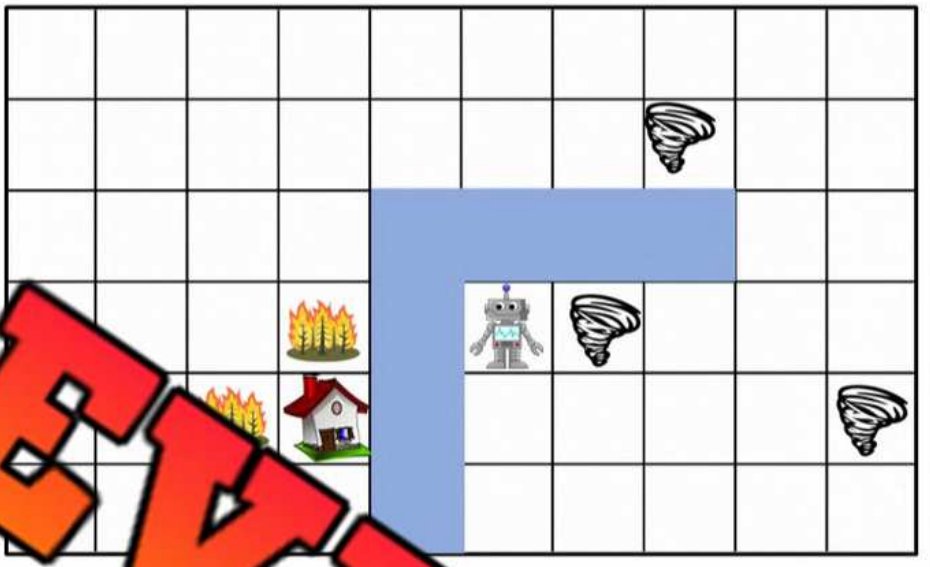
Unit Test Coding

Part 1 Use as few lines as possible to write efficient code.

Move the robot home by writing the least number of lines as possible.

Code



Lines of code written: _____

PREVIEW

Part 2 Write code that sends the runner around the track

2. Use a loop to send the runner 4500 metres.

Line 1: _____

Line 2 _____

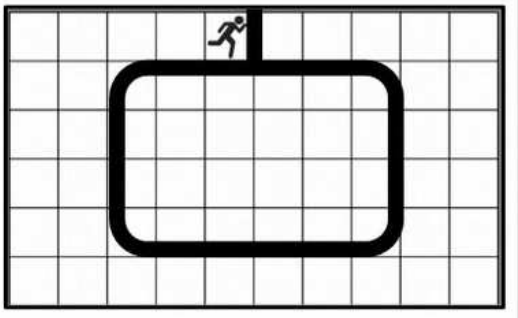
Line 3: _____

Line 4: _____

Line 5: _____

Line 6: _____

Line 7: _____



1 lap = 450 metres

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Part 3 Write what the computer would reply with based on the code written.

Code Written	The Computer Replied
y = 33 $x + y$ = 85 print (x)	— —
x = 90 $x \div y$ = 35 print (y)	—

Code Written	The Computer Replied
y = 8 $3y + x - 5$ = 20 print (x)	—
x = 63 $x \div y + 22$ = 29 print (y)	—

Part [illegible] the answer to the question and then run the code.

	The Computer Prints...
If answer is >90, t[illegible]rint "[illegible] If answer is <90, then p[illegible]c[illegible]try!" run 7 x 11 + 12	
If y is <150, then print "Better luck n[illegible]ne!" If y is >150, then print "Wow, great job!" run y = 5 x 20 + 55	

PREVIEW

Part 5 Read the code and describe what will ha[illegible].

when enter is pressed
- set [shape] as (hexagon)
- set [colour] as (blue)

loop (10) times
- if mouse is clicked then
  - draw [shape] using [colour]

loop (forever) times
- if spacebar is pressed
  - sound (horn)
  - flash (front) lights

Description

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