



Preview – Information



Thank you for your interest in this product. Within this preview, you will see:

- ✓ A selection of Ready-To-Use Google Slides Lessons.
- ✓ A selection of worksheets included in the workbook.

When you make a purchase, you will receive a folder that contains the .pdf workbook file and a link to where you can make a copy of the Google Slides Lessons unit to your Google Drive.

Thank you for shopping with us. Please let us know if you have any questions at:

rob@supersimplesheets.com



Google Slides Lessons Preview





Saskatchewan Math Curriculum

Number Unit – Grade 8

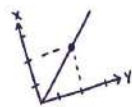
3-Part Lesson Format

Part 1 – Minds On!

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

Learning Goal

We are learning to **estimate and calculate square roots** so we can solve problems involving area, measurements, and real-life situations more accurately and efficiently.



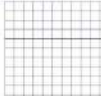
Why Are We Learning This?

- 1) If a square has an area of 25 square metres, what could the length of one side be?
- 2) If your friend told you the area of a square garden is 100 m², how would you figure out the length of one side without measuring it?
- 3) Imagine a robot that can only move in square paths. If it walks a path that encloses 49 square metres, how long is each side of the path?
- 4) Can you find a number that, when multiplied by itself, gives you 64? What's your strategy?

Area of a Square – Square Root

When we calculate the area of a square, we use a square number to determine the area.
Example: If the area of a square is 9, its side length is $\sqrt{9}$ or 3.

What is the area? Write the side lengths as square roots and units.

#	Question	Area	Side Length
1)			____ units $\sqrt{\quad}$
2)			____ units $\sqrt{\quad}$
3)			____ units $\sqrt{\quad}$
4)			____ units $\sqrt{\quad}$

Part 2 – Action!

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

Part 3 – Consolidation!

- Exit Cards
- Quizzes
- Reflection
- And More!

Perfect Squares - Word Problems

- 1) A public garden is designed in the shape of a square and covers an area of 225 square metres. What is the length of each side of the garden?

	Side Length
--	-------------

- 2) A farmer wants to build a square pen using 169 wooden planks to form equal rows and columns. How many planks will go along each side of the square?

	Number of Planks
--	------------------



Saskatchewan Math Curriculum

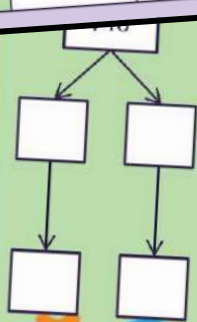
Number Unit – Grade 8

Perfect Squares – Square Roots

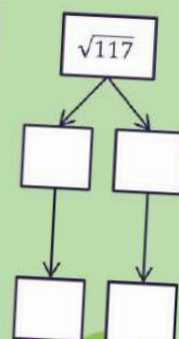
Every positive number has two square roots—one positive and one negative. For example, $\sqrt{81} = 9$, but also $-9 \times -9 = 81$, so $\sqrt{81} = \pm 9$. In this activity, you'll write both the positive and negative square roots for each perfect square.

#	Question	Square Root	
		(+)	(-)
1)	$\sqrt{81}$		
2)	$\sqrt{121}$		
3)	$\sqrt{196}$		
4)	$\sqrt{225}$		
5)	$\sqrt{256}$		

#	Question	Square Root	
		(+)	(-)
6)	$\sqrt{289}$		
7)	$\sqrt{324}$		
8)	$\sqrt{361}$		
9)	$\sqrt{400}$		
10)	$\sqrt{441}$		



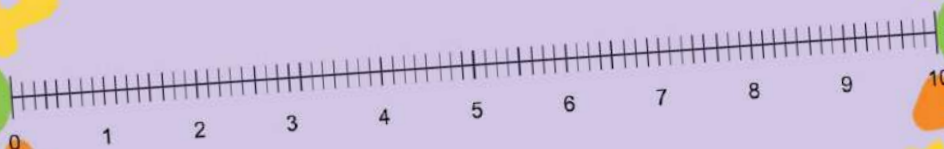
$$\begin{array}{r} \square - \square = \square \\ \square - \square = \square \end{array}$$
$$\sqrt{48} = \frac{\square}{\square} \text{ or } \frac{\square}{\square}$$



$$\begin{array}{r} \square - \square = \square \\ \square - \square = \square \end{array}$$
$$\sqrt{117} = \frac{\square}{\square} \text{ or } \frac{\square}{\square}$$

Place each square root on the number line.

1) $\sqrt{24}$	2) $\sqrt{45}$	3) $\sqrt{39}$
4) $\sqrt{55}$	5) $\sqrt{68}$	6) $\sqrt{74}$





Saskatchewan Math Curriculum

Number Unit – Grade 8



Percents Greater Than 100

Fill in the table using fractions out of 100.



#	Fraction	Decimal	Percent
1)	110/100	1.10	110.0%
2)			126%
3)	138/100		%
4)		1.44	%
5)			156%
6)		1.69	%
7)			178%
8)	181/100		%
9)			196%
10)		2.00	%

Comparing Fractions, Decimals, and Percents

Drag the correct sign between the numbers.



#	Number 1	Sign	Number 2
1	215%		$2\frac{1}{4}$
2	0.55		$\frac{11}{20}$
3	$\frac{8}{12}$		0.6
4	145%		$1\frac{2}{5}$
5	320%		$\frac{14}{6}$

#	Number 1	Sign	Number 2
6	5.6		180%
7	$\frac{4}{20}$		6.8
8	165%		$\frac{15}{30}$
9	0.99		230%
10	$\frac{120}{50}$		3.47

Original Price Sale

sale price.

MEGA SALE

Original Price	Sale
\$150	25% off

Original Price	Sale
\$300	10% off

Original Price	Sale
\$50	15% off

Original Price	Sale
\$220	50% off

Original Price	Sale
\$2300	25% off

Original Price	Sale
\$4000	75% off

\$17.25

\$270

\$1000

\$100

\$112.50

\$112

\$275

\$1725

\$110

\$40.25

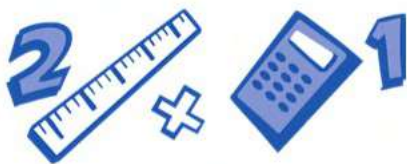
\$42.5

\$101



Workbook Preview





Grade 8

Strand: Number

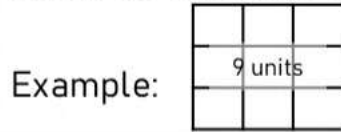


	Curriculum Expectations	Pages
N8.1	Demonstrate understanding of the square and principle square root of whole numbers concretely or pictorially and symbolically	5-39
N8.2	Expand and demonstrate understanding of percents	40-103
N8.3		104-139
N8.4	Demonstrate understanding of multiplying and dividing positive fractions and mixed numbers, concretely, pictorially, and symbolically.	143-207
N8.5	Demonstrate understanding of multiplication and division of integers concretely, pictorially, and symbolically.	211-242
TQ	Tests and quizzes	104-107, 140-142, 208-210, 243-246

Preview of 130 pages from
this product that contains
474 pages total.

Area of a Squares – Square Root

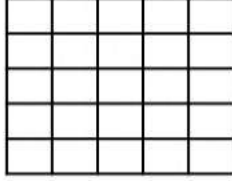
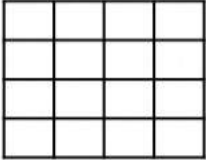
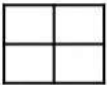
When we calculate the area of a square, we use a square number to determine the area.



If the area of a square is 9, its side length is $\sqrt{9}$ or 3.

Part 1

What is the area? Write the side lengths as square roots and units

	Area	Side Length		Question	Area	Side Length
1)		____ units	4)			____ units $\sqrt{\quad}$
2)		____ units $\sqrt{\quad}$	5)			____ units $\sqrt{\quad}$
3)		____ units $\sqrt{\quad}$	6)			____ units $\sqrt{\quad}$

Part 2

Fill in the table

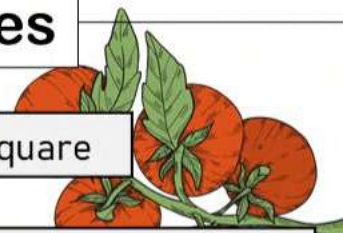
	Area	Side Length (Units)	Side Length
1)			$\sqrt{64}$
2)		7	$\sqrt{\quad}$
3)	144		$\sqrt{\quad}$
4)		11	$\sqrt{\quad}$

Part 3

Is the number a perfect square?

	Area	Yes/No
1)	12	
2)	81	
3)	42	
4)	100	

Word Problems - Perfect Squares



Questions

Answer the questions below and provide the perfect square

1) Sarah is planting a square-shaped garden. She has 16 tomato plants and wants to plant them in equal rows and columns. How many plants should she plant in each row and column?

Perfect Square

Square Number (x^2)

2) A square dance floor has an area of 144 square meters. What is the length of each side of the dance floor?

Perfect Square

Square Number (x^2)

3) Tim wants to create a square-shaped mosaic using identical tiles. If he places the tiles in equal rows and columns, how many tiles will he need in each row and column?

Perfect Square

Square Number (x^2)

4) A square-shaped bedroom has a floor area of 64 square meters. What is the length of each side of the bedroom?

Perfect Square

Square Number (x^2)

5) In a park, there is a square-shaped sandbox with an area of 49 square meters. What is the length of each side of the sandbox?

Perfect Square

Square Number (x^2)

Square Roots

A **square root** is a number that can be multiplied by itself to give the original number. A square root is the opposite of a perfect square. Instead of multiplying a number by itself, we take the answer and find out what number was used.

Each positive number has two possible square roots – one positive and one negative

Example The square roots of 49 are +7 and -7 because $(+7)(+7)$ and $(-7)(-7) = 49$

Part 1 Provide the positive and negative square root

	Question	Positive Root	Negative Root
1)	$\sqrt{36}$		
2)	$\sqrt{4}$		
3)	$\sqrt{9}$		
4)	$\sqrt{16}$		
5)	$\sqrt{121}$		
6)	$\sqrt{144}$		

	Question	Square Root	
		(+)	(-)
7)	$\sqrt{49}$		
8)	$\sqrt{25}$		
9)	$\sqrt{16}$		
10)	$\sqrt{81}$		
11)	$\sqrt{100}$		
12)	$\sqrt{64}$		

Part 2 Provide the square root based on the symbol used

The symbol $\sqrt{\quad}$ means positive square root and the symbol $\pm\sqrt{\quad}$ means provide both the positive and negative square roots.

	Question	Answer(s)
1)	$\pm\sqrt{81}$	
2)	$\sqrt{49}$	
3)	$\pm\sqrt{9}$	

	Question	Answer(s)
4)	$\pm\sqrt{36}$	
5)	$\sqrt{100}$	
6)	$\pm\sqrt{64}$	

Comparing Square Roots & Perfect Squares

Part 1

Which number is larger? Use < > or = to compare the numbers

1)	3^2		$\sqrt{100}$
2)	$\sqrt{4}$		6
3)	$\sqrt{4}$		5^2
4)	2^2		5
5)	$\sqrt{36}$		8
6)	$\sqrt{121}$		11^2
7)	$\sqrt{25}$		-6
8)	50		7^2
9)	4^2		$\sqrt{144}$
10)	2		$\sqrt{4}$

Part 2

Order from least to greatest

1) $\sqrt{4}$, 4, $\sqrt{16}$, -16, $\sqrt{9}$, $\sqrt{81}$	3) $\sqrt{144}$, 49, $\sqrt{100}$
2) $\sqrt{64}$, $\sqrt{36}$, -3, 9, $\sqrt{121}$	4) $\sqrt{4}$, 16, $\sqrt{64}$, 9, $\sqrt{9}$

Part 3

Challenge: find the square root for each number

1) $\sqrt{289}$		5) $\sqrt{400}$	
2) $\sqrt{225}$		6) $\sqrt{324}$	
3) $\sqrt{169}$		7) $\sqrt{256}$	
4) $\sqrt{361}$		8) $\sqrt{625}$	

Perfect Squares - Word Problems

Word Problems

Answer the word problems below

1) Which whole numbers between 100 and 150 are perfect squares?

2) Which numbers between 150 and 200 are perfect squares?

3) I am a square number. The sum of my digits is 7. What square numbers might I be?

4) What three square numbers have a sum that is a perfect square?

5) Archer is planning to make a square garden this year. The garden needs to have an area less than 50m^2 .

a) What is the largest area the garden could be?

b) What is the side length of the garden?

c) How many metres of fencing will be needed?

d) If one metre of fencing costs Archer \$2.50, how much would the entire fence cost him?



PREVIEW



Rational vs Irrational Numbers

A **rational number** can be written as a ratio of two integers (a simple fraction). If a decimal number has a repeating or terminating decimal, it is a rational number.

Examples

5 can be written as $5/1$

$\sqrt{16}$ can be written as 4 ($4/1$)

$0.333\ldots$ can be written as $1/3$

An **irrational number** cannot be written as a ratio of two integers. Another clue is that the decimal goes on forever without repeating.

Examples

π (Pi) = 3.141592653589793...

$\sqrt{2}$ = 1.414213562373095...

$\sqrt{10}$ = 3.162277660168379...

Part 1

Is the number rational or irrational number?

	Question	Rational/Irrational
1)	$\sqrt{18}$	
2)	9	
3)	$\frac{5}{8}$	
4)	$\sqrt{16}$	
5)	$2.\bar{3}$	
6)	$\sqrt{24}$	

	Question	Rational/Irrational
	$\sqrt{49}$	
8)	$0.7\bar{5}$	
10)	$\sqrt{10}$	
11)	$\frac{2}{6}$	
12)	$\sqrt{72}$	

Part 2

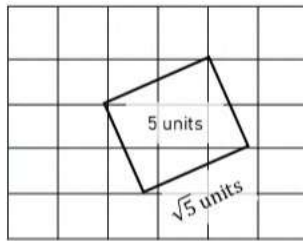
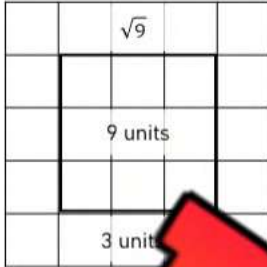
Write at least 10 rational and irrational numbers below

Rational Numbers

Irrational Numbers

Estimating Square Roots

Perfect squares can be calculated. Imperfect squares can only be estimated.



An imperfect square and its square root is an irrational number with a decimal number that never ends.

We can estimate a square root by determining the two perfect squares that are closest to it.

Example: $\sqrt{31}$ is between $\sqrt{25}$ and $\sqrt{36}$, which means it is in between 5 and 6. This means that the square of $\sqrt{31}$ is around 5.5. Since 31 is closer to 36 than 25, a better estimate would be 5.6.

Practice

Estimate the square roots of the numbers below by filling in the table

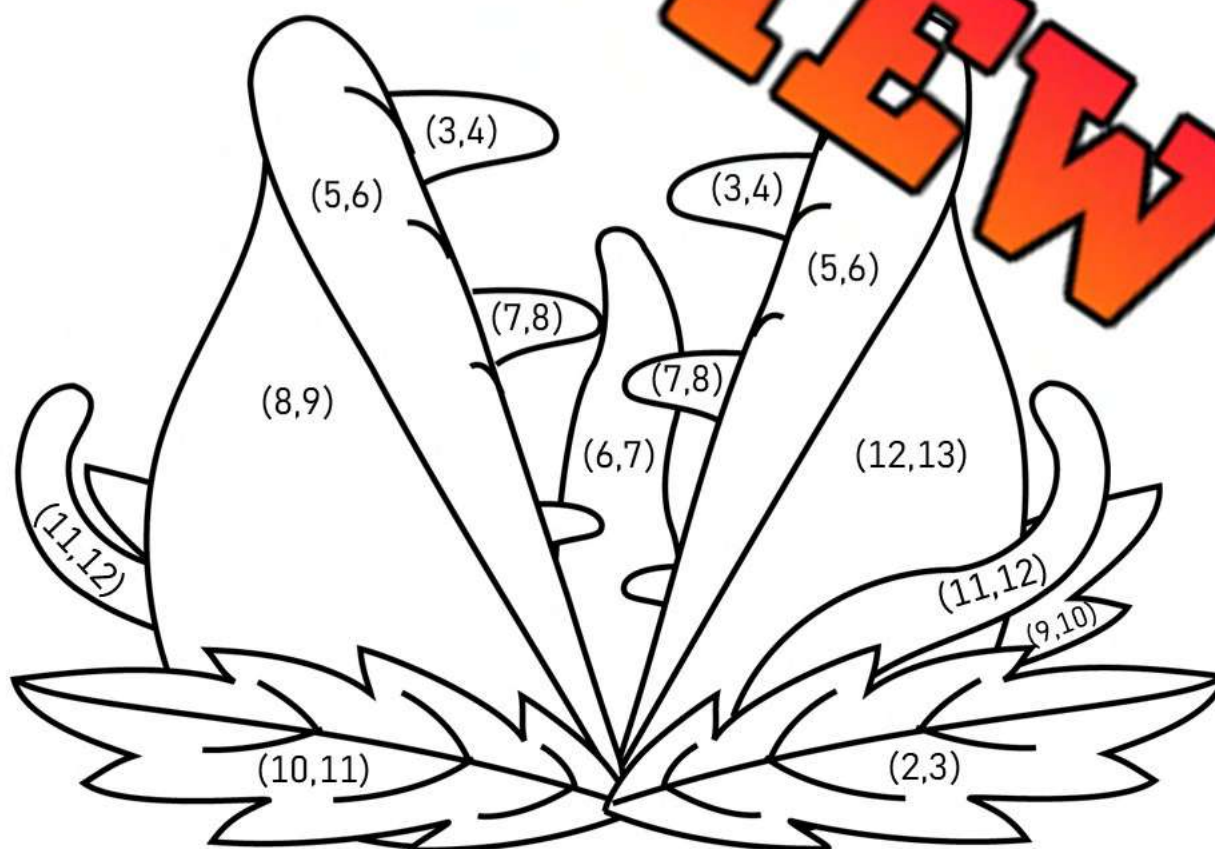
	Non-Perfect Square	Lower Perfect Square	Higher Perfect Square	Estimate	Calculate round to tenth
1)	$\sqrt{19}$	$\sqrt{16} = 4$	$\sqrt{25}$	4.4	4.4
2)	$\sqrt{42}$				
3)	$\sqrt{68}$				
4)	$\sqrt{91}$				
5)	$\sqrt{29}$				
6)	$\sqrt{13}$				
7)	$\sqrt{55}$				
8)	$\sqrt{73}$				
9)	$\sqrt{6}$				
10)	$\sqrt{130}$				

Estimating Square Roots - Colouring

Practice

Find the two square roots between the irrational numbers and colour the picture with the matching colour

	Irrational Number	Square Root 1	Square Root 2	Colour
1)	$\sqrt{32}$	$\sqrt{\quad}$	$\sqrt{\quad}$	Light Green
2)	$\sqrt{11}$	$\sqrt{\quad}$	$\sqrt{\quad}$	Yellow
3)	$\sqrt{47}$	$\sqrt{\quad}$	$\sqrt{\quad}$	Purple
4)	$\sqrt{6}$	$\sqrt{\quad}$	$\sqrt{\quad}$	Green
5)	$\sqrt{\quad}$	$\sqrt{\quad}$	$\sqrt{\quad}$	Light Green
6)	$\sqrt{\quad}$	$\sqrt{\quad}$	$\sqrt{\quad}$	Dark Green
7)	$\sqrt{54}$	$\sqrt{\quad}$	$\sqrt{\quad}$	Yellow
8)	$\sqrt{8}$	$\sqrt{\quad}$	$\sqrt{\quad}$	Dark Green
9)	$\sqrt{152}$	$\sqrt{\quad}$	$\sqrt{\quad}$	Green
10)	$\sqrt{89}$	$\sqrt{\quad}$	$\sqrt{\quad}$	Dark Green



Name: _____

19

Curriculum Connection
N8.1

Estimating Square Roots - Riddle

Practice

Find the lower and higher perfect squares and write the corresponding letter above the numbers below

	Non-Perfect Square	Lower Perfect Square	Higher Perfect Square
B	$\sqrt{11}$		
Z	$\sqrt{10}$		
S	$\sqrt{5}$		
R	$\sqrt{55}$		
A	$\sqrt{2}$		
A	$\sqrt{6}$		
A	$\sqrt{77}$		
D	$\sqrt{125}$		
E	$\sqrt{18}$		

What's black and white and blue

(64,81)

(81,100)

(4,9)

(121,144)

(36,49)

(16,25)

(9,16)

(49,64)

(1,4)

Square Roots - Area

Part 1

Assume the side lengths and area below are of squares. Fill in the table

	Side Length	Area
1)		81cm^2
2)		
3)		
4)		144cm^2
5)	10	

	Side Length	Area
6)		4m^2
7)	11cm	
8)	4km	
9)		9m^2
10)		36km^2

Part 2

Find the side length of the square below. You will need to estimate one square

1)	A = 49 side length =	A = 54 side length =	A = 64 side length =	4)	A = 36 side length =	A = 45 side length =	A = 49 side length =
2)	A = 9 side length =	A = 15 side length =	A = 16 side length =	5)	A = 81 side length =	A = 85 side length =	A = 100 side length =
3)	A = 64 side length =	A = 66 side length =	A = 81 side length =	6)	A = 16 side length =	A = 20 side length =	A = 25 side length =

Estimating Square Roots

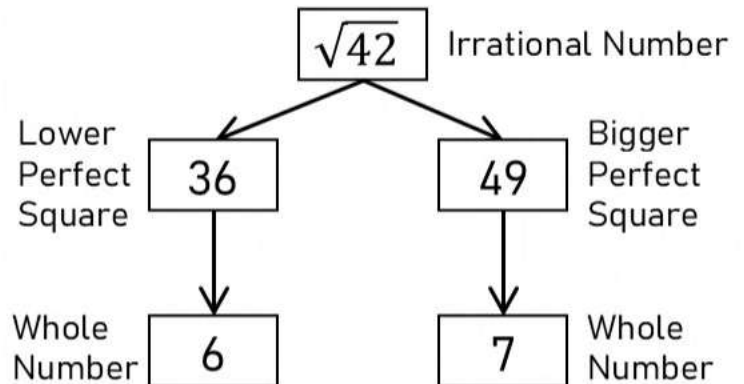
Step 1: Find the two perfect squares above and below the irrational number.

Step 2: Use the following formula to find the decimal number that will go with the whole number. Simplify the fraction.

Irrational Number Lower Perfect Square
Bigger Perfect Square Lower P.S.

Step 3: Take the decimal number using the lower perfect square and the simplified fraction from above.

Step 4: Change the decimal number to a fraction (rounded to the nearest hundredth).



$$\frac{42 - 36}{49 - 36} = \frac{6}{13}$$

$$= 6 \frac{6}{13} \text{ or } 6.46$$

Practice

Fill in the blanks by following the steps above

Diagram for $\sqrt{19}$:

```

graph TD
    A["√19"] --> B[" "]
    A --> C[" "]
    B --> D[" "]
    C --> E[" "]
  
```

Formulas for $\sqrt{19}$:

$$\frac{\square - \square}{\square - \square} = \square$$

$$\sqrt{19} \frac{\square}{\square} = \square$$

Diagram for $\sqrt{68}$:

```

graph TD
    A["√68"] --> B[" "]
    A --> C[" "]
    B --> D[" "]
    C --> E[" "]
  
```

Formulas for $\sqrt{68}$:

$$\frac{\square - \square}{\square - \square} = \square$$

$$\sqrt{68} \frac{\square}{\square} = \square$$

Diagram for $\sqrt{28}$:

```

graph TD
    A["√28"] --> B[" "]
    A --> C[" "]
    B --> D[" "]
    C --> E[" "]
  
```

Formulas for $\sqrt{28}$:

$$\frac{\square - \square}{\square - \square} = \square$$

$$\sqrt{28} \frac{\square}{\square} = \square$$

Diagram for $\sqrt{57}$:

```

graph TD
    A["√57"] --> B[" "]
    A --> C[" "]
    B --> D[" "]
    C --> E[" "]
  
```

Formulas for $\sqrt{57}$:

$$\frac{\square - \square}{\square - \square} = \square$$

$$\sqrt{57} \frac{\square}{\square} = \square$$

Comparing Square Roots & Perfect Squares

Part 1

Which number is larger? Use < > or = to compare the numbers

1)	3^2		$\sqrt{110}$
2)	$\sqrt{75}$		10
3)	7		8
4)	$\sqrt{29}$		5
5)	11		$\sqrt{127}$
6)	$\sqrt{45}$		7
7)	$\sqrt{7}$		3
8)	$\sqrt{14}$		3
9)	12		$\sqrt{138}$

Part 2

Order from least to greatest

1) $\sqrt{8}$, 2, $\sqrt{10}$, 3, $\sqrt{5}$	3) $\sqrt{82}$, 8, $\sqrt{100}$
2) $\sqrt{32}$, $\sqrt{41}$, -11, 6, $\sqrt{35}$	4) $\sqrt{140}$, 12, $\sqrt{147}$, 11, 23

Part 3

Circle which numbers are imperfect squares

1) 25, 4, 12, 24, 36, 50, 100, 68, 56, 64, 88, 96, 1, 6, 20
2) 16, 10, 28, 35, 9, 0, 81, 144, 110, 108, 121, 64, 62, 18

Square Roots – Number Line

Part 1

Place each square root on the number line to show its approximate value

1) $\sqrt{38}$

2) $\sqrt{10}$

3) $\sqrt{28}$

4) $\sqrt{42}$

5) $\sqrt{65}$

6) $\sqrt{87}$

7) $\sqrt{62}$

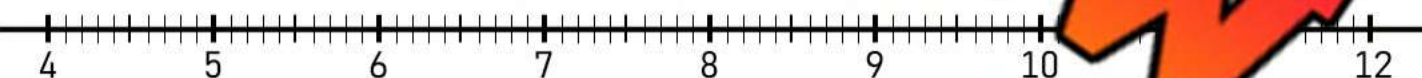
10) $\sqrt{100}$

9) $\sqrt{132}$

10) $\sqrt{141}$

11) $\sqrt{98}$

8) $\sqrt{22}$



Part 2

Which value is larger? Use < > or = to compare the values

1) 5 $\sqrt{21}$

4) 8.5 $\sqrt{66}$

7) 7.5 $\sqrt{52}$

2) 3 $\sqrt{14}$

5) 9.5 $\sqrt{95}$

8) 12.5 $\sqrt{145}$

3) 6 $\sqrt{31}$

6) 7.5 $\sqrt{60}$

9) 11.5 $\sqrt{142}$

Square Roots - Word Problems

Word Problems

Answer the word problems below

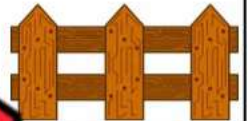
1) Jade painted a beautiful square painting. She would like to frame it, so she needs the dimensions of the sides. The area of the painting is 5m^2 . What are the side lengths? Round to the nearest two decimal places.



2) Weston is creating a fence around his square yard. The area of his yard is 140m^2 .

a) What are the side lengths? Round to the nearest hundredth?

b) The fencing comes in metre lengths. How many metres should he buy?



3) Livia made a rectangular painting for her friend. It has an area of 226cm^2 . Livia's friend loves it but needs a square painting to fit the space. If Livia recreates a square painting with the same area, what should the side lengths be?



4) An estimate for a square root is 8.49. Is the whole number (square) closer to 64 or 81? Explain.



Exit Cards

Cut Out

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

Name: _____

1) Which value is larger?

a) 4 $\sqrt{20}$

b)

2) Order from least to greatest

 $\sqrt{50}$, 8, $\sqrt{60}$, 7, $\sqrt{48}$

Name: _____

1) Which value is larger?

a) 4 $\sqrt{20}$

b) 9 $\sqrt{85}$

2) Order from least to greatest

 $\sqrt{50}$, 8, $\sqrt{60}$, 7, $\sqrt{48}$

Name: _____

1) Which value is larger?

a) 4 $\sqrt{20}$

b) 9 $\sqrt{85}$

2) Order from least to greatest

 $\sqrt{50}$, 8, $\sqrt{60}$, 7, $\sqrt{48}$

Name: _____

1) Which value is larger?

a) 4 $\sqrt{20}$

b) 9 $\sqrt{85}$

2) Order from least to greatest

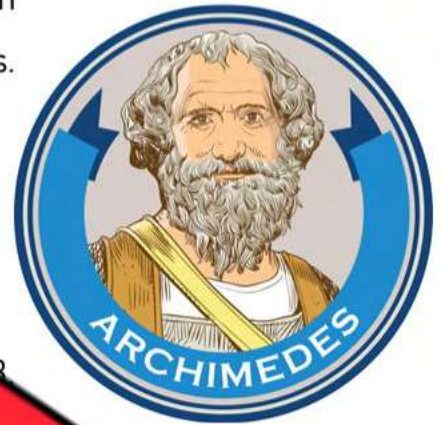
 $\sqrt{50}$, 8, $\sqrt{60}$, 7, $\sqrt{48}$

Story - Archimedes and the Square Root of 3

Archimedes and the Square Root of 3

Once upon a time in the ancient city of Syracuse, there lived a genius mathematician named Archimedes. He was well-known for his incredible discoveries in the fields of math, physics, and engineering. One day, Archimedes decided to embark on an ambitious journey to figure out how many grains of sand it would take to fill the entire universe. To accomplish this task, he needed to accurately determine the square root of 3.

He began by creating a right-angled triangle with one side measuring 1 unit and the other side measuring 2 units. The third side, by Pythagoras' theorem, would have the length he sought. Using the Pythagorean theorem, he figured out that the square root of 3 was the length of the third side. He knew the square root of 2 (approximately 1.4) and the square root of 4 (which is 2).



To pinpoint a more accurate value for the square root of 3, Archimedes used an ingenious method called the "method of exhaustion." He carefully drew polygons with an increasing number of sides around a circle that had a diameter of 2 units. By calculating the perimeters of these polygons, he could find numbers that were very close to the square root of 3, both a little bit larger and a little bit smaller.

Archimedes worked diligently, performing numerous calculations. Finally, he discovered that the square root of 3 was between the fractions $\frac{265}{153}$ (1.73202614379) and $\frac{1351}{780}$ (1.73205128205). His approximation was remarkably accurate for his time and a testament to his mathematical prowess.

With this newfound knowledge of the square root of 3, Archimedes could estimate the number of grains of sand required to fill the universe. His groundbreaking work laid the foundation for countless mathematicians and scientists who came after him.

Archimedes' story is an inspiring example of how curiosity, determination, and creativity can lead to extraordinary discoveries.

Story - Archimedes and the Square Root of 3

True or False

Is the statement true or false?

1) Archimedes was a famous mathematician from the city of Syracuse.	True	False
2) Archimedes used the Pythagorean theorem to begin his calculations.	True	False
3) The square root of 3 is exactly 1.7	True	False
4) Archimedes used polygons around a circle with a diameter of 1 unit.	True	False
5) Archimedes estimated the square root of 3 to be between $\frac{265}{153}$ and $\frac{1351}{781}$	True	False

Questioning

Write the questions you have after reading the text.

1)	
2)	
3)	

Questions

Answer the questions below using evidence from the text.

1) Who was Archimedes? What was he trying to figure out?

2) How did Archimedes estimate the value of the square root of 3?

Adding Square Roots

We can simplify expressions with square roots by evaluating the square root and performing the addition operation afterwards.

Example 1

$$\begin{aligned}\sqrt{9} + \sqrt{25} \\ &= 3 + 5 \\ &= 8\end{aligned}$$

Example 3

$$\begin{aligned}\sqrt{22 + 27} \\ &= \sqrt{49} \\ &= 7\end{aligned}$$

Example 3

$$\begin{aligned}\sqrt{40 + \sqrt{81}} \\ &= \sqrt{40 + 9} \\ &= \sqrt{49} \\ &= 7\end{aligned}$$

Example 4

$$\begin{aligned}\sqrt{\sqrt{49} + \sqrt{100}} \\ &= \sqrt{7 + 10} \\ &= \sqrt{17} \\ &= 4.12\end{aligned}$$

Questions: Simplify the expressions below

1) $\sqrt{16} + \sqrt{49}$

2) $\sqrt{25 + 13}$

3) $\sqrt{81} + \sqrt{64}$

4) $\sqrt{8 + \sqrt{64}}$

5) $\sqrt{\sqrt{25} + 20}$

6) $\sqrt{\sqrt{5} + \sqrt{81}}$

7) $\sqrt{\sqrt{36} + \sqrt{100}}$

8) $\sqrt{\sqrt{100} + 111}$

9) $\sqrt{\sqrt{49} + \sqrt{31}}$

10) $\sqrt{144} + \sqrt{100}$

11) $\sqrt{\sqrt{4} + \sqrt{49}}$

12) $\sqrt{95} + 26$

Task Cards: Square Root Operations

Objective

What are we learning about?

Students will practice adding, subtracting, multiplying, and dividing square roots using simplified expressions to enhance their understanding of operations with square roots.

Materials

What you will need for the activity.

- Task cards
- Separate sheet of paper for answers
- Pencils



Instructions

How you will complete the activity

1. Begin by reviewing the concepts of adding, subtracting, multiplying, and dividing square roots, and the importance of simplifying expressions.
2. Organize the students into pairs and provide each pair with their sets of task cards containing square root operations.
3. Give each pair an answer recording sheet to record their answers.
4. Encourage teamwork by having students collaborate with their partner to solve the square root operations on each task card.
5. Allow students to select any task card to begin with, emphasizing that they can complete the cards in any order they prefer.
6. Instruct students to solve the operation on their chosen card and write the simplified answer on their answer sheet.
7. If using a timer, set it for 30 minutes to encourage focus and manage classroom time effectively.
8. After the activity, review the answers collectively, discussing any challenging operations and the strategies used to solve them.
9. Have students reflect on the activity, sharing the methods they applied and obstacles they overcame.

Task Cards

Cut out the task cards below

Task Card 1:

Calculate:

$$\sqrt{\sqrt{49} + \sqrt{81}} = \underline{\hspace{2cm}}$$

Task Card 6:

Calculate:

$$\sqrt{100 \div 25} = \underline{\hspace{2cm}}$$

Task Card 2:

$$\sqrt{74} = \underline{\hspace{2cm}}$$

Task Card 7:

Calculate:

$$\sqrt{9 \times 16} = \underline{\hspace{2cm}}$$

Task Card 3:

Calculate:

$$\sqrt{81 \times 4} = \underline{\hspace{2cm}}$$

Task Card 8:

Calculate:

$$\sqrt{16 \div 4} = \underline{\hspace{2cm}}$$

Task Card 4:

Calculate:

$$\sqrt{\sqrt{36} + \sqrt{100}} = \underline{\hspace{2cm}}$$

Task Card 9:

Calculate:

$$\sqrt{\sqrt{25} + \sqrt{16}} = \underline{\hspace{2cm}}$$

Task Card 5:

Calculate:

$$\sqrt{58 - 9} = \underline{\hspace{2cm}}$$

Task Card 10:

Calculate:

$$\sqrt{36} \times \sqrt{81} = \underline{\hspace{2cm}}$$

Task Cards

Cut out the task cards below

Task Card 21:

Calculate:

$$\sqrt{\sqrt{25} \times \sqrt{25}} = \underline{\hspace{2cm}}$$

Task Card 26:

Calculate:

$$\sqrt{81} + \sqrt{16} = \underline{\hspace{2cm}}$$

PREVIEW

Task Card 22:

$$\sqrt{36} \div 6 = \underline{\hspace{2cm}}$$

Task Card 27:

Calculate:

$$\sqrt{\sqrt{49} + \sqrt{81}} = \underline{\hspace{2cm}}$$

Task Card 23:

Calculate:

$$\sqrt{\sqrt{100} + \sqrt{36}} = \underline{\hspace{2cm}}$$

Task Card 28:

Calculate:

$$\sqrt{\sqrt{4} \times \sqrt{9}} = \underline{\hspace{2cm}}$$

Task Card 24:

Calculate:

$$\sqrt{\sqrt{144} + \sqrt{169}} = \underline{\hspace{2cm}}$$

Task Card 29:

Calculate:

$$\sqrt{\sqrt{64} \div \sqrt{4}} = \underline{\hspace{2cm}}$$

Task Card 25:

Calculate:

$$\sqrt{\sqrt{144} - 3} = \underline{\hspace{2cm}}$$

Task Card 30:

Calculate:

$$\sqrt{\sqrt{169} \div 13} = \underline{\hspace{2cm}}$$

Name: _____

38

Task Cards: Square Root Operations

Answers

Record your answers below

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	

Fractions, Decimals, and Percents

Part 1

Fill in the table with the converted decimal, fraction, and percent

Fraction	Decimal	Percent
100/1000		10.0%
200/1000		20.0%
	0.300	%
		40.0%
50/100		%
		60.0%
		%
		%
900/1000		%
	1.000	100.0%

Part 2

Answer the word problems below

- 1) Cole played in a doubles tennis match with Lilly. Cole scored 40 points. What percentage of the points did Lilly score?



- 2) Leon won a chili cooking competition. He received 150 of the 200 first place votes. What percentage of first place votes did Leon get?



- 3) Samantha finished 90% percent of the triathlon she competed in. Write what fraction of the race she completed in its simplest form.



Name: _____

41

Fraction/Decimal/Percent Bottle Flip Challenge

Objective

What are we learning about?

To practise and reinforce understanding of converting between fractions, decimals, and percents through the engaging and physically active bottle flip game.



Materials

What you will need for the activity.

- Plastic bottles (one per pair/group) filled to approximately one-third with water (or use cups with water)
- Set of fraction, decimal, and percent conversion question cards
- Answer sheet (one per group)

Instructions

How you will complete the activity

1. Start with a short lesson on converting between fractions, decimals, and percents.
2. Arrange the students into pairs or small groups and distribute one bottle and a set of question cards to each.
3. Each pair or group receives an answer sheet to record their answers.
4. Explain the rules: One student draws a question card and solves the conversion problem between fractions, decimals, or percents.
5. Once they believe they have the correct answer, they write it down on the answer sheet.
6. The student then gets to attempt a bottle flip. A successful flip means they get a point; an unsuccessful flip means they need to try to solve another question card before flipping again.
7. Alternate turns within each group or pair until they have completed all the question cards.
8. Groups or pairs tally their successful flips and compare with the rest of the class to determine the winning team.
9. Go through the answer sheet with the class to ensure understanding and correct any misconceptions.

Name: _____

42

Curriculum Connection
N8.2

Questions

Cut out the questions below and use them for the game.

$$\frac{50}{1000} = \underline{\hspace{1cm}}\%$$

$$\frac{902}{1000} = 0 \underline{\hspace{1cm}}$$

$$33.5\% = 0. \underline{\hspace{1cm}}$$

$$72\% = \underline{\hspace{1cm}}/1000$$

$$0.523 = \underline{\hspace{1cm}}\%$$

$$0 \underline{\hspace{1cm}}\%$$

$$86.7\% = 0. \underline{\hspace{1cm}}$$

$$93.1\% = \underline{\hspace{1cm}}/1000$$

$$\frac{475}{1000} = \underline{\hspace{1cm}}\%$$

$$\frac{150}{1000} = 0 \underline{\hspace{1cm}}$$

$$12\% = 0. \underline{\hspace{1cm}}$$

$$43.1\% = \underline{\hspace{1cm}}/1000$$

$$0.789 = \underline{\hspace{1cm}}\%$$

$$0.947 = \underline{\hspace{1cm}}\%$$

$$45.8\% = 0. \underline{\hspace{1cm}}$$

$$58.2\% = \underline{\hspace{1cm}}/1000$$

Name: _____

43

Questions

Cut out the questions below and use them for the game.

A student read 180 pages out of a 300-page book. What is the fraction, decimal, and percent of the book read?

A store sold 75 out of 150 items on sale. What fraction, decimal, and percent of the items were sold?

A runner completed 6 out of 8 laps in a race. What is the fraction, decimal, and percent of the laps completed?

A survey showed 120 out of 400 people prefer coffee over tea. What is the fraction, decimal, and percent of people who prefer coffee?

A garden has 20 out of 60 plants that are flowers. What fraction, decimal, and percent of the plants are flowers?

A recipe used 2 out of 3 cups of sugar. What fraction, decimal, and percent of the sugar was used?

A student answered 45 out of 60 questions correctly on a test. What fraction, decimal, and percent of the questions were answered correctly?

A printer has printed 480 out of 600 pages. What is the fraction, decimal, and percent of pages printed?

A car was driven for 320 miles out of a 400-mile journey. What is the fraction, decimal, and percent of the journey completed?

A basketball team won 15 out of 25 games this season. What fraction, decimal, and percent of the games were won?

A factory produced 1,200 units with 200 defects. What is the fraction, decimal, and percent of defect-free units?

A athlete drank 120 out of 1,000 milliliters out of a bottle. What is the fraction, decimal, and percent of the bottle drunk?

A class of 30 students had 9 students who received an A grade. What fraction, decimal, and percent of the class received an A?

A library lent out 350 of its 500 books. What fraction, decimal, and percent of the books were lent out?

A worker finished 80 out of 100 tasks for the day. What is the fraction, decimal, and percent of tasks completed?

A swimmer swam 800 meters out of a 1,000-meter race. What is the fraction, decimal, and percent of the race completed?

Name: _____

44

Conversions Bottle Flip Challenge

Answers

Record your answers below.

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	

Name: _____

45

Curriculum Connection
N8.2

Class List - Decimal, Fraction, Percent

Mrs. Hansen just finished marking a math test. Her class list with the results of the test are below. She has simplified some of the fractions, and some students wrote a different test, meaning they are out of a different total.

Grades

A = 80% and up

B = 70% - 79%

C = 60% - 69%

D = 50% - 59%

F = 49% or less

Questions

Fill in the class list

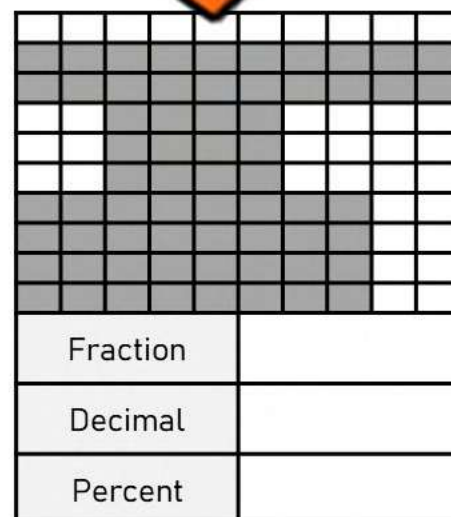
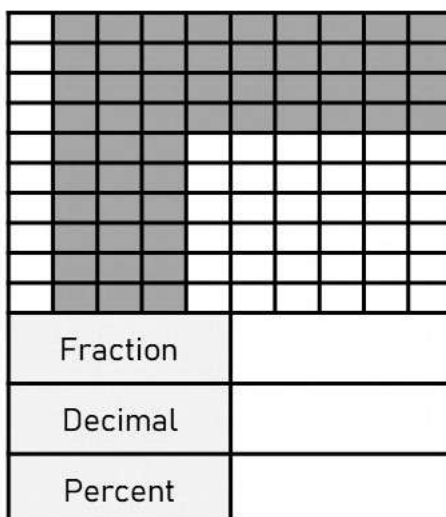
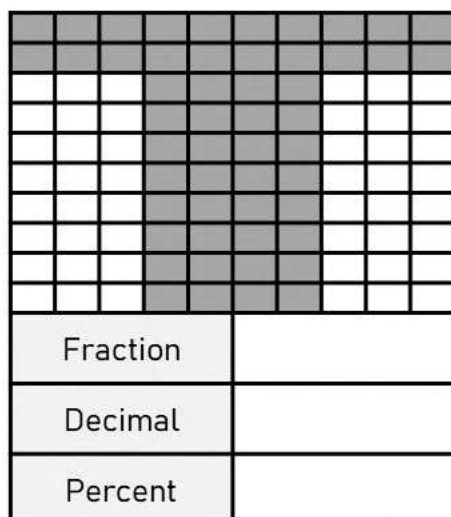
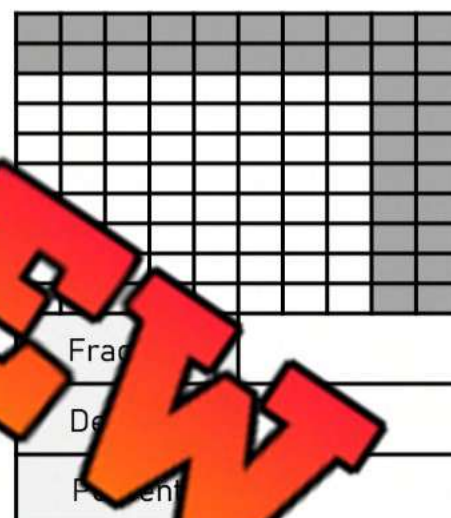
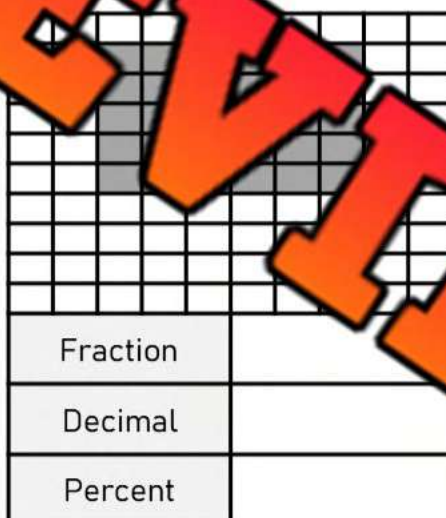
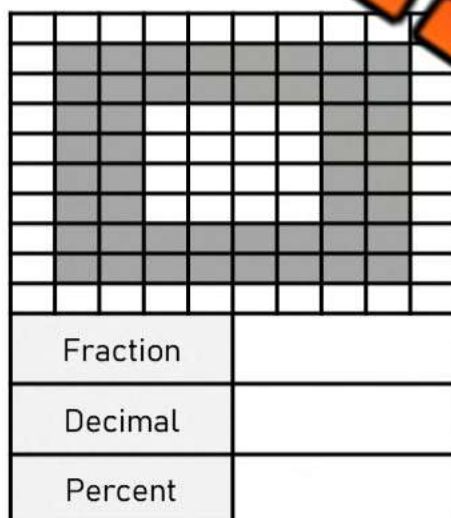
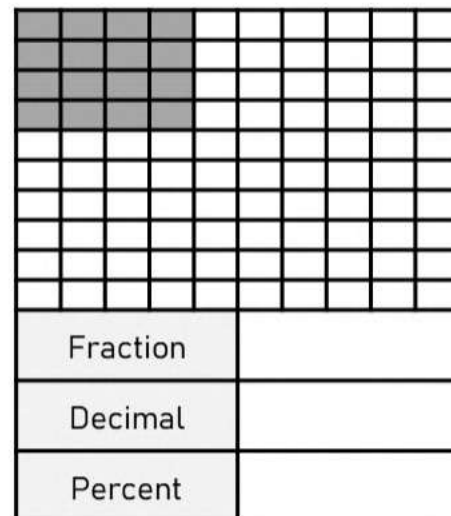
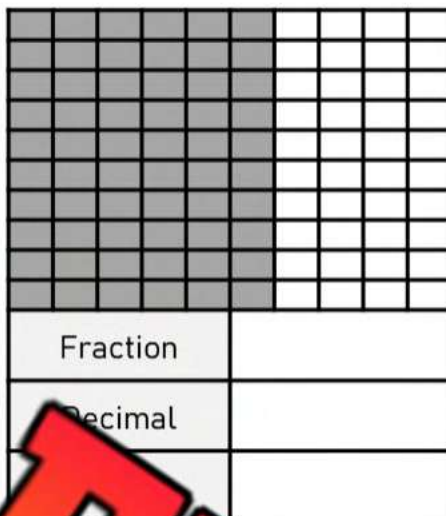
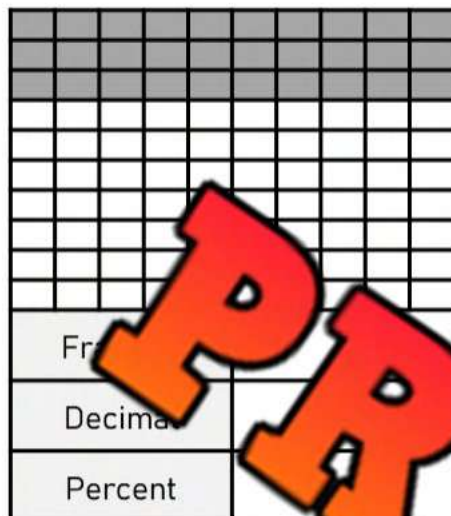


Student	Mark	Decimal	Percent	Grade
Madison				
River	6/100			
Parker	75/100			
Zara	14/20			
Lorenzo	1/2			
Damian	1/7			
Matteo	5/5			
Everly	2/5			
Evan	79.5/100			
Skylar	93.5/100			
Luka	9.5/12			
Josie	2.5/9			
Cora	2/10			
Kaylee	3.5/5			
Savannah	75/100			

Fractions, Decimals, and Percents

Questions

What fraction, decimal and percent of the array is shaded in?



Sport Statistics – Fractions, Decimals, and Percents

Questions

Baseball Statistics – 2021 Regular Season Offensive Statistics

1) Vladamir Guerrero Jr. had 600 at bats in the 2021 season. His stats are listed in the table below.

	Hits	Runs	Doubles	Triples	Home Runs
Totals - Fraction	188/600	124/600	21/600	1/600	51/600
Decimal					
Percent					

- a) If Guerrero had 100 at bats, how many home runs would he have?
- b) If Guerrero had 1000 at bats, how many doubles would he have?
- c) If Guerrero had 50 at bats, how many hits would he have?
- d) Write the probability as a percentage that Guerrero will get a hit at his next at bat?



2) Bo Bichette had 700 at bats in the 2021 season. His stats are listed in the table below.

	Hits	Runs	Doubles	Triples	Home Runs
Totals - Fraction	195/700	118/700	29/700	1/700	28/700
Decimal					
Percent					

- a) If Bichette had 100 at bats, how many home runs would he have?
- b) If Bichette had 1000 at bats, how many doubles would he have?
- c) If Bichette had 50 at bats, how many hits would he have?
- d) Write the probability as a percentage that Bichette will get a home run at his next at bat?

Fractions, Decimals, and Percents - Word Problems**Questions**

Answer the word problems below

1) Finn scored 82% on a math test. Aspen scored $20/25$ on the same test. Who received a higher percentage?



2) Gracie and Blakely all ran for student president. Gracie received 35% of the 200 votes and Gael received 0.31 of the votes and Blakely received $68/200$ votes.

How many votes did each student get?

Gracie	Gael	Blakely

3) Daisy's goal is to walk 10,000 steps each day. Today she walked 9253 steps. What percentage of her goal did she reach?

4) Tyler's investment of \$100 gained \$10. His investment increased by $10/100$. What percentage has his investment increased?

5) Zayden and his friend Norah drove 500km to Canada's Wonderland. Zayden drove 335km and Norah drove the rest.

- What percentage of the trip did Zayden drive?
- What percentage of the trip did Norah drive?

6) Arthur can throw a football 66 yards. A Canadian football field is 110 yards. What percentage of the football field can Arthur throw?



Exit Cards

Cut Out

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

Name: _____

1) Fill in the table with the converted decimal, fraction, and percent

Fraction	Decimal	Percent
		95%
62.5/100		
	0.4	

2) Lucas scored 18/20 on a science test, while Emma scored 85% on the same test. Who received a higher percentage?

Name: _____

1) Fill in the table with the converted decimal, fraction, and percent

Fraction	Decimal	Percent
		95%
62.5/100		
	0.4	

2) Lucas scored 18/20 on a science test, while Emma scored 85% on the same test. Who received a higher percentage?

Name: _____

1) Fill in the table with the converted decimal, fraction, and percent

Fraction	Decimal	Percent
		95%
62.5/100		
	0.4	

2) Lucas scored 18/20 on a science test, while Emma scored 85% on the same test. Who received a higher percentage?

Name: _____

1) Fill in the table with the converted decimal, fraction, and percent

Fraction	Decimal	Percent
		95%
62.5/100		
	0.4	

2) Lucas scored 18/20 on a science test, while Emma scored 85% on the same test. Who received a higher percentage?

Four Finger Quiz - Percent Calculation

Objective

What are we learning about?

Students will practice solving real-world word problems using mental math techniques for calculating percentages (1%, 10%, 15%, 25%, and 50%).

Materials: _____ you will need for the activity.

- Printed questions (display on a projector)



Instructions

How you will complete the activity

1. Prepare a list of questions with four 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 signal when you read each question.
4. Read the first question aloud clearly and repeat if necessary.
5. Give students time to write down the problem and solve it.
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 multiplying decimals.

Questions

Read the questions to the students

Question	A	B	C	D
1. A backpack costs \$85. You get a 10% discount. How much is the discount?	\$8.50	\$8.00	\$7.00	\$9.00
2. A book has 340 pages. You read 1% of it today. How many pages did you read?	3.5 pages	3.0 pages	3.4 pages	4.0 pages
3. A restaurant bill is \$150. You leave a 15% tip. How much is the tip?	\$22.00	\$22.50	\$23.00	\$25.00
4. A coat costs \$120. It's on sale for 50% off. How much does it cost now?	\$150	\$135	\$140	\$120
5. A pair of shoes costs \$40. You get a 25% discount. How much is the discount?	\$35.00	\$25.00	\$30.00	\$40.00
6. Your total grocery bill is 70 grams and you use 0.1 of it for a recipe. How much do you use?	67 grams	6.7 grams	6.8 grams	60 grams
7. A soccer team won 10% of 90 matches. How many matches did they win?	90	92	95	85
8. A class has 1,300 students. 1% of them are on the debate team. How many are on the debate team?	11 students	10 students	12 students	13 students
9. A dinner costs \$200. You leave a 15% tip. How much tip did you leave?	\$20	\$25.00	\$25.00	\$22.50
10. A jar weighs 850 grams. You remove 0.01 of its weight. How much weight did you remove?	8.5 grams	85 grams	8.5 grams	8 grams
11. A plant weighs 400 grams. It loses 25% of its weight. How much weight was lost?	150 grams	120 grams	100 grams	80 grams
12. A water bottle is filled with 340 ml of water. You drink 50%. How much water did you drink?	170 ml	150 ml	160 ml	165 ml
13. A video game costs \$450. You save 0.1 of your money for it. How much money do you save?	\$45	\$50	\$40	\$47
14. A cake recipe calls for 900 grams of flour, but you only use 10% of it. How much flour do you use?	90 grams	85 grams	95 grams	100 grams
15. A project weighs 670 grams. You reduce the weight by 0.01. How much weight is reduced?	6.7 grams	7.0 grams	5.7 grams	8.0 grams

Determining Sales Tax

We can determine the exact price of a good or service by using a calculator. We can either convert the percentage to a decimal or we can use the percent button on our calculator.

Steps to use % Button on a Calculator

- 1) Enter the cost of the product
- 2) Hit the + button
- 3) Type the tax percentage (11)
- 4) Hit the % button (this will display the sales tax)
- 5) Click the = button



Question: Follow the steps above to calculate the sales tax and total price

#	Product Price	Sales Tax (11%)	Total Price
1	\$24.00	\$2.64	\$26.64
2	\$17.50		
3	\$27.35		
4	\$44.75		
5	\$74.25		
6	\$68.70		
7	\$125.15		
8	\$174.10		
9	\$194.65		
10	\$214.20		

Determining Sales Tax - Word Problems

Questions

Answer the word problems below

1) Kayden has a \$10 bill and wants to know if he can afford a burger and fry meal that costs \$7.99 before taxes. Calculate the total cost of the meal. Can he afford the meal?

Bonus: How much money does he have left?



2) Dexter wants to buy a video game that costs \$100 and the game costs \$65.00 before tax. How much will the total cost be?

Bonus: How much money will he have left if he has \$100?



3) Mya is thinking of purchasing a new pair of headphones that cost \$59.99. She only has \$65.00. Does she have enough money? Explain.



Name: _____

68

Curriculum Connection
N8.2

Determining Sales Tax – Multiple Items

Item #1	Item #2	Total Price	Taxes	Total Cost
 \$10.50	 \$5.50	\$16.00	\$1.76	\$17.76

Questions

Fill in the table below

Item #1	Item #2	Total Price	Taxes	Total Cost
 \$2.50				

Item #1	Item #2	Total Price	Taxes	Total Cost
 \$1.25	 \$0.75			

Item #1	Item #2	Total Price	Taxes	Total Cost
 \$3.20	 \$1.75			

Item #1	Item #2	Total Price	Taxes	Total Cost
 \$3.50	 \$2.20			

Item #1	Item #2	Total Price	Taxes	Total Cost
 \$7.25	 \$12.50			

Determining Final Price – Multiple Items – Word Problems**Questions**

Answer the word problems below

1) George went to the movies with his friends. He ordered a bag of popcorn for \$6.50 and a drink for \$4.75. How much was his total purchase with tax included?



Bonus: If he paid with a \$10 bill, how much will he get back?

2) Ruby went to the bank to get a track and field meet. Her money is below:



She bought a hot dog for \$3.00, a bag of chips for \$1.50, and a drink for \$2.25. How much did it cost her with tax?

Bonus: How would you pay – would you use all three pieces of money?

3) Steve went to a video game store and bought a video game for \$29.99 and a controller for \$49.99. How much money total did he spend with tax?



Bonus: He paid with a \$100 bill. How much will he get back?

Challenge – Restaurant Menu

Questions

Answer the word problems below

You are just sitting down to a meal at a restaurant with your friends. The waiter hands you a menu. You plan to choose 1 appetizer, 1 main, and 1 dessert.

1) What items will you choose?

2) How much will these things cost without tax?

3) How much will these things cost with tax? (11%)

4) When you finished your meal, it is customary to leave a 15–20% gratuity (tip). What percent will you leave? _____

5) What will your entire meal cost with the tax and tip included?

6) Your friend enjoys expensive things. He orders the most expensive dinner, picking the most expensive appetizer, main, and dessert. How much would it cost him with tax and a 20% gratuity?

Menu

Appetizer

Soup -----	\$4.50
Salad -----	\$8.25
Chicken Wings ----	\$9.75
Poutine -----	\$8.99

Mains

Pasta -----	14.99
Steak -----	\$25.99
Hamburger -----	\$8.99
Pizza -----	\$22.50

Desserts

Ice Cream -----	\$4.99
Apple Pie -----	\$6.99
Chocolate Cake -----	\$5.25
Chocotate -----	

Restaurant Order – Adding Tip

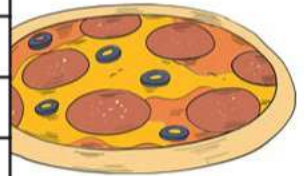
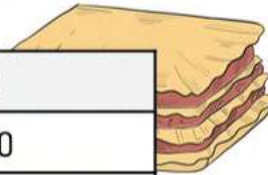
Word Problems

Answer the questions below

An Italian restaurant serves the items below.



Menu	Cost
Spaghetti	\$14.50
Pizza	\$18.90
Lasagna	\$22.25
Risotto	\$19.75
Dessert - Gelato	\$5.80



1) James orders spaghetti for \$14.50 and gelato for dessert.

- How much will the meal cost with sales tax (11%)?
- James adds 15% tip to the total with tax. How much will he owe?

2) Sophia brings her family to the restaurant. They order pizzas and risotto.

- How much will the meal cost with sales tax (11%)?
- Sophia adds 20% tip to the total with tax. How much will she owe?

3) Evelyn and her 3 friends go to the restaurant. Each of them got a different meal and they all got gelato for dessert. Evelyn paid for the entire meal.

- How much will the meal cost with sales tax (11%)?
- Evelyn adds 18% tip to the total with tax. How much will she owe?

Exit Cards

Cut Out

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

Name: _____

1) Calculate the sales tax and total price.

Product Price	Sales Tax (11%)	Total Price
\$55.89		
\$24.75		
\$86.40		

2) Ethan went to a cafe and ordered a sandwich for \$4.75, a coffee for \$2.50, and a cookie for \$1.25. How much was his total bill with tax included?

Name: _____

1) Calculate the sales tax and total price.

Product Price	Sales Tax (11%)	Total Price
\$55.89		
\$24.75		
\$86.40		

2) Ethan went to a cafe and ordered a sandwich for \$4.75, a coffee for \$2.50, and a cookie for \$1.25. How much was his total bill with tax included?

Name: _____

1) Calculate the sales tax and total price.

Product Price	Sales Tax (11%)	Total Price
\$55.89		
\$24.75		
\$86.40		

2) Ethan went to a cafe and ordered a sandwich for \$4.75, a coffee for \$2.50, and a cookie for \$1.25. How much was his total bill with tax included?

Name: _____

1) Calculate the sales tax and total price.

Product Price	Sales Tax (11%)	Total Price
\$55.89		
\$24.75		
\$86.40		

2) Ethan went to a cafe and ordered a sandwich for \$4.75, a coffee for \$2.50, and a cookie for \$1.25. How much was his total bill with tax included?

Introduction to Interest

What is Interest?

Interest is the amount of money earned from an investment or the cost of borrowing based on an interest rate.



Interest From Investments

We can earn interest on our investments, which means we are putting our money to work! If we invest \$100 in the stock market, we hope that one hundred dollars is worth more at the end of the year. The average interest rate return in the stock market over the last 100 years is about 10%. This means that after one year, your \$100 is now worth \$110.

Interest From Borrowing

Most people need to borrow money to pay for things like cars, houses, or even water heaters and other necessities. When we borrow money, we pay the lender (usually a bank) for the use of the money. The amount of money we pay in interest depends on the **interest rate**. A higher interest rate will require us to pay more in interest. For example, if we borrow \$100 with a 15% yearly interest rate, we will have to pay \$15 at the end of the year. It is important to shop around for the lowest interest rate.

Part 1 A bank pays 5% interest for your savings account – \$5 per \$100

Savings	Savings + Interest	Savings	Savings + Interest
1) \$200	\$210	5) \$1000	\$1050
2) \$450		6) \$1700	
3) \$625		7) \$2500	
4) \$932		8) \$2800	

Part 2 You pay 19% interest on your credit card – for every \$100 you owe, you pay \$19

Debt	Debt + Interest	Debt	Debt + Interest	Debt	Debt + Interest
1) \$300	\$357	4) \$999		7) \$4230	
2) \$485		5) \$1452		8) \$5417	
3) \$712		6) \$2375		9) \$7759	

Part 3 Answer the question below

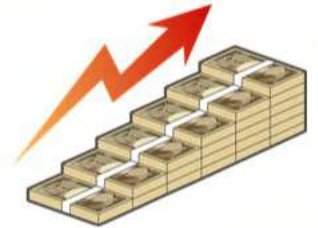
What are your thoughts on interest? Is paying a 19% interest rate fair?

Calculating Interest Rates - Investments

When dealing with interest rates, we are either paying interest or being paid interest. When we invest money in a savings account, we are paid interest. We can also invest in the stock market in hopes of being paid interest on our investment. We can calculate how much return we will get on an investment by using the following steps.

Steps to use % Button on a Calculator

- 1) Enter the investment amount
- 2) Hit the **%** button
- 3) Type the interest rate
- 4) Hit the **=** button (this will display how much earned from interest)
- 5) **ON** button (this will give you the total return)



Questions Use the steps above to calculate the return on investment

#	Investment	5% Interest	15% Interest	Total Return on Investment
1	\$28	\$1.40	\$4.20	\$32.20
2	\$37			
3	\$41			
4	\$97			
5	\$150			
6	\$370			
7	\$525			
8	\$855			
9	\$1400			
10	\$2755			

Calculating Interest

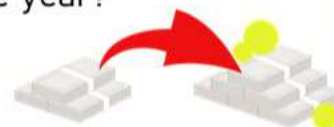
Questions

Calculate how much interest we will pay in the situations below

1) If you borrow \$600 for 6 years at an interest rate of 10%, how much interest will you pay?

b) How much in total will you pay?

2) How much interest does a \$430 investment earn at 6% over one year?



3) How much interest will you earn on a \$875 investment at 4% for six years?

4) How much interest will you have to pay if you borrow \$325 for 2 years at a 12% interest rate.

5) Jacob invested \$250 for 4 years. He earned \$12.50 of interest. He forgets his interest rate. He thinks it was either 5% or 10%. Which interest rate did he get?



6) If you borrow \$1750 for 3 years at an interest rate of 6%, how much interest will you pay?

b) How much will you pay in total?

7) If you get a loan for \$225 000 to buy a house with an interest rate of 2%, how much interest will you pay for a 10-year loan?



8) Hanna paid \$28 of interest when she borrowed \$200. Her father said she paid 28% interest, but she says she only paid 14%. Who is correct?

Calculating Simple Interest

When we borrow money, we usually pay interest on the total amount we borrow. We call this amount the **principal**. Depending on the type of loan, the interest rates will vary. **Simple interest** is interest paid on the principal amount. We can calculate simple interest by using the following formula:

Simple interest = principal x interest rate x time to pay back the loan

This will give us how much interest we will pay for our loan.

For example, if we borrow \$5000 for a car loan with a 5% simple interest rate on a 5-year term. The amount of interest you will pay after the 5 years is $5000 \times 0.05 \times 5 = \1250



Part 1 Fill in the table to determine the cost of borrowing for 3 and 8 years

#	Principal	Interest Rate	3-Year Loan	8-Year Loan
1)	\$2000		\$300	\$800
2)	\$3500			
3)	\$6000	19%		
4)	\$10,000	8%		
5)	\$17,000	10%		
6)	\$25,000	4%		
7)	\$47,500	3.5%		

Part 2 Answer the questions below

1) Is it more or less costly to borrow money for longer periods of time. Explain why that might be the case.

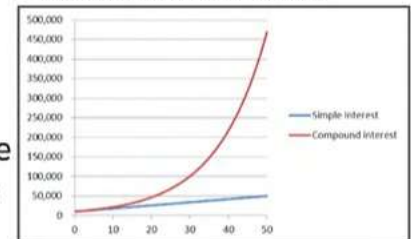
2) Jake is borrowing \$8000 for a new car. The interest rate is 6%. He's not sure if he'll choose the 5- or 7-year term. How much will he save in interest on the 5-year term?

Simple Interest vs Compound Interest

Overview - Simple Interest vs Compound Interest

Simple interest is based on the principal amount of the loan or deposit. This means the interest paid does not change. For example, if you borrow \$100 at a 5% annual interest rate, you will owe \$5 in interest each year until the loan is paid.

Compound interest is based on the principal amount and the interest that accumulates on it every period. For example, if you borrow \$100 at a 5% annual interest rate, you will owe \$5 after the first year, a total of \$105 the next year (\$5.25). The third year, you would owe \$110.25, which is \$5.51.



Question: Does the graph display a simple or compound interest loan?



1) How do you know which type of loan this was? Explain

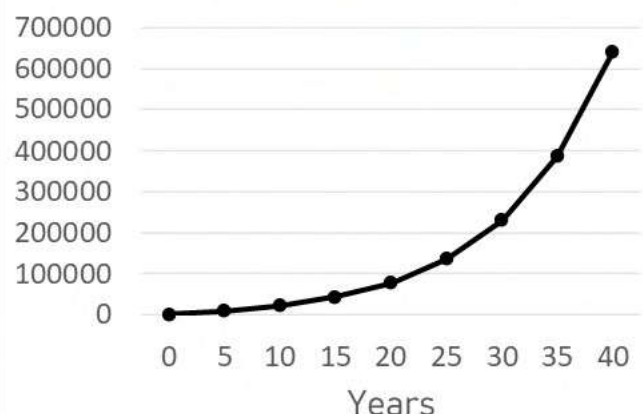
2) How much interest will be paid after 7 years?

3) Will this loan get a massive amount of interest?

1) How do you know which type of interest is being applied? Explain

2) What do you notice about the graph? Why isn't it linear?

Money earned with \$100 deposit and \$100 Monthly Contributions (10%)



Compound Interest - Borrowing

When we borrow money, we pay interest on how much we borrow. We need to consider how long it will take to pay back the debt before we decide to borrow. Borrowing money to buy things like a house or car are essential for most people even though those debts will take a long time to pay off. Luckily, mortgage interest rates are between 2-4% and car loans are typically around 5%.

On the other hand, borrowing to buy things we don't need can lead to us using credit cards to borrow. Credit cards have a 19% interest rate. Complete the table to show how credit card debt can become overwhelming with compound



Question: How much interest is paid after borrowing for up to 5 years

#	Principal Borrowing Amount	1-Year 19% - Total	2-Year 19% - Total	3-Year 19% - Total	4-Year 19% - Total	5-Year 19% - Total
1	\$100	\$119	\$141.61	\$168.52	\$200.53	\$238.64
2	\$250					
3	\$700					
4	\$1250					
5	\$2000					
6	\$2500					
7	\$2800					
8	\$3250					
9	\$5000					
10	\$15,000					

Compound Interest – Online Tool

Calculating compound interest is a complicated process. Fortunately, we can use online compound interest calculators to help us with the math. Using these tools helps us understand the importance of compounding interest, as it can get us in a lot of debt or earn us a lot of money.

Directions:

- 1) Search online: compound interest calculator
- 2) Type in the values from the table below to determine how much your investment or debt will grow.
- 3) Use the calculator to determine how much interest is compounded monthly for all your results



Part 1 Fill in the table below

#	Principal (Initial investment or borrowing amount)	Monthly Addition	Interest Rate	Years to Grow	Total Value of Debt or Investment
1	\$100	\$100	10%	45	
2	\$500	\$50	8%	40	
3	\$2000	\$200	10%	30	
4	\$25	\$25	10%	20	
5	\$5000	\$100	9%	30	
6	\$8000	\$250	8%	20	

Part 2 Answer the questions below

1	What amount could you contribute now and each month? How much would you have in 40 years if you started today assuming a 10% return?	
2	Alex and Jeff are both 14 years old. Alex plans to contribute \$10 today and \$25 every month for the next 40 years. Jeff has more money now, so he will contribute \$2000 today, but only \$20 each month for the next 40 years. Assuming a 10% interest rate, who will earn more?	
3	Sam has two options for a compound interest loan. Option A is borrowing \$500 for 5 years with a 7% interest rate and option B is borrowing \$500 for 4 years with an 8% interest rate. Which will cost him more money?	

Loans

A **loan** is an amount of money that is expected to be paid back with interest. When people get a loan, they are borrowing money that is not theirs.

To get a loan, people apply to a lender asking for a certain amount of money. The lender – often a bank, will need to investigate whether the person can afford to pay back the loan. They will look at how much income they earn, assets they own, and how much debt they already have.

People can apply for a fixed rate loan or a variable rate loan. A **fixed rate** loan has an interest rate that stays the same for the period of time chosen – typically 5 years. You can get a longer fixed rate, but the interest rate will rise the longer you request. These loans are safe because you won't be surprised by the payment you need to make as the rate and payments stay the same. Fixed rates are usually slightly higher than variable but less risky.

A **variable rate** has an interest rate that changes whenever the bank changes their prime rate, which is the base interest rate that all loans are based on. Usually all five big banks use the same prime rate. When they give any loan, they describe the loan as prime plus a certain number. For example, a mortgage rate might be prime plus 1%, whereas an auto loan might be prime plus 5.5%. In 2021, the prime rate was 2.45%, the lowest it has been in over 10 years. A variable rate could change each day as the prime rate changes, so it is a bit riskier.



Part 1 If the prime rate is 2.45%, how much interest paid for 1 year

Loan Amount	Prime + 0.5%	Loan Amount	Prime + 4%
1) \$5000		4) \$15 540	
2) \$15 250		5) \$42 000	
3) \$250 000		6) \$66 750	

Part 2 Compare the fixed rate (5%) and variable-rate loans over the course of 5 years

1)	Loan	After 1 Year (2.45 + 2%)	After 2 Years (2.75 + 2%)	After 3 Years (3.5 + 2%)	After 4 Years (4.2 + 2%)	After 5 Years (5.1 + 2%)
Fixed Rate (5%)	\$1500					
Variable Rate	\$1500					

2)	Loan	After 1 Year (2.45 + 1.5%)	After 2 Years (3.65 + 1.5%)	After 3 Years (4.5 + 1.5%)	After 4 Years (5.5 + 1.5%)	After 5 Years (3.45 + 1.5%)
Fixed Rate (6%)	\$9200					
Variable Rate	\$9200					

Choosing a Loan

1) Scenario	Jill is on a fixed income, meaning she earns the same each month: \$3000. She needs a loan to pay for a condo. She is worried the loan could get too expensive. She will pay off the loan over the next 25 years.			
	Fixed Rate – 3 Years	Fixed Rate – 5 Years	Fixed Rate – 10 Years	Variable Rate
	3.1%	3.5%	3.9%	Prime + 0.5% (Prime = 2.5%)
Which loan should Jill choose? Explain why.				

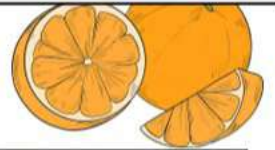
2) Scenario	Josh has been paying off a large amount of savings. He doesn't mind taking risks if it means he can get a better deal. He needs a loan for a new house that he will pay off over the next 30 years.			
	Fixed Rate – 3 Year	Fixed Rate – 5 Years	Fixed Rate – 10 Years	Variable Rate
	2.6%	3.1%	3.5%	Prime - 0.4% (Prime = 2.4%)
Which loan should Josh choose? Explain why.				

3) Scenario	Julian signed a contract to work for a business for the next 5 years. He will have a fixed income until his contract is up. His job pays him well, but he's worried he won't find a job quickly after his contract is up. He needs a loan for a new car. He will pay the car off over the next 6 years.			
	Fixed Rate – 2 Years	Fixed Rate – 4 Years	Fixed Rate – 6 Years	Variable Rate
	4.6%	5.2%	5.7%	Prime + 2.5% (Prime = 2.6%)
Which loan should Julian choose? Explain why.				

Percents Greater Than 100

Percentages are out of 100. In other words, 100% is 100/100. In some cases, it may be impossible to get over 100%. For example, you can't watch TV more than 100% of your time. This is impossible because 100% is all the time you have.

On the other hand, it is very possible to have percentages over 100%. For example, you may get 100% of the vitamin C you need from eating an orange. But suppose you ate 3 oranges. You would receive 300% of the vitamin C you need for the day.



Part 1 Fill in the table using fractions out of 100

Fraction	Decimal	Percent
105/100	1.05	105.0%
150/100		
		400.0%
510/100		
	7.02	
900.5/100		

Part 2 Fill in the table using fractions out of 1000

Fraction	Decimal	Percent
2005/1000	2.005	200.5%
		301%
	3.582	
4486/1000		
		672.3%
	8.08	
10500/1000		

Fractions, Decimals, Percents – Word Problems

Questions

Answer the word problems below

1) Kylie bakes cakes and sells them. It costs her \$5 to make a cake. She sells the cake for \$18. What percentage is the selling price in comparison to the cost price?



2) Gavin worked for an hour. He received a raise from his boss and is now earning \$60 an hour. What percentage does Gavin earn now in relation to what he earned before the raise?



3) Maeve did well on her test. She got 17 of the 20 questions correct and answered 3 bonus questions. What was her mark as a fraction and percentage?

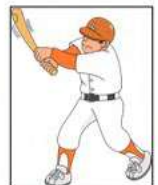
Fraction	Percentage



4) Elliott ran a 10km race last week. The winner finished in 30 minutes. It took Elliot 45 minutes. What percentage of the winner's time did Elliott take in relation to the winner's time?



5) Calvin sold a baseball card for \$88. He bought it for \$20. How much did Calvin sell it for in relation to what he paid as a percentage?



6) Luke hit the golf ball 200 yards. Scott drove the golf ball 300 yards right after. Write how much further Scott hit the ball than Luke as a fraction, decimal, and percent.

Fraction	Decimal	Percent



Comparing Fractions, Decimals, and Percents

Part 1

Use the $<$, $>$, $=$ to make the statement true

1) 2.15 218%

2) $2\frac{1}{3}$ 210%

3) 1.55 $1\frac{2}{4}$

4) $3\frac{1}{4}$ 3.25

5) 0.15 13%

6) $\frac{8}{3}$ 231%

7) $4\frac{1}{8}$

8) 5.33 $5\frac{1}{3}$

9) 6.75 685%

10) $\frac{15}{5}$

$\frac{1}{2}$

12) $7\frac{3}{4}$ 7.8

Part 2

Arrange the fractions, percents, and numbers from least to greatest below

1) 300% , $\frac{16}{4}$, 3.14 , 232% , $2\frac{3}{4}$

3) 5% , 66 , 65% , $\frac{3}{5}$

2) 250% , $2\frac{1}{4}$, 2.45 , 275% , $\frac{14}{5}$

4) 750% , $\frac{1}{5}$, 7 , $\frac{4}{5}$

Part 3

Answer the question below

Tucker, Maddox, and Camden all invested \$100 in the stock market. Tucker earned 258% of his initial investment. Maddox earned 2.49 times his investment. Camden earned $\frac{265}{100}$ of his investment.

Who earned the most from their \$100 investment?

Fractions, Decimals, Percents – Word Problems

Questions

Answer the word problems below

1) Tristan earns \$30 each time he cuts his neighbour's grass. Last week, his neighbour paid him 150% of the \$30. How much did he get paid?



2) Walker makes wooden tables and sells them. It costs him \$50 to make one table. If he wants to earn 20% of his cost, how much should he sell the tables for?

3) Colt won the long drive contest. The second place driver drove the ball 310 yards. Colt drove it 132% further than the second-place driver. How far did he drive the ball?



4) Alaina and her friend Londyn both sell clothes. Alaina earned $2\frac{1}{4}$ more money than Londyn yesterday. Londyn earned \$38. How much did Alaina earn?

Exit Cards

Cut Out

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

Name: _____

Arrange the following from least to greatest below

1) 47%, $\frac{16}{4}$, 4.5, 232%, $1\frac{5}{6}$ 2) 80%, $\frac{7}{10}$, 0.85, $\frac{5}{8}$, $1\frac{4}{8}$ 3) 1.2, 125%, $1\frac{2}{5}$, 1.5, 115%,

Name: _____

Arrange the following from least to greatest below

1) 470%, $\frac{16}{4}$, 4.5, 232%, $1\frac{5}{6}$ 2) 80%, $\frac{7}{10}$, 0.85, $\frac{5}{8}$, $1\frac{4}{8}$ 3) 1.2, 125%, $1\frac{2}{5}$, 1.5, 115%,

Name: _____

Arrange the following from least to greatest below

1) 470%, $\frac{16}{4}$, 4.5, 232%, $1\frac{5}{6}$ 2) 80%, $\frac{7}{10}$, 0.85, $\frac{5}{8}$, $1\frac{4}{8}$ 3) 1.2, 125%, $1\frac{2}{5}$, 1.5, 115%,

Name: _____

Arrange the following from least to greatest below

1) 470%, $\frac{16}{4}$, 4.5, 232%, $1\frac{5}{6}$ 2) 80%, $\frac{7}{10}$, 0.85, $\frac{5}{8}$, $1\frac{4}{8}$ 3) 1.2, 125%, $1\frac{2}{5}$, 1.5, 115%,

Test – Squares, Multiplication/Division, and Percent**Part 1**

Provide the positive and negative square root

	Question	Square Root	
		(+)	(-)
1)	$\sqrt{3}$		
2)	$\sqrt{4}$		
3)	$\sqrt{9}$		

	Question	Square Root	
		(+)	(-)
4)	$\sqrt{121}$		
5)	$\sqrt{25}$		
6)	$\sqrt{64}$		

Part 2

Which number is less, greater, or = to compare the number

1)	5^2		$\sqrt{100}$
2)	$\sqrt{64}$		7
3)	$\sqrt{49}$		2^2

4)	$\sqrt{81}$		11^2
5)	-1		-6
6)	-50		

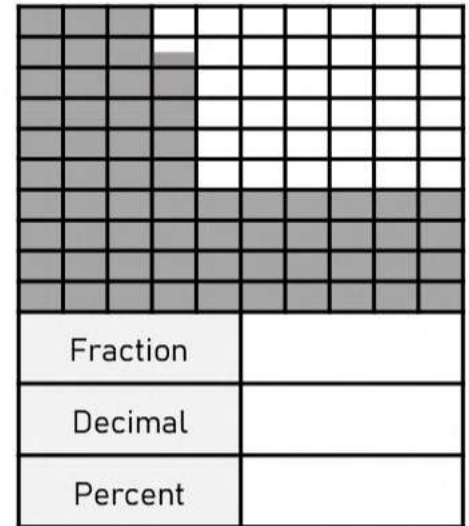
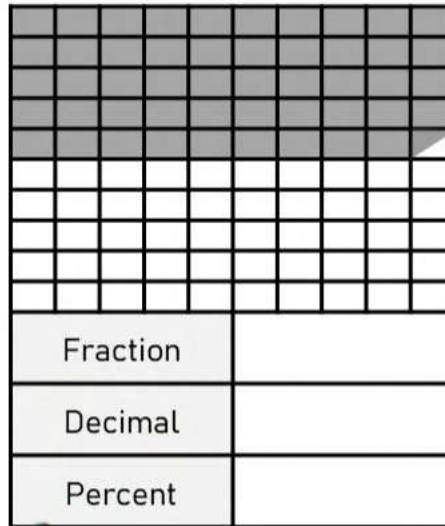
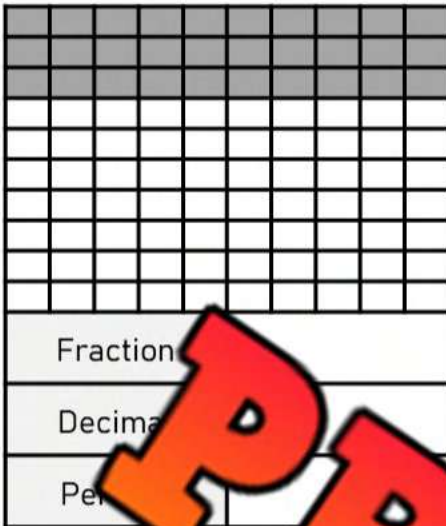
Part 3

Order from least to greatest

1) $\sqrt{49}$, 49, $\sqrt{16}$, -16, $\sqrt{9}$, $\sqrt{81}$	3) $\sqrt{16}$, 16, $\sqrt{64}$, -1, $\sqrt{100}$
2) $\sqrt{144}$, $\sqrt{36}$, -6, 6, $\sqrt{121}$	4) $\sqrt{9}$, 4, $\sqrt{81}$, 10, $\sqrt{4}$

Part 4

What fraction, decimal and percent of the array is shaded in?



Part 5

Convert the fraction to a decimal and a percent

	Fraction	Decimal	Percent
1)	$\frac{68}{100}$		
2)	$\frac{30}{20}$		
3)	$\frac{60}{20}$		
4)	$3\frac{4}{6}$		
5)	$2\frac{1}{4}$		
6)	$\frac{8}{3}$		

Part 6

Arrange the fractions, percents, and decimal numbers from least to greatest below

1) 350%, $\frac{8}{2}$, 3.64, 432%, $3\frac{3}{4}$ 2) 0.66%, $\frac{5}{6}$, 0.76, 65%, $\frac{3}{5}$

Part 7

Answer the word problems below

1) John's investment of \$200 gained \$40. His return as a fraction is $\frac{40}{200}$. What percentage has his investment increased?



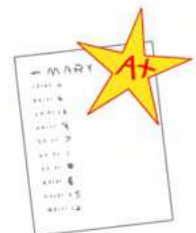
2) Farrah baked cookies and sells them. It costs her \$1 to make a cookie. She sells each cookie for \$1.50. What percentage is the selling price in comparison to the cost price?



3) Jonah earns \$25 an hour. He received a raise from his current salary and is now earning \$45 an hour. What percentage does Jonah earn now in comparison to what he earned before the raise?



4) Sienna did well on her math test. She got all of the 50 questions correct and answered 5 bonus questions correct as well. What was her mark as a fraction and percentage?

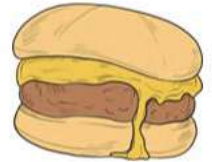


Part 8

Answer the questions below

1) George has a \$10 bill and wants to know if he can afford a burger and milk shake that costs \$7.50 before taxes. Calculate the total cost of the meal after adding 11% tax. Can he afford the meal?

Bonus: How much money does he have left?



2) Luca wants to buy a new video game controller. He has \$100 and the controller costs \$59.00 before tax. How much will the controller cost with a 11% tax?

Bonus: How much money will he have left after the controller?



Part 9

A bank pays you a 5% interest rate for your savings account - \$5 per \$100

Savings	Savings + Interest
1) \$200	
2) \$550	
3) \$725	

Savings	Savings + Interest
4) \$1365	
5) \$1952	
6) \$2382	

Part 10

You pay 19% interest on your credit card - for every \$100 you spend, you owe \$119

Debt	Debt + Interest
1) \$200	
2) \$455	
3) \$742	

Debt	Debt + Interest
4) \$1099	
5) \$1575	
6) \$2525	

Equivalent Ratios – Scaling Up and Down

Questions

Circle two equivalent ratios for each of the questions below

1) 2:8	2:6	4:8	4:16	1:4	1:2
2) 2:12	1:8	4:22	1:6	1:4	4:24
3) 6:8	12:14	12:18	12:16	3:8	
4) 2:4	4:6	4:7	4:8	1:4	1:2
5) 10:12	20:24	5:16	5:12	10:24	5:6
6) 5:10	1:2	5:20	10:11	10:20	10:30
7) 4:14	2:10	8:28	2:7	7:2	8:24
8) 10:30	10:60	20:15	5:15	20:60	20:10
9) 2:20	6:60	6:80	1:20	1:30	1:10
10) 4:8	8:12	8:16	8:14	2:4	2:6

Rates

A **rate** is a **comparison** between two numbers that are in **different** units. We use a colon for ratios, but we commonly use per when we describe a unit rate.

For example – John drove 200 km in 2 hours. His speed is a rate between km and hours. His unit rate is 100km per hour.

Questions

Write the rates for the questions below

1) 8 dollars for 2 burgers

Rate =



Unit Rate = 4 dollars per burger

2) 5 dollars for 10 pencils

Rate =

Unit Rate = _____

3) 10 dollars for 10 batteries

Rate =

Unit Rate = _____

4) 6 dollars for 3 coffees

Unit Rate = _____



5) 6 dollars for 12 chocolate bars

Rate =



Unit Rate = _____

6) 1 hour of swimming

Rate =

Unit Rate = _____

7) Driving 600km in 4 hours

Rate =

Unit Rate = _____

8) Running 15km in 3 hours

Rate =

Unit Rate = _____



9) 300km on 20 litres of gas

Rate =



Unit Rate = _____

10) Growing 52cm every 4 years

Rate =

Unit Rate = _____

Equivalent Rates

Multiple Choice

Circle the equivalent rates below

1) 3 burgers per person

- a) 4 burgers for 10 people
- b) 8 burgers for 12 people
- c) 15 burgers for 5 people
- d) 6 burgers for 10 people



2) 5 pencils per 5 people

- a) 5 pencils for 8 people
- b) 8 pencils for 8 people
- c) 6 pencils for 12 people
- d) 10 pencils for 15 people



3) \$1 per person

- a) \$30 for 5 people
- b) \$25 for 3 people
- c) \$20 for 2 people
- d) \$50 for 10 people

4) 30 minutes per show

- a) 40 minutes for 3 shows
- b) 90 minutes for 3 shows
- c) 60 minutes for 3 shows
- d) 120 minutes for 2 shows

5) 3 games per day

- a) 12 games in 3 days
- b) 15 games in 5 days
- c) 10 games in 2 days
- d) 6 games in 3 days



6) 4 ice cubes per drink

- a) 12 ice cubes for 2 drinks
- b) 8 ice cubes for 2 drinks
- c) 16 ice cubes for 5 drinks
- d) 6 ice cubes for 3 drinks



7) 8 minutes per book

- a) 30 minutes for 3 books
- b) 50 minutes for 4 books
- c) 20 minutes for 3 books
- d) 32 minutes for 4 books

8) 2 pillows per person

- a) 4 pillows for 4 people
- b) 8 pillows for 8 people
- c) 16 pillows for 8 people
- d) 20 pillows for 5 people

9) 7 basketballs per team

- a) 21 basketballs for 3 teams
- b) 25 basketballs for 5 teams
- c) 10 basketballs for 3 teams
- d) 16 basketballs for 2 teams



10) 5 snacks per student

- a) 9 snacks for 3 students
- b) 13 snacks for 3 students
- c) 25 snacks for 5 students
- d) 16 snacks for 4 students



Memory Game: Matching Equivalent Rates

Objective

What are we learning about?

Students will learn to identify and match equivalent rates through a fun and interactive game.

Materials

What you will need for the activity.

- Memory game cards. Each card will have a different rate. Two cards can be matched to another equivalent rate.
- A small table or clear floor space.



Instructions

How you will complete the activity.

1. Divide the class into groups of 3 or 4. Give each group a set of Memory Game cards. (provided)
2. Have each group lay all the cards face down in a grid on a table or clear floor space.
3. The students take turns flipping over two cards at a time, trying to find a matching equivalent rate.
4. If a student finds a match, they remove those cards from the grid and keep them.
5. If the cards do not match, they are turned back over, and the next student takes a turn.
6. The game continues until all the cards have been matched.
7. After the game, review the equivalent fractions with the class.

Name: _____

113

Curriculum Connection
N8.3

Cards

Memory Game Cards

\$84/12

\$42/6

8 for \$4.00

4 for \$2.00

\$120/5

\$100/2.5

6 for \$3.00

12 for \$6.00

\$200/10

\$100/5

Name: _____

115

Curriculum Connection
N8.3

Cards

Memory Game Cards

\$36/6

\$18/3

8 for \$4.00

6 for \$8.00

\$50/2

\$100/4

9 for \$3.00

18 for \$6.00

\$150/3

\$300/6

Cards

Memory Game Cards

7 for \$2.10

14 for \$4.20

\$9.12

\$48/6

20 for \$8.00

1 for \$4.00

\$180/15

\$90/15

\$250/10

\$125/5

Comparing Rates

Part 1Compare the rates using $<$ $>$ or $=$

	Rate #1		Rate #2
1)	\$10/5		\$7/3
2)			\$12/3
3)	\$38/5		\$
4)	\$21/6		\$
5)	\$36/12		\$14/5

	Rate #1		Rate #2
6)	\$84/12		\$50/7
7)	\$36/11		\$66/22
8)	\$95/15		\$72/11
	\$99/9		\$130/12
	\$		\$410/20

Part 2

Answer the questions below

1) Jake wants to buy some bottles of sports drinks. He has two options: Option 1 is a case of 12 sports drinks for \$26.00. Option 2 is a case of 18 drinks for \$39.00. Which option is the better deal, or are they the same value?



2) Hanna is about to buy a box of donuts. She has two options: Option 1 is 12 donuts for \$4.99. Option 2 is 20 donuts for \$7.39. Which is a better deal?



Comparing Rates

Questions

Circle the rate that is less expensive

1)



12 for \$4.00



8 for \$3.00

2)



10 for \$4.00



\$4.00

3)



3 for \$6.00

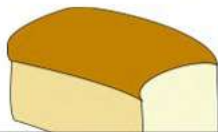


6 for \$10.00

4)



12 for \$20.00



5 for \$11.00

5)



8 for \$20.00



4 for \$9.00

6)



3 for \$8.00



6 for \$15.00

7)



24 for \$10.00



12 for \$5.25

8)



24 for \$10.00



10 for \$7.25

9)



20 for \$6.00



24 for \$7.00

10)



4 for \$9.50



6 for \$11.25

Unit Prices – Best Buys

When we buy things in a grocery store, we can often look at the price label to find out the unit price of the sale item. The unit price is often in 100mL or 100g. This allows us to compare different sizes of products to determine which is a better deal.

Questions

Find out the unit price of each product. Which is the better buy?

	Item 1:	Item 2:	Better Buy
1)	 500g for \$4.25 Price per 100g = _____	 300g for \$2.75 Price per 100g = _____	1 2
2)	 700ml for \$3.90 Price per 100ml = _____	 500ml for \$2.50 Price per 100ml = _____	1 2
3)	 350g for \$3.10 Price per 100g = _____	 1kg for _____ Price per 100g = _____	1 2
4)	 500ml for \$1.25 Price per 100ml = _____	 4L for \$6.25 Price per 100ml = _____	1 2
5)	 450ml for \$1.12 Price per 100ml = _____	 2.1L for \$9.25 Price per 100ml = _____	1 2

Choosing a Service Rate

Questions

Choose one of the options below after comparing the rates

1) Jackson is trying to find someone to build him a skateboard ramp. He has asked two different people to build him one. Which person should he get to build the ramp?

Person 1 – Will complete the job in 12 hours and will charge \$325

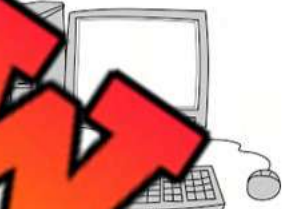
Person 2 – Will work for \$25 per hour and will take 15 hours to finish the ramp.



2) Thomas needs to get his computer fixed. He takes it to 2 different computer repair shops and gets two quotes. Which shop should he choose to fix his computer?

Shop 1 – Will fix the computer in 5 hours and charge \$50 per hour.

Shop 2 – Will fix the computer in 6 hours and charge \$50 per hour.



3) Charlotte is doing a kitchen renovation. She received two quotes from different businesses. Which quote should she choose?

Quote 1 – Will complete the job in 75 hours and will charge \$20.50 per hour

Quote 2 – Will complete the job in 50 hours and will charge \$30.75 per hour



Ratio In 3 Ways

Part 1

Write the ratios for the questions below

1) Ratio of 35 balls to 78 strikes.

Words: _____

Ratio: _____

Fraction: _____

2) Ratio of 12 dunks to 3 three pointers

Words: _____

Ratio: _____

Fraction: _____

3) Ratio of 10 cars to 3 trucks

Words: _____

Ratio: _____

Fraction: _____

4) Ratio of 2 coffees to 6 waters

Words: _____

Ratio: _____

Fraction: _____

5) Ratio of sitting for 30 minutes to standing for 60

Words: _____

Ratio: _____

Fraction: _____

6) Ratio of 1 grade 8 to 1 grade 7

Words: _____

Ratio: _____

Fraction: _____

7) Ratio of 3 baskets to 1 shot

Words: _____

Ratio: _____

Fraction: _____

8) Ratio of 10 treats to 1 healthy snack

Words: _____

Ratio: _____

Fraction: _____

Part 2

Answer the questions below

1) A baseball pitcher threw a ratio of 1 ball to 3 strikes. The pitcher threw 75 strikes. How many balls did they throw?



2) A hockey player has a ratio of 1 goal for every 8 shots they took. The player scored 5 goals today. How many shots did they take?



Equivalent Ratios – Scaling Up and Down

Questions

Circle two equivalent ratios for each of the questions below

1) 5:10	$\frac{1}{3}$	2:5	1 to 2	3:5	$\frac{10}{20}$
2) 4:12	1:3	8 to 36	12:36	$\frac{2}{3}$	8:36
3) $\frac{6}{16}$	12:32	3:32	18:16	3:8	
4) $\frac{3}{6}$	1:4	$\frac{2}{4}$	5:10	2:8	5 to 15
5) 9:12	$\frac{2}{3}$	3:4	18:36	$\frac{27}{36}$	18:48
6) 6:8	2:4	$\frac{1}{3}$	3:4	36:48	$\frac{60}{76}$
7) 4 to 10	1:3	2:6	$\frac{3}{7}$	2 to 5	12:30
8) 15:20	5 to 10	10:15	3:4	30:50	$\frac{45}{60}$
9) $\frac{25}{40}$	1:3	5 to 8	50:80	3 to 6	10:30
10) 8:12	5 to 8	7:11	$\frac{3}{6}$	28:42	24 to 36

Proportional vs Non-Proportional Relationship

A **proportional relationship** is when two variables change at the same rate.

Example – 1 cookie per 1 student ($1/1$) is proportional to 10 cookies per 10 students ($10/10$). Both variables (cookie and student), were multiplied by the same number – 10.

A **non-proportional relationship** is when two variables do not change at the same rate.

Example – \$100 per 1 month ($1/100$) is different than \$500 per 7 months ($500/7$)

Question: Are the following relationships proportional or non-proportional?

1) $\frac{9}{2}$ and $\frac{18}{8}$ Proportional Non-Proportional	2) $\frac{2}{6}$ and $\frac{5}{15}$ Proportional Non-Proportional
3) $\frac{14}{5}$ and $\frac{98}{35}$ Proportional Non-Proportional	4) $\frac{3}{5}$ and $\frac{75}{125}$ Proportional Non-Proportional
5) $\frac{5}{8}$ and $\frac{45}{64}$ Proportional Non-Proportional	6) $\frac{1}{6}$ and $\frac{1}{5}$ Proportional Non-Proportional
7) $\frac{12}{7}$ and $\frac{84}{56}$ Proportional Non-Proportional	8) $\frac{7}{3}$ and $\frac{210}{90}$ Proportional Non-Proportional
9) $\frac{60}{7}$ and $\frac{300}{35}$ Proportional Non-Proportional	10) $\frac{8}{17}$ and $\frac{56}{102}$ Proportional Non-Proportional
11) $\frac{9}{22}$ and $\frac{54}{132}$ Proportional Non-Proportional	12) $\frac{15}{35}$ and $\frac{120}{245}$ Proportional Non-Proportional

Proportional vs Non-Proportional Relationship

When representing variables, we can use a table to determine if the relationship is proportional or non-proportional.

Example – Erica earned a pay cheque each week from her employer. Her earnings go up \$250 each week, which makes the relationship between weeks and earnings proportional.

Weeks (x)	1	2	3	4	5	6
Earnings (y)	250	500	750	1000	1250	1500

Question: Are the relationships proportional or non-proportional?

1)

(x)	1	2	3	4
(y)	75	150	225	300

Proportional

Non-Proportional

2)

(x)	5	10	15	20
(y)	50	100	150	200

Proportional

Non-Proportional

3)

(x)	3	6	9	12
(y)	15	30	45	60

Proportional

Non-Proportional

4)

(x)	12	16	20
(y)	42	114	136

Proportional

Non-Proportional

5)

(x)	10	20	30	40
(y)	70	140	210	280

Proportional

Non-Proportional

6)

(x)	10	20	30	40
(y)	200	400	600	1200

Proportional

Non-Proportional

7)

(x)	20	40	60	80
(y)	5	10	15	20

Proportional

Non-Proportional

8)

(x)	7	14	21	28
(y)	21	42	64	86

Proportional

Non-Proportional

9)

(x)	1	11	21	31
(y)	10	110	210	310

Proportional

Non-Proportional

10)

(x)	5	15	25	35
(y)	150	450	750	1050

Proportional

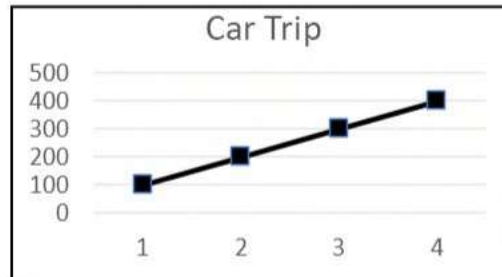
Non-Proportional

Proportional Relationship - Graph

When a proportional relationship is represented on a graph, the result is a straight line. This is called a linear graph.

Example:

Kim drove from Kingston to Toronto. She kept track of her distance every hour.



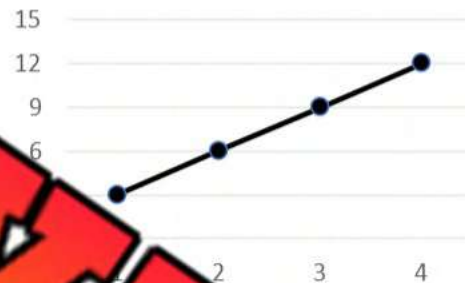
Hours	Distance (km)
1	100
2	200
3	300
4	400

Questions: Determine if the relationship is proportional based on the graph. Is the relationship proportional?

1)

(x)	(y)
1	
2	
3	
4	

Proportional

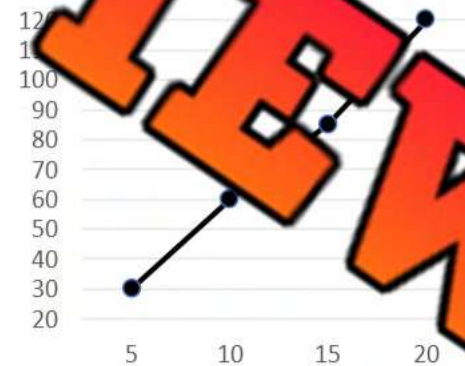


Non-Proportional

2)

(x)	(y)
5	
10	
15	
20	

Proportional

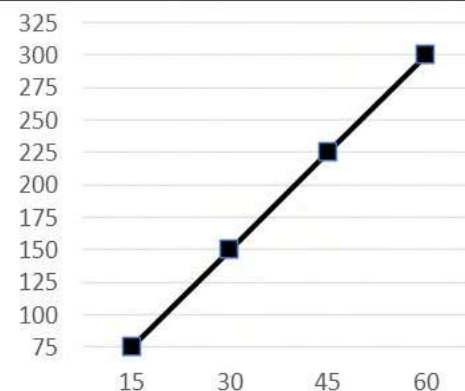


Non-Proportional

3)

(x)	(y)
15	
30	
45	
60	

Proportional



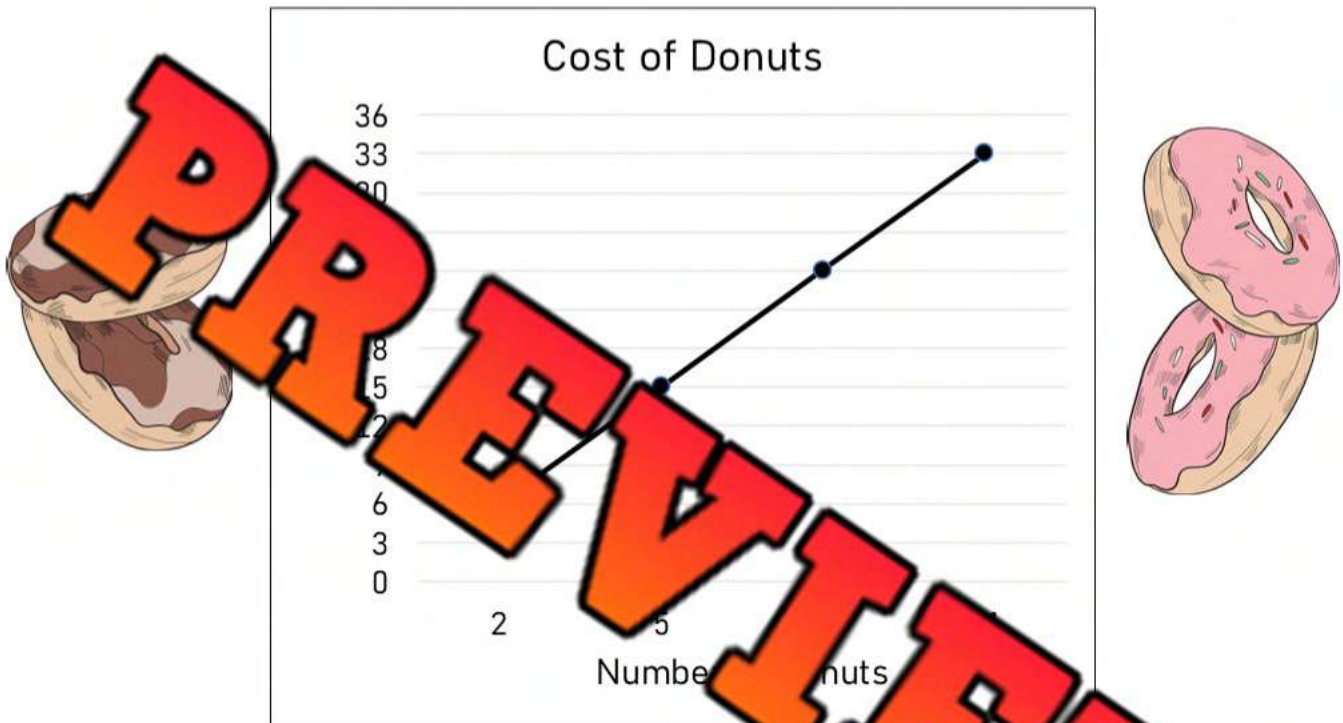
Non-Proportional

Proportional Relationship – Donut Problem

Questions

Solve the problem below

Hailey is buying donuts for a party. The graph below represents the relationship between the cost of the donuts and the number of donuts.



1) Is the graph proportional or non-proportional?

2) What is the unit rate? (cost per donut)

3) How much does 8 donuts cost?

4) How many donuts could Hailey buy for \$33?

5) Use the graph to determine how many donuts you could buy for \$12

6) Use the graph to determine how much 9 donuts would cost.

7) If Hailey needs 150 donuts for her party, how much will it cost her?

Proportional Relationship – Bike Race

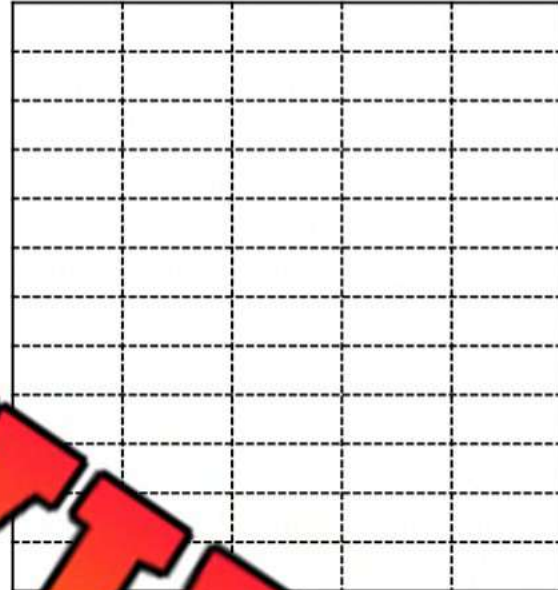
Questions

Draw a line graph that represents the data in the table

Nick was in a bike race yesterday. They raced an 110km course. The relationship between his time and distance is listed in the table below.



Minutes	Distance (km)
30	20
60	40
90	
120	80
150	110



- 1) Is the relationship between minutes and distance proportional or non-proportional?
- 2) What was the unit rate for the first 120 minutes of Nick's bike ride?
- 3) How far did Nick travel after 45 minutes?
- 4) How long did it take Nick to bike 70 kilometres?
- 5) What was Nick's unit rate during his 120-150 minute time interval?
- 6) Nick paced most of the race perfectly. What happened at the end of his race?

Proportional Reasoning - Quiz

Part 1

Write the ratios for the questions below

1) Ratio of 41 balls to 67 strikes.	Words: _____ Ratio: _____ Fraction: _____	3) Ratio of 27 cars to 12 trucks.	Words: _____ Ratio: _____ Fraction: _____
2) Ratio of 15 green balls to 15 red balls.	Words: _____ Ratio: _____ Fraction: _____	4) Ratio of 25 students to 1 teacher.	Words: _____ Ratio: _____ Fraction: _____

Part 2

Circle the equivalent ratio for each of the questions below

1) 3 to 9	$\frac{1}{3}$	2:5	1 to 4	9:27	$\frac{10}{33}$
2) 4:16	1:3	1 to 4	$\frac{1}{6}$	$\frac{1}{2}$	12:48
3) $\frac{5}{20}$	2:8	6:40	7:28	3:1	10:50

Part 3

Answer the word problems below

There are 35 students in a grade 8 class. The ratio of girls to boys is 3:2.

- Write the ratio in words and as a fraction.
- How many boys are in the class?
- How many girls are in the class?

Part 4

Are the relationships proportional or non-proportional?

1) $\frac{8}{2}$ and $\frac{18}{4}$

Proportional

Non-Proportional

2) $\frac{4}{7}$ and $\frac{16}{28}$

Proportional

Non-Proportional

3) $\frac{16}{5}$ and $\frac{64}{20}$

Proportional

Non-Proportional

4) $\frac{9}{12}$ and $\frac{81}{109}$

Proportional

Non-Proportional

Part 5 Use proportional rates by determine the value of the variable

1) $\frac{3}{8}$ and $\frac{18}{r}$

r = _____

2) $\frac{2}{7}$ and $\frac{m}{63}$

m = _____

3) $\frac{11}{t}$ and $\frac{121}{44}$

t = _____

4) $\frac{48}{9}$ and $\frac{y}{8}$

y = _____

5) $\frac{15}{6}$ and $\frac{105}{p}$

p = _____

6) $\frac{35}{s}$ and $\frac{35}{s}$

s = _____

Part 6

Are the relationships proportional or non-proportional?

1)	(x)	1	2	3	4
	(y)	33	66	99	123

Proportional

Non-Proportional

2)	(x)	5	10	15	20
	(y)	45	90	135	170

Proportional

Non-Proportional

3)	(x)	3	6	9	12
	(y)	65	130	195	260

Proportional

Non-Proportional

4)	(x)	8	12	16	20
	(y)	125	250	375	500

Proportional

Non-Proportional

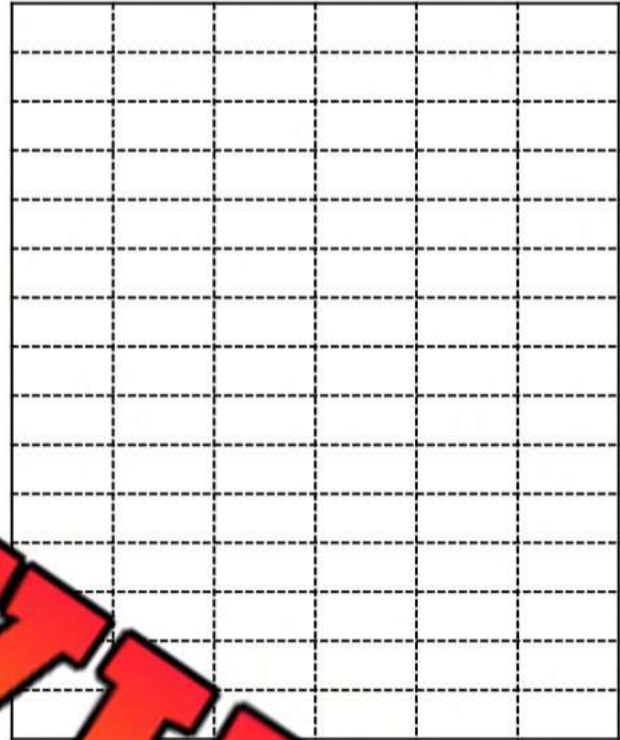
Part 7

Draw a line graph and fill in the table to represent the situation

Stuart earns \$225 a week from his job. Fill in his earnings over a 10-week period and graph his earnings.



	Total Earnings
4	
8	
10	



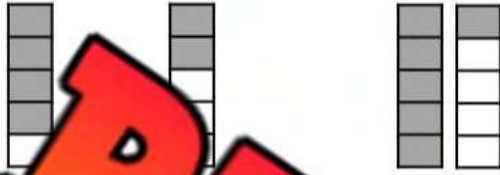
- 1) Is the relationship between week and savings proportional or non-proportional?
- 2) How much did Stuart earn after 5 weeks?
- 3) What is the unit rate? (earnings per week)
- 4) How much does he earn after 4.5 weeks?
- 5) After 20 weeks, how much would Stuart have earned?
- 6) After 30 weeks, Stuart saved all his money and then spent \$2650. How much does he have now?

Adding Fractions With Common Denominators

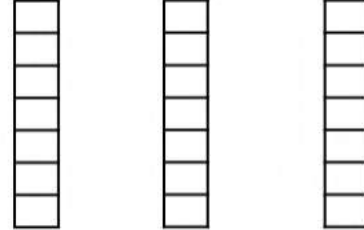
Questions

Add the fractions below using the models

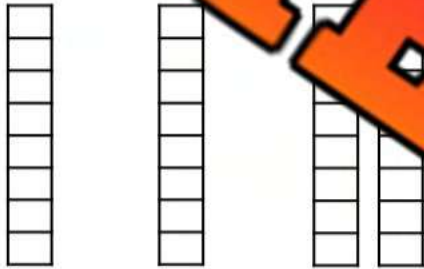
1) $\frac{4}{5} + \frac{2}{5} = \frac{6}{5}$ or $1 \frac{1}{5}$



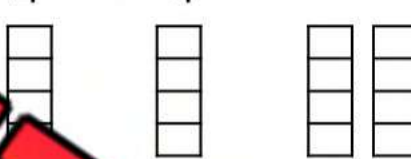
2) $\frac{3}{7} + \frac{2}{7} = \underline{\hspace{1cm}}$



3) $\frac{5}{8} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$



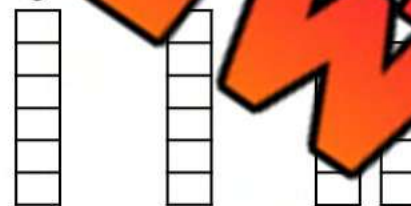
4) $\frac{3}{4} + \frac{2}{4} = \underline{\hspace{1cm}}$



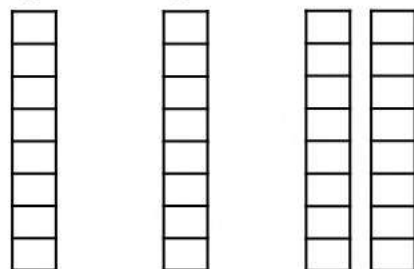
5) $\frac{2}{3} + \frac{3}{3} = \underline{\hspace{1cm}}$



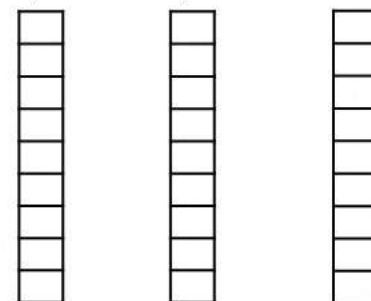
6) $\frac{3}{6} + \frac{3}{6} = \underline{\hspace{1cm}}$



7) $\frac{4}{8} + \frac{5}{8} = \underline{\hspace{1cm}}$



8) $\frac{7}{9} + \frac{1}{9} = \underline{\hspace{1cm}}$



Adding Fractions With Common Denominators

Questions**Solve the word problems**

1) At the end of the birthday party, there were 4 pizza boxes left. The first box had $\frac{5}{8}$ slices left. The second box had $\frac{3}{8}$ slices left. The third box had $\frac{4}{8}$ slices remaining and the last box had $\frac{6}{8}$ left.

- a) How much pizza is left in total?
- b) How many pizzas are left?
- c) How many slices are there if there were 8 slices in each box?



2) Thomas is starting a sports run. The distances he ran are presented in the table.

Day	Distance (km)
Monday	$\frac{3}{8}$
Tuesday	$\frac{6}{8}$
Wednesday	$1\frac{3}{8}$
Thursday	$2\frac{4}{8}$
Friday	$2\frac{1}{8}$

a) How far did he run after the 5 days?

b) Which day did he run the farthest?



3) Shelly bought $\frac{38}{6}$ metres of red fabric, $3\frac{7}{6}$ metres of blue fabric, and $1\frac{2}{6}$ metres of green fabric.

- a) How much fabric did she buy in total?
- b) Which colour of fabric did she buy the most of?



Adding Mixed Fractions

When adding a mixed fraction, we have two options we can use to solve.

- 1) We can keep the wholes and add them together first and then add the fractional parts after.
- 2) We can convert the mixed fractions to improper fractions and then add them

Part 1

Add the mixed fractions together using option 1

Ex) $7\frac{7}{8} + 10\frac{1}{8} =$	1) $6\frac{2}{5} + 3\frac{1}{5} =$	2) $5\frac{3}{9} + 11\frac{5}{9} =$
3) $8\frac{4}{8} + 5\frac{3}{8} =$	4) $7\frac{5}{6} + 9\frac{1}{6} =$	5) $2\frac{4}{5} + 6\frac{3}{5} =$
6) $12\frac{5}{9} + 10\frac{8}{9} =$	7) $8\frac{9}{12} + 4\frac{5}{12} =$	8) $15\frac{8}{10} + 3\frac{4}{10} =$

Part 2

Add the mixed fractions together using option 2

Ex) $3\frac{2}{8} + 7\frac{4}{8} = \frac{26}{8} + \frac{60}{8} = \frac{86}{8} \text{ or } 10\frac{6}{8}$	1) $3\frac{4}{8} + 4\frac{2}{8} =$
2) $6\frac{1}{4} + 8\frac{2}{4} =$	3) $11\frac{7}{9} + 7\frac{5}{9} =$
4) $10\frac{8}{11} + 9\frac{5}{11} =$	5) $12\frac{6}{14} + 6\frac{10}{14} =$

Adding Mixed Fractions

Questions**Solve the word problems**

1) Arabella made a birthday cake for her mom. She used $2\frac{1}{4}$ cups of white sugar, $1\frac{3}{4}$ cups of brown sugar, and $3\frac{2}{4}$ cups of icing sugar. How many cups of sugar did she use?



2) The Miller family went on vacation to the beach. The drive to the airport took them $3\frac{2}{6}$ hours. The flight took $5\frac{4}{6}$ hours and the drive from the airport to the hotel took $2\frac{5}{6}$ hours. How many hours did it take them to get to the hotel?



3) The grade 8 classes collected garbage on Earth Day. Class one collected $3\frac{1}{5}$ kg of garbage. Class two collected $2\frac{3}{5}$ kg and class three collected $4\frac{4}{5}$ kg. How much garbage did the grade 8 classes collect in total?



Adding Fractions With Unlike Denominators

Part 1

Add the fractions using the common denominators provided

1) $\frac{1}{4} + \frac{4}{12} = \frac{3}{12} + \frac{4}{12} = \frac{7}{12}$

2) $\frac{2}{4} + \frac{1}{16} = \frac{\quad}{16} + \frac{\quad}{16} = \frac{\quad}{16}$

3) $\frac{1}{8} + \frac{\quad}{8} = \frac{\quad}{8}$

4) $\frac{5}{9} + \frac{2}{3} = \frac{\quad}{9} + \frac{\quad}{9} = \frac{\quad}{9}$

5) $\frac{6}{18} + \frac{5}{6} = \frac{\quad}{18} + \frac{\quad}{18} = \frac{\quad}{18}$

6) $\frac{3}{5} + \frac{6}{15} = \frac{\quad}{15} + \frac{\quad}{15} = \frac{\quad}{15}$

Part 2

Create common denominators and then add the fractions below

1) $\frac{3}{4} + \frac{7}{12} =$

2) $\frac{12}{30} + \frac{\quad}{\quad} =$

3) $\frac{4}{5} + \frac{2}{3} =$

4) $\frac{5}{6} + \frac{8}{10} =$

5) $\frac{3}{4} + \frac{6}{7} =$

6) $\frac{3}{5} + \frac{7}{9} =$

7) $\frac{6}{8} + \frac{8}{12} =$

8) $\frac{5}{6} + \frac{4}{7} =$

Cooking With Fractions - Adding

**Questions**

Solve the word problems

- 1) Alice baked 100 pies last month. Of the 100 pies, $\frac{1}{5}$ were blueberry, $\frac{2}{10}$ were apple, and $\frac{8}{25}$ were peach.

a) What fraction of pies were blueberry, apple, or peach?



b) How many pies were either blueberry, apple, or peach?

- 2) Melanie sells donuts at her shop. Last month, $\frac{2}{6}$ of the customers bought chocolate donuts, $\frac{1}{12}$ bought vanilla donuts, and $\frac{2}{9}$ bought caramel donuts.



What fraction of customers bought either vanilla or caramel donuts?

- 3) Ruben owns a restaurant. He likes to keep track of what his customers are buying. His top 3 sellers are sandwiches, salads, and pizza. He knows that $\frac{2}{8}$ of his customers buy a sandwich, $\frac{1}{4}$ buy a salad, and $\frac{2}{6}$ buy a pizza.

What fraction of customers buy one of his top 3 sellers?



- 4) Evan has 4 methods of payment for his restaurant. He accepts credit cards, debit cards, cash, and cheque. Out of his last 100 customers, $\frac{2}{6}$ paid with a credit card, $\frac{1}{3}$ paid with a debit card, and $\frac{2}{9}$ paid with cash.

a) What fraction of customers paid with credit, debit, or cash?

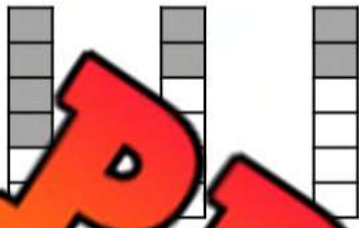
b) What fraction paid with a cheque?



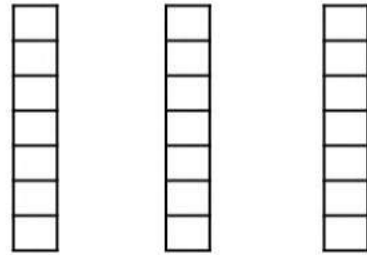
Subtraction Fractions - Common Denominators**Questions**

Subtract the fractions below using the models

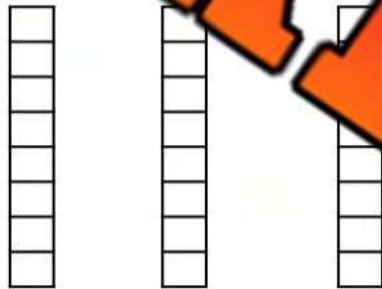
1) $\frac{4}{6} - \frac{2}{6} = \frac{2}{6}$



2) $\frac{6}{7} - \frac{3}{7} = \underline{\hspace{2cm}}$



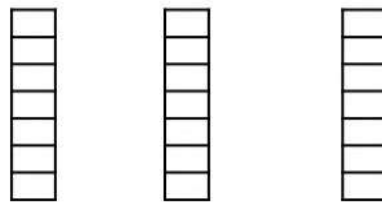
3) $\frac{7}{8} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$



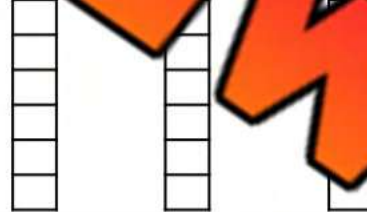
4) $\frac{3}{5} - \frac{1}{5} = \underline{\hspace{2cm}}$



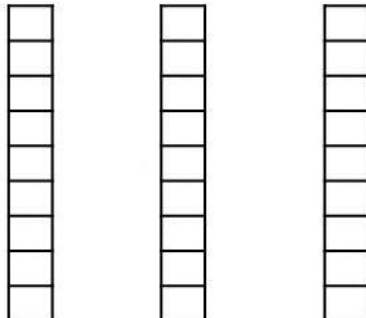
5) $\frac{6}{7} - \frac{3}{7} = \underline{\hspace{2cm}}$



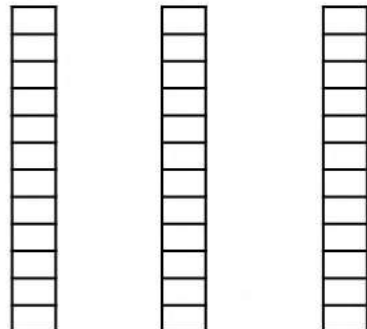
6) $\frac{5}{6} - \frac{2}{6} = \underline{\hspace{2cm}}$



7) $\frac{7}{9} - \frac{4}{9} = \underline{\hspace{2cm}}$



8) $\frac{10}{12} - \frac{7}{12} = \underline{\hspace{2cm}}$



Subtraction Fractions – Word Problems**Questions****Solve the word problems**

1) Drew ran $4\frac{3}{4}$ km yesterday in 20 minutes. Lindsay ran $\frac{18}{4}$ km yesterday in 20 minutes.

- a) Who ran further in the 20 minutes?
- b) How much further did they run?



2) Baker found a green snake and a black snake in his backyard. The green snake was $22\frac{1}{3}$ cm long. The black snake was $\frac{45}{3}$ cm long.

- a) Which snake is longer?
- b) How much longer is the snake?



3) Ayden picked $3\frac{3}{5}$ baskets of strawberries and Ayden's sister picked 5 baskets of strawberries.

- a) Who picked more strawberries?
- b) How much more did they pick?



4) Sharon has practiced playing the piano for $2\frac{2}{7}$ hours this week. She wants to practice for $\frac{25}{7}$ hours.

- a) How much more time does she need to practice?
- b) If she wants to practice for 10 hours, how much longer does she need to practice?



Subtracting Mixed Fractions

When subtracting a mixed fraction, we have two options we can use to solve.

- 1) We can keep the wholes and subtract them first and then subtract the fractional parts after.
- 2) We can convert the mixed fractions to improper fractions and then subtract.

Part 1

Subtract the mixed fractions using option 1

Ex) $3\frac{5}{8} - 2\frac{1}{8} =$	1) $8\frac{4}{6} - 5\frac{1}{6} =$	2) $3\frac{7}{9} - 1\frac{5}{9} =$
3) $7\frac{5}{7} - 3\frac{3}{7} =$	4) $5\frac{5}{6} - 2\frac{1}{6} =$	5) $4\frac{6}{8} - 1\frac{3}{8} =$
6) $12\frac{9}{11} - 10\frac{8}{11} =$	7) $13\frac{12}{15} - 5\frac{6}{15} =$	8) $5\frac{9}{10} - 8\frac{4}{10} =$

Part 2

Subtract the mixed fractions using option 2

Ex) $6\frac{7}{8} - 2\frac{3}{8} = \frac{55}{8} - \frac{19}{8} = \frac{36}{8}$ or $4\frac{4}{8}$	1) $8\frac{7}{9} - 4\frac{3}{9} =$
2) $7\frac{4}{5} - 3\frac{2}{5} =$	3) $13\frac{8}{11} - 6\frac{3}{11} =$
4) $10\frac{11}{13} - 8\frac{6}{13} =$	5) $15\frac{12}{14} - 9\frac{9}{14} =$

Repeated Addition & Multiplying Fractions

Part 1

Add and multiply the fractions below

Addition Version	Multiplication Version
1) $\frac{4}{7} + \frac{4}{7} + \frac{4}{7} + \frac{4}{7} + \frac{4}{7} = \frac{20}{7}$ or $2\frac{6}{7}$	$5 \times \frac{4}{7} = \frac{20}{7}$ or $2\frac{6}{7}$
2) $\frac{1}{9} + \frac{1}{9} + \frac{1}{9} + \frac{1}{9} + \frac{1}{9} + \frac{1}{9} =$	
3) $\frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} =$	
4) $\frac{3}{6} + \frac{3}{6} + \frac{3}{6} + \frac{3}{6} + \frac{3}{6} + \frac{3}{6} + \frac{3}{6} =$	
5) $\frac{4}{9} + \frac{4}{9} + \frac{4}{9} + \frac{4}{9} + \frac{4}{9} + \frac{4}{9} + \frac{4}{9} =$	
6) $\frac{5}{10} + \frac{5}{10} + \frac{5}{10} + \frac{5}{10} + \frac{5}{10} + \frac{5}{10} + \frac{5}{10} + \frac{5}{10} =$	
7) $\frac{3}{7} + \frac{3}{7} + \frac{3}{7} + \frac{3}{7} + \frac{3}{7} + \frac{3}{7} + \frac{3}{7} =$	

Part 2

Answer the word problems below using an addition and multiplication sentence

- 1) Jerry made 5 pizzas. Each of the pizzas have $\frac{2}{7}$ cups of cheese. How much cheese do all 5 pizzas have in total?

Addition Sentence	Multiplication Sentence

- 2) Helen buys 9 bags of chips. Each bag is $\frac{4}{9}$ of a kg. How many kilograms are all 9 bags combined?

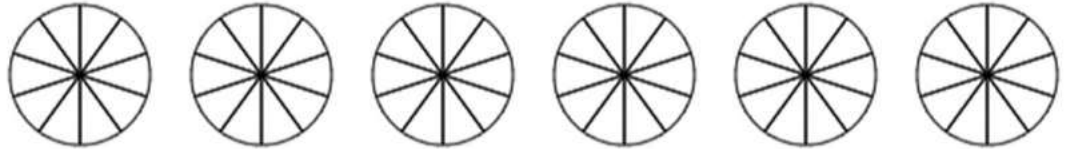
Addition Sentence	Multiplication Sentence

Multiply Whole Numbers by Fractions - Visual

Questions

Shade in the fractions and then answer the multiplication equation

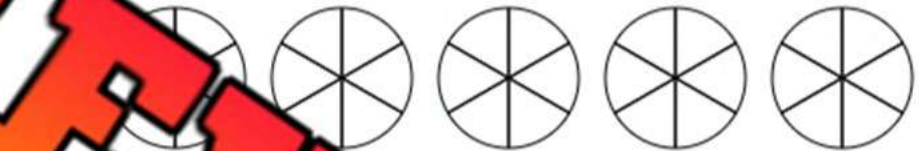
1) $6 \times \frac{4}{10}$



2) $7 \times$



3) $5 \times \frac{2}{6}$



4) $6 \times \frac{7}{10}$



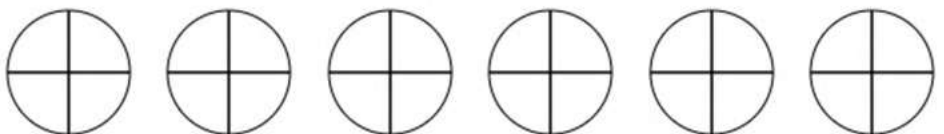
5) $6 \times \frac{5}{6}$



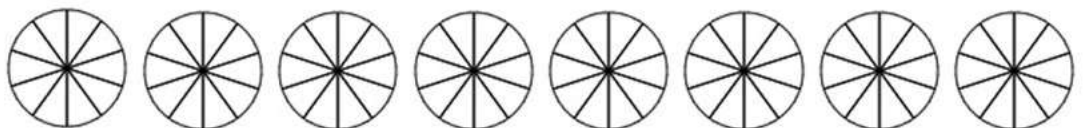
6) $9 \times \frac{6}{12}$



7) $6 \times \frac{2}{4}$



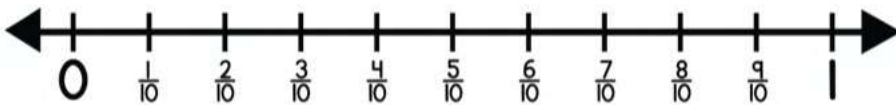
8) $8 \times \frac{5}{10}$



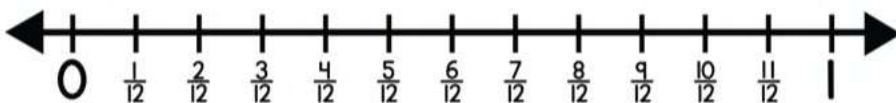
Multiply Whole Numbers by Fractions – Number Line**Questions**

Use the number line by skip counting to find the answer

1) $8 \times \frac{1}{10} =$



2) $10 \times \frac{1}{12} =$



3) $7 \times \frac{1}{8} =$



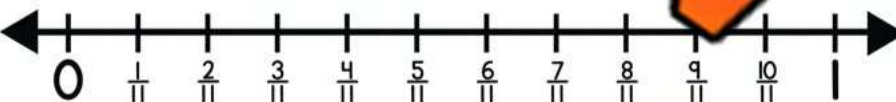
4) $5 \times \frac{1}{6} =$



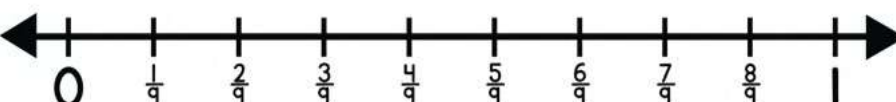
5) $4 \times \frac{1}{5} =$



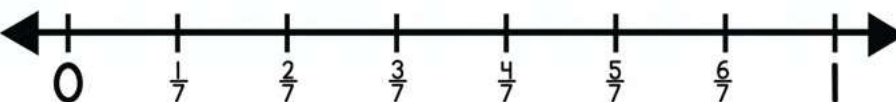
6) $7 \times \frac{1}{11} =$



7) $8 \times \frac{1}{9} =$



8) $6 \times \frac{1}{7} =$



Multiply Whole Numbers by Fractions

Questions

Multiply the whole numbers by the fractions below. Write the answer as an improper fraction

1) $4 \times \frac{3}{4} = \frac{12}{4}$

2) $5 \times \frac{2}{5} = \boxed{}$

3) $8 \times \frac{4}{8} = \boxed{}$

4) $9 \times \frac{7}{10} = \boxed{}$

5) $4 \times \frac{4}{7} = \boxed{}$

6) $6 \times \frac{6}{8} = \boxed{}$

7) $7 \times \frac{4}{6} = \boxed{}$

8) $4 \times \frac{2}{5} = \boxed{}$

9) $7 \times \frac{2}{5} = \boxed{}$

10) $3 \times \frac{6}{7} = \boxed{}$

11) $3 \times \frac{8}{10} = \boxed{}$

12) $2 \times \frac{3}{4} = \boxed{}$

13) $5 \times \frac{2}{6} = \boxed{}$

14) $5 \times \frac{3}{7} = \boxed{}$

15) $9 \times \frac{5}{7} = \boxed{}$

16) $6 \times \frac{3}{7} = \boxed{}$

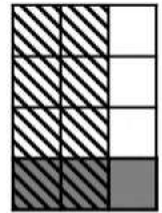
17) $7 \times \frac{6}{8} = \boxed{}$

18) $11 \times \frac{2}{9} = \boxed{}$

Multiplying Fractions – Area Models

We can represent two fractions using the same area model. Doing so will allow us to determine the product when we multiply two fractions together.

$$\frac{2}{3} \times \frac{1}{4} = \frac{2}{12}$$



Example

Step 1: Divide the area model into thirds horizontally to represent $\frac{2}{3}$

Step 2: Draw diagonal lines that fill in two-thirds of the area model

Step 3: Divide the area model into fourths vertically to represent $\frac{1}{4}$

Step 4: Shade one-fourth of the area model

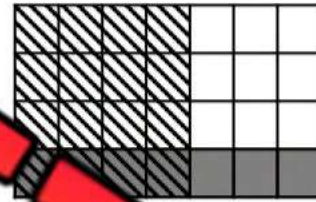
Step 5: Count how many squares overlap compared to the total number of squares

Questions Find the product using an area model. Steps 1-4 have been done for you

1)

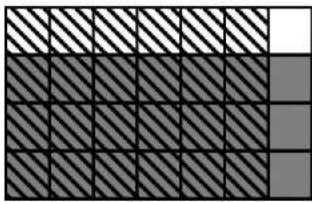


$$\frac{3}{5} \times \frac{2}{4} = \underline{\hspace{2cm}}$$



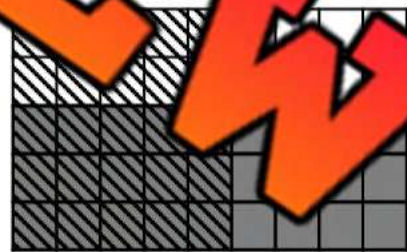
$$= \underline{\hspace{2cm}}$$

3)



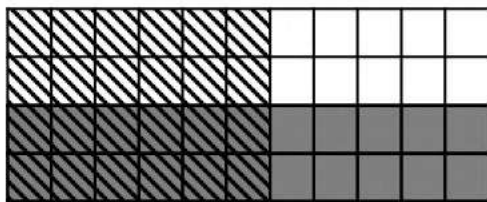
$$\frac{6}{7} \times \frac{3}{4} = \underline{\hspace{2cm}}$$

4)



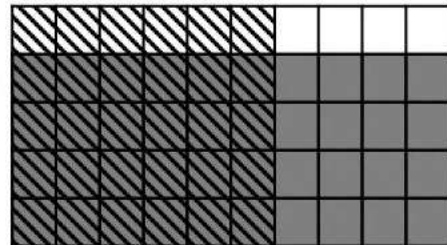
$$\frac{5}{9} \times \frac{3}{5} = \underline{\hspace{2cm}}$$

5)



$$\frac{6}{11} \times \frac{2}{4} = \underline{\hspace{2cm}}$$

6)



$$\frac{6}{10} \times \frac{4}{5} = \underline{\hspace{2cm}}$$

Multiplying Fractions – Area Models

The area models below have been divided to represent the fractions.

Directions:

- 1) Use diagonal lines to represent the first fraction
- 2) Shade in the area model to represent the second fraction
- 3) Write the answer

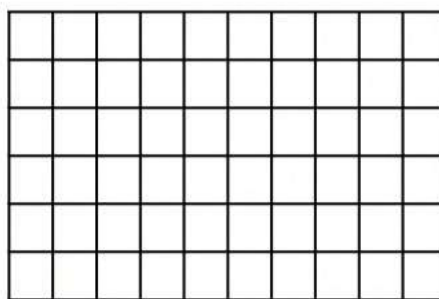
Questions Find the product using the area models below

1)



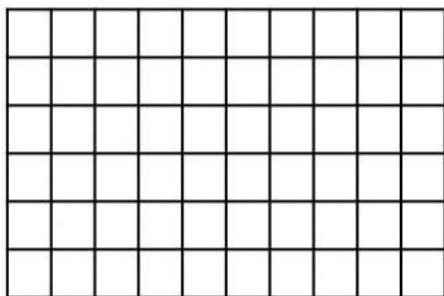
$$\frac{7}{9} \times \frac{5}{6} = \underline{\hspace{2cm}}$$

2)



$$\frac{3}{10} \times \frac{4}{6} = \underline{\hspace{2cm}}$$

3)



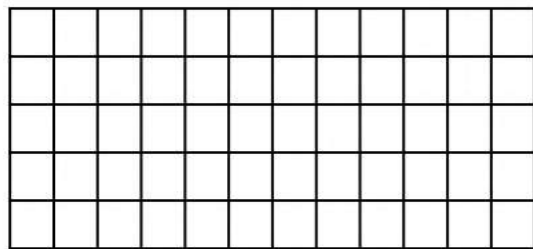
$$\frac{4}{10} \times \frac{4}{6} = \underline{\hspace{2cm}}$$

4)



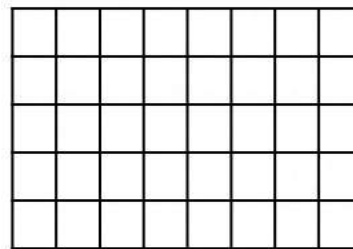
$$\frac{6}{14} \times \frac{3}{5} = \underline{\hspace{2cm}}$$

5)



$$\frac{8}{12} \times \frac{4}{5} = \underline{\hspace{2cm}}$$

6)



$$\frac{5}{8} \times \frac{2}{5} = \underline{\hspace{2cm}}$$

Multiplying Fractions – Word Problems

Questions

Find the products of the fractions below

1) Axel and Jasmine raced for 5 minutes. In the 5 minutes, Axel ran $\frac{4}{5}$ of a kilometre. Jasmine ran $\frac{2}{3}$ times as far as Axel. How far did Jasmine run?



2) Faith and Ember had sandwiches. Faith ate $\frac{3}{4}$ of her sandwich. Ember wasn't that hungry, so she ate $\frac{1}{4}$ as much as Faith ate. How much of her sandwich did Ember eat?



3) Laura completed $\frac{8}{11}$ of a marathon in the first time. Adalyn finished $\frac{2}{3}$ times as much of the race that Laura finished. How much of the marathon did Adalyn finish?



4) Atlas and Evie volunteered one day. Atlas spent $\frac{3}{4}$ of the 8-hour workday volunteering. Evie volunteered $\frac{1}{3}$ the amount of time that Atlas volunteered.

- What fraction of the workday did Evie volunteer?
- How much time did Atlas volunteer?
- How much time did Evie volunteer?



Multiplying Mixed Fractions

How to multiply mixed fractions

- 1) Convert the mixed fractions to improper fractions
- 2) Multiply the improper fractions
- 3) Convert the improper fraction back to a mixed fraction
- 4) Simplify if necessary

$$2\frac{2}{3} \times 2\frac{2}{4} = \frac{8}{3} \times \frac{10}{4} = \frac{80}{12} \text{ or } 6\frac{8}{12} \text{ or } 6\frac{2}{3}$$

Part 1 Find the products of the fractions below. Simplify the fractions.

1) $3\frac{1}{3} \times 2\frac{2}{4} =$

2) $4\frac{2}{5} \times 7\frac{5}{6} =$

3) $5\frac{1}{2} \times 6\frac{3}{7} =$

4) $9\frac{2}{4} \times 4\frac{7}{9} =$

5) $10\frac{5}{7} \times 7\frac{2}{3} =$

6) $1\frac{2}{5} \times 3\frac{7}{8} =$

7) $12\frac{3}{5} \times 5\frac{2}{3} =$

8) $8\frac{1}{9} \times 3\frac{2}{3} =$

Part 2 Answer the word problems below

1) Hadley ran $3\frac{4}{5}$ km. Freya ran $2\frac{2}{3}$ km times further. How far did Freya run?



2) Parker made tomato and chicken noodle soup. He made $2\frac{3}{4}$ kg of tomato soup and $4\frac{4}{5}$ times more chicken noodle soup. How much chicken noodle soup did he make?



Dividing Fractions by Whole Numbers

Steps

1. Change the whole number to a fraction by putting it over a denominator of 1
2. Flip the numerator and denominator of the dividend fraction (fraction after $\div$ sign)
3. Switch the $\div$ sign to a $\times$ sign and solve

Questions

Follow the steps above to solve

1) $\frac{2}{4} \div 3 =$

2) $\frac{5}{6} \div 3 =$

3) $\frac{7}{8} \div 4 =$

4) $\frac{6}{7} \div 6 =$

5) $\frac{5}{11} \div 5 =$

6) $\frac{2}{5} \div 5 =$

7) $\frac{6}{7} \div 8 =$

8) $\frac{7}{15} \div 3 =$

9) $\frac{3}{7} \div 3 =$

10) $\frac{1}{2} \div 4 =$

11) $\frac{3}{4} \div 5 =$

12) $\frac{5}{6} \div 2 =$

Dividing Fractions by Whole Numbers

Questions

Answer the questions below

1) A baker has $2\frac{1}{4}$ cups of flour and needs to divide it evenly among 3 bread loaves. How much flour will each loaf receive?



2) Emily has $3\frac{1}{2}$ chocolate bars with her 5 friends. How much chocolate will each friend get?

3) A group of 4 friends has $5\frac{1}{2}$ meters of ribbon for their craft project. How much ribbon will each friend receive?

4) A group of students is working on an art project that requires $\frac{5}{6}$ of a litre of paint. If they want to equally divide the paint among the 5 students, how much will each student get?

5) A mother wants to divide her $4\frac{1}{6}$ kilograms of fruit evenly among her 3 children. How much fruit will each child get?

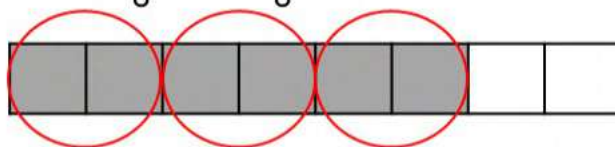


Dividing Fractions Using Models

Dividing Fractions

When we divide a fraction by its unit fraction, we should think, "how many counts of the unit are in the fraction (i.e., how many two-eighths are in six-eighths?)"

$$\frac{6}{8} \div \frac{2}{8} = 3$$



Solution – We can see that there are 3 two eighths in six eighths.

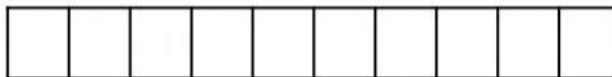
Questions Draw a fraction bar. How many times does the divisor fit into the dividend

1)



$$\frac{4}{8} \div \frac{2}{8} = \underline{\quad}$$

2)



$$\frac{9}{10} \div \frac{3}{10} = \underline{\quad}$$

3)



$$\frac{4}{8} \div \frac{1}{8} = \underline{\quad}$$

4)



$$\frac{6}{10} \div \frac{2}{10} = \underline{\quad}$$

5)



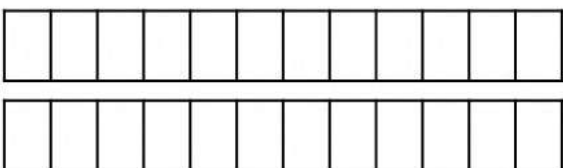
$$\frac{8}{10} \div \frac{2}{10} = \underline{\quad}$$

6)



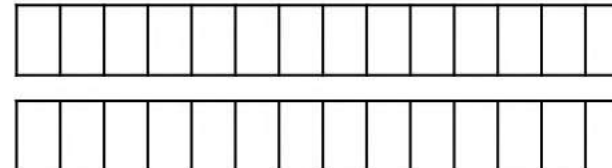
$$\frac{16}{20} \div \frac{4}{20} = \underline{\quad}$$

7)



$$\frac{24}{24} \div \frac{4}{24} = \underline{\quad}$$

8)



$$\frac{21}{28} \div \frac{3}{28} = \underline{\quad}$$

Dividing Fractions Using Models

Dividing Fractions

We can use a bar model to compare fractions to make it easier to divide.

$$\frac{3}{4} \div \frac{1}{8} = 6$$



Solution – We can see that $\frac{1}{8}$ fits into $\frac{3}{4}$ six times.

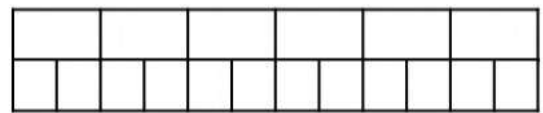
Questions _____ in the fraction bars. How many times does the divisor fit into the dividend

1)



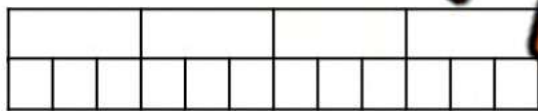
$$\frac{3}{5} \div \frac{1}{10} = \underline{\quad}$$

2)



$$\frac{5}{6} \div \frac{1}{12} = \underline{\quad}$$

3)



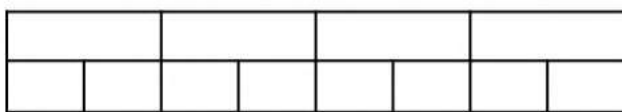
$$\frac{2}{4} \div \frac{1}{12} = \underline{\quad}$$

6)



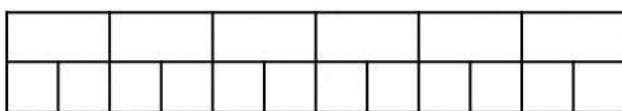
$$\frac{1}{3} \div \frac{1}{9} = \underline{\quad}$$

5)



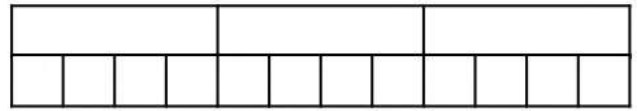
$$\frac{3}{4} \div \frac{1}{8} = \underline{\quad}$$

7)



$$\frac{5}{6} \div \frac{1}{12} = \underline{\quad}$$

8)



$$\frac{1}{3} \div \frac{1}{12} = \underline{\quad}$$

Dividing Mixed Fractions

How to divide mixed fractions

- 1) Convert the mixed fractions to improper fractions
- 2) Use the Keep, Switch, Flip (K,S,F) method to change the question to multiplication
- 3) Convert the answer back to a mixed fraction and simplify if necessary

Question	Improper	K, S, F	Answer	Simplified
$4\frac{2}{3} \div 3\frac{1}{5}$	$\frac{14}{3} \div \frac{16}{5}$	$\frac{14}{3} \times \frac{5}{16} = \frac{70}{48}$	$1\frac{32}{48}$	$1\frac{2}{3}$

Part 1

Write the answers of the fractions below. Simplify the fractions.

Question	Improper	K, S, F	Answer	Simplified
1) $6\frac{3}{7} \div 2\frac{2}{5}$				
2) $5\frac{4}{6} \div 4\frac{1}{3}$				
3) $8\frac{5}{6} \div 3\frac{3}{4}$				
4) $7\frac{4}{5} \div 4\frac{1}{6}$				
5) $6\frac{1}{4} \div 3\frac{2}{5}$				
6) $8\frac{3}{9} \div 2\frac{5}{7}$				

Part 2

Answer the word problem

Jasper ordered $5\frac{4}{5}$ loads of mulch to fill gardens around his property. Each garden requires $1\frac{2}{3}$ loads of mulch. How many gardens can he fill with mulch?



Dividing Fractions - Word Problems

Questions

Find the answers of the fractions below

1) At a bakery, the baker divides $4 \frac{1}{2}$ pounds of chocolate into portions of $1 \frac{1}{2}$ pounds each for making cakes. How many portions can the baker make?



2) During a science experiment, Michael needs to divide $6 \frac{3}{6}$ liters of a liquid into containers that can hold $1 \frac{1}{2}$ liters each. How many containers can he fill completely?

3) Emily has $4 \frac{2}{4}$ meters of fabric and wants to make scarves that are $1 \frac{1}{4}$ meters long each. How many scarves can she make using all the fabric?

4) A landscaper has $3 \frac{3}{9}$ meters of mulch and needs to spread it in flower beds that are each $1 \frac{1}{3}$ meters wide. How many flower beds can he cover with the mulch?

Unit Test - Fractions

Part 1

Convert the mixed numbers to improper fractions

1) $7\frac{2}{4} =$

2) $4\frac{1}{5} =$

3) $5\frac{3}{5} =$

Part 2

Convert the improper fractions to mixed numbers

1) $\frac{27}{4} =$

2) $\frac{26}{5} =$

3) $\frac{34}{6} =$

Part 3

Multiply the mixed numbers. Write your answers as a mixed fraction

1) $4 \times \frac{4}{7} = \boxed{} = \boxed{}$

2) $3 \times \frac{2}{5} = \boxed{} = \boxed{}$

3) $6 \times \frac{5}{8} = \boxed{} = \boxed{}$

4) $5 \times \frac{3}{12} = \boxed{} = \boxed{}$

Part 4

Find the products of the fractions below. Simplify the fractions.

1) $\frac{4}{5} \times \frac{5}{6} = \text{---}$

2) $\frac{2}{8} \times \frac{6}{8} = \text{---}$

Part 5

Solve the division questions below

1) $\frac{7}{8} \div \frac{3}{12} =$

2) $\frac{9}{11} \div \frac{3}{7} =$

3) $\frac{5}{6} \div \frac{2}{3} =$

4) $\frac{8}{9} \div \frac{4}{6} =$

5) $8 \div \frac{1}{6} =$

6) $5 \div \frac{7}{8} = \text{---} \times \text{---} =$

7) $\frac{3}{4} \div 2 =$

$5 \div 3 =$

Part 6

Answer the word problems below

1) Scotty can run a kilometre in $\frac{4}{8}$ of an hour. How many kilometres can he run in $\frac{3}{4}$ of an hour?

2) Quinn bought 5 cans of tomato soup. Each can holds $\frac{8}{9}$ litres of soup. How many litres of soup do all 5 cans hold?

3) A cook has $7\frac{1}{2}$ cups of sugar and needs to divide it into portions of $1\frac{1}{2}$ cups each for different dessert recipes. How many portions can the cook make?

4) Samantha is making a punch for a party. She needs to make $5\frac{1}{2}$ batches of her punch recipe. Each batch requires $2\frac{1}{3}$ cups of orange juice. How many cups of orange juice does Samantha need in total to make the punch?

5) A baker needs to divide 3 cups of flour into portions of $\frac{1}{4}$ cup each to make cookies. How many portions can the baker make?

6) There are 5 submarine sandwiches, and a teacher wants to divide them equally among her students so that each student gets $\frac{1}{5}$ of a sandwich. How many students are in her class?

7) In a recipe, a cook uses $2\frac{1}{4}$ cups of flour for each batch of cookies. If he wants to make $\frac{1}{2}$ of a batch, how much flour should he use?

Introduction to Integers

Integers are whole numbers that can be positive, negative or zero. Integers do not include fractions or decimals. We use positive integers a lot, but we sometime need to use negative integers, like when we are measuring the temperature outside in the winter.

Questions

Use the number lines to solve the questions

- 1) The temperature at 6am was -9°C . At noon, the temperature was 5°C . Circle the temperature on the number line. How much did the temperature rise?



Rise in temperature = _____

- 2) Steve was in debt to his brother Henry and $-\$5$. He was able to make some money by cutting his neighbour's grass and paid his brother back and has $\$10$ left. How much did he make cutting grass?



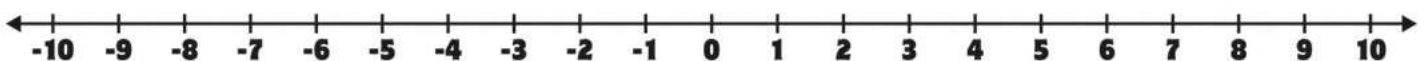
Earnings from cutting grass = \\$ _____

- 3) A running back in football earned -8 yards in the first half of his game. In the second half, he earned 10 yards. How many yards did he get in the second half?



Yards in the second half = _____

- 4) Tiger Woods scored a -8 in his third round of a golf tournament. He scored $+8$ in the fourth round. How many more shots did he take in the fourth round?



Extra shots in the fourth round = _____

Comparing Integers

**Part 1**Use the $<$, $>$, $=$ to compare the integers below

- 1) 9 -3 2) -7 3 3) -10 0
- 4) -2 1 -1 6) -10 10
- 7) -3 3 5 6 9) 8 -6
- 10) -6 -7 11) -7 -1 0

Part 2

Arrange the integers from least to greatest

- | | |
|-----------------------|---------------------|
| 1) 7, 2, -6, -7, 4 | 2) 0, -4, -8, 8 |
| 3) 0, 3, -4, 5, -6 | 4) -2, 0, -6, 2, -5 |
| 5) 10, -10, -9, 8, -8 | 6) -8, -7, 7, 0, 8 |

Adding Integers – Zero Pairs



$\begin{array}{ccc} (+) & (+) & (+) \\ (+) & (+) & (+) \\ (+) & (+) & \end{array}$	$\begin{array}{ccc} (-) & (-) & (-) \\ (-) & (-) & (-) \\ \end{array}$
$\underline{8} + \underline{(-6)} = \underline{2}$	



Question: Cross out the zero pairs. What is left?

1) $\begin{array}{ccc} (+) & (+) & (+) \\ (+) & (+) & (+) \end{array}$

_____ + _____ = _____

2) $\begin{array}{ccc} (+) & (+) & (+) \\ (+) & & \end{array}$ $\begin{array}{ccc} (-) & (-) & (-) \\ (-) & & \end{array}$

_____ + _____ = _____

3) $\begin{array}{ccc} (+) & (+) & (+) \\ (+) & (+) & (+) \\ (+) & (+) & \end{array}$ $\begin{array}{cc} (-) & (-) \end{array}$

_____ + _____ = _____

4) $\begin{array}{cc} (+) & (+) \end{array}$ $\begin{array}{ccc} (-) & (-) & (-) \\ (-) & (-) & (-) \\ & & (-) \end{array}$

_____ + _____ = _____

5) $\begin{array}{ccc} (+) & (+) & (+) \\ (+) & (+) & \end{array}$ $\begin{array}{ccc} (-) & (-) & (-) \\ (-) & (-) & (-) \\ (-) & (-) & \end{array}$

_____ + _____ = _____

6) $\begin{array}{cc} (+) & (+) \end{array}$ $\begin{array}{ccc} (-) & (-) & (-) \\ (-) & (-) & (-) \end{array}$

_____ + _____ = _____

7) $\begin{array}{ccc} (+) & (+) & (+) \\ (+) & (+) & (+) \\ (+) & & \end{array}$ $\begin{array}{ccc} (-) & (-) & (-) \end{array}$

_____ + _____ = _____

8) $\begin{array}{ccc} (+) & (+) & (+) \\ (+) & (+) & (+) \\ (+) & (+) & (+) \end{array}$ $\begin{array}{ccc} (-) & (-) & (-) \\ & & (-) & (-) \end{array}$

_____ + _____ = _____

9) $\begin{array}{ccc} (+) & (+) & (+) \\ (+) & (+) & \end{array}$ $\begin{array}{ccc} (-) & (-) & (-) \\ (-) & (-) & (-) \\ (-) & (-) & \end{array}$

_____ + _____ = _____

10) $\begin{array}{ccc} (+) & (+) & (+) \\ (+) & (+) & \end{array}$ $\begin{array}{ccc} (-) & (-) & (-) \\ (-) & (-) & (-) \\ (-) & (-) & (-) \end{array}$

_____ + _____ = _____

11) $\begin{array}{ccc} (+) & (+) & (+) \\ (+) & (+) & (+) \\ (+) & (+) & \end{array}$ $\begin{array}{ccc} (-) & (-) & (-) \\ (-) & (-) & (-) \\ & & (-) & (-) \end{array}$

_____ + _____ = _____

12) $\begin{array}{ccc} (+) & (+) & (+) \\ (+) & (+) & \end{array}$ $\begin{array}{ccc} (-) & (-) & (-) \\ (-) & (-) & (-) \\ & & (-) \end{array}$

_____ + _____ = _____

Golf - Adding Integers – Zero Pairs

Word Problems

Solve the word problems below using counter chips



1) Bailey played 3 rounds of golf. She filled out her scorecard, but she forgot what she shot in round 2. Fill it in for her.

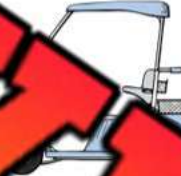
Round	Score
1	-6
2	
3	+9
Total Score	+10



Equation: _____ + _____ + _____ = _____

2) Ryker played 3 rounds of golf. His final scores for all three rounds are on the scorecard. What is his total score?

Round	Score
1	-13
2	-8
3	+11
Total Score	



Equation: _____ + _____ + _____ = _____

3) Sara played 4 rounds of golf. Her final scores are on the scorecard, but she can't remember what she scored on her first round. Help her complete her score card.

R1	R2	R3	R4	Total Score
	3	-6	-5	-17



Equation: _____ + _____ + _____ + _____ = _____

4) Jason played 4 rounds of golf. His final scores are written on the scorecard. What is his total score?

R1	R2	R3	R4	Total Score
-11	-6	8	-7	



Equation: _____ + _____ + _____ + _____ = _____

Adding Integers – Using Number Lines

-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

Part 1

Solve the questions below

1) $9 + (-4)$

6) $-35 + 21 + (-17)$

2) $15 + (-3) + 5$

7) $17 + (-25) + (-11)$

3) $-17 + 30 + (-15)$

8) $-10 + (-10) + 35 + (-12)$

4) $20 + (-32) + (-7)$

9) $19 + (-8) + (-7) + (22)$

5) $-18 + 20 + (-21)$

10) $12 + (-15) + 8 + (-3)$

Part 2

Answer the word problems below. Write the equations in the boxes.

- 1) You start at point A and take 19 steps forward to point B, then 29 steps backward to point C, followed by 10 steps backward to point D, and finally 31 steps forward to point E. How many steps are you away from the starting point, point A?



- 2) A submarine starts at sea level and dives 52m down before coming up 16m. It makes another plunge down 39m and then rises 14m. How many meters is it below sea level?



Subtracting Integers – Keep, Flip, Change

Subtraction Integers Rules

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

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

Keep the
first
integer

Flip the
operation

Change the
sign of the next
integer

Part 1

Use the rule above to solve the problems

1) $11 - (-6) =$

6) $(+45) - (+43) =$

2) $24 - (-11) =$

7) $(+7) - (-33) =$

3) $(-11) - 8 =$

8) $(-5) - (-8) =$

4) $(-23) - 13 =$

9) $(-118) - (-4) =$

5) $(-31) - (-12) =$

10) $159 - (-77) =$

Part 2

Answer the word problem below. Write the equation

Jake has +\$130 in his bank account. Todd owes \$80 to his brother and has no other money. How much more money does Jake have than Todd?

Subtracting Integers – Word Problems

Questions

Answer the questions below

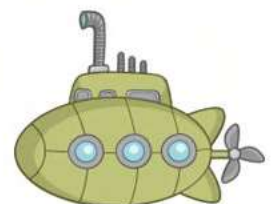
1) The temperature in the morning was 5°C and dropped to -3°C in the evening. What was the change in temperature?

2) A company made a profit of \$300 in January. In February, they lost \$8,600 in profits. What is the difference between the two months?



3) A mountain peak is 6,387 meters above sea level. A valley is 215 meters below sea level. What is the difference in elevation between the mountain peak and the valley?

4) A submarine was at a depth of -150 meters below sea level. It then descended until it was -325 metres below sea level. What was its change in metres below sea level?



Multiplying Integers – Number Line

Follow these steps to use a number line for solving multiplication questions involving integers.

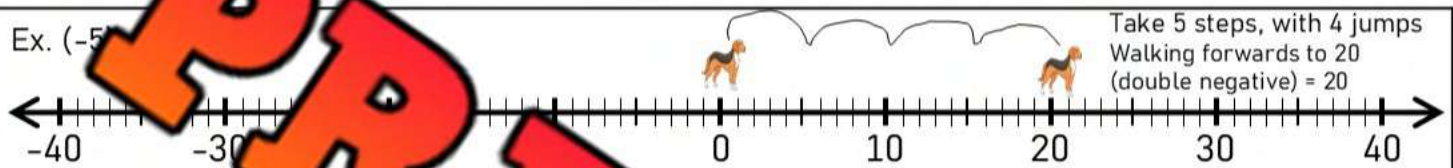
- 1) The dog always starts at 0
- 2) The multiplier tells us how many steps the dog will take.
- 3) The multiplicand tells us to walk forwards or backwards. For a positive number, walk forwards. For a negative number, walk backwards.
- 4) The multiplicand also tells us how many jumps to take.
- 5) If both numbers are negative, the answer will be positive (the dog will jump in the opposite direction)

Multiplier

$$-5 \times -4 = 20$$

Multiplicand

Product

Ex. $(-5) \times (-4)$ 

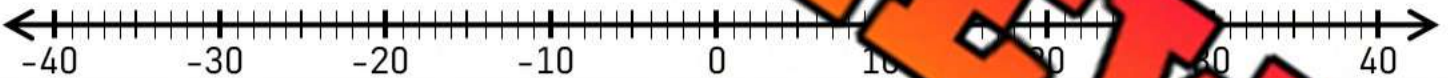
Questions

Use the number line to solve the questions

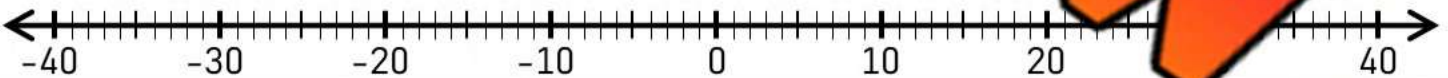
1) $(-5) \times (-7) =$



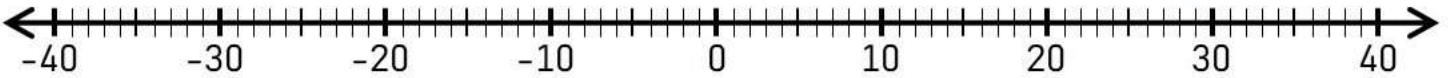
2) $8 \times (-4) =$



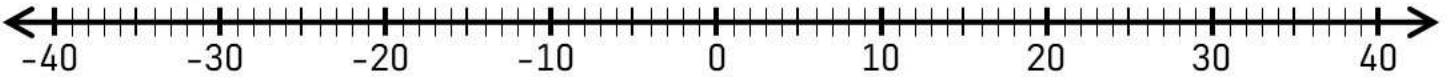
3) $(-7) \times 3 =$



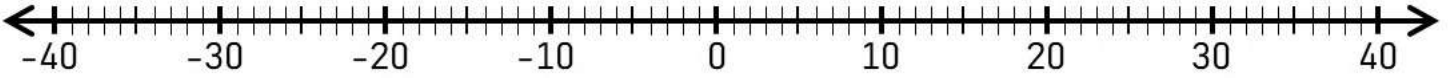
4) $(-9) \times (-4) =$



5) $5 \times (-8) =$



6) $(-20) \times (-2) =$



Multiplying Integers

Multiplying Integers Rules

- $(+) \times (+) = (+)$ Multiplying 2 positive integers will give a positive answer
 $(-) \times (-) = (+)$ Multiplying 2 negative integers will give a positive answer
 $(+) \times (-) = (-)$ Multiplying integers with different signs will give a negative answer
 $(-) \times (+) = (-)$ Multiplying integers with different signs will give a negative answer

Part 1 Use the rules above to answer the 1-step equations below

1) $5 \times (-2) = \square$	6) $1 \times (-5) = \square$	11) $(-8) \times (-12) = \square$
2) $(-7) \times 7 = \square$	7) $(-4) \times (-3) = \square$	12) $13 \times (-9) = \square$
3) $(-8) \times (-3) = \square$	8) $(-12) \times (-5) = \square$	13) $(-16) \times 8 = \square$
4) $12 \times 8 = \square$	9) $(-13) \times (-11) = \square$	14) $9 \times (-13) = \square$
5) $(-11) \times 12 = \square$	10) $20 \times 7 = \square$	15) $25 \times (-6) = \square$

Part 2 Simplify the multi-step expressions and use the rules

Ex) $2 \times (-3) \times (-8)$ $= (-6) \times (-8)$ $= 48$	3) $5 \times 10 \times (-10) \times (-10)$
1) $(7) \times (-3) \times 2$	4) $6 \times (-2) \times (-4) \times 2$
2) $(-4) \times (-6) \times (-3)$	5) $(-9) \times 3 \times (-2) \times 10$

Multiplication Squares

Part 1

Fill in the squares by multiplying the integers

1)

x	5	-8
-3		
-7		

2)

x	2	-9
-8		
-6		

3)

x	7	-1
-9		
-3		

4)

x	-3	-7	-10
-8			
6			

6)

x	12	-6
-4		
9		

7)

x	-15	-13
-3		
-5		

8)

x	-6	1	23	-56
-4				
7				

Part 2

Fill in the squares by multiplying the integers

1)

x	6	-5	2
-4			
-7			
3			

2)

x	10	-11	12
-3			
-7			
-9			

3)

x	-5	15	-25
-2			
-4			
6			

Name: _____

Integer Multiplication Chart

Directions

Fill in the chart by multiplying the integers

x	-5	-4	-3	-2	-1	0	2	3	4	5
5										
4										
3										
2										
1										
0										
-1										
-2										
-3										
-4										
-5										

Dividing Integers – Number Line

Follow these steps to use a number line for solving division questions involving integers.

- 1) The dog always starts at 0
- 2) The dog jumps by the divisor until it reaches the dividend.
- 3) Your answer is how many jumps it takes
- 4) The answer is negative if the dog faces the negative side and positive if it faces the positive side.

Dividend

$$(-15) \div 5 = -3$$

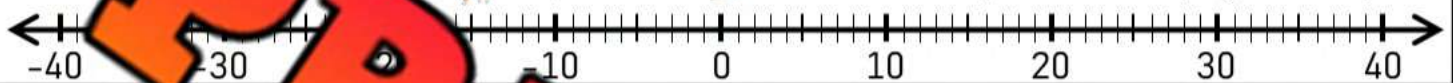
Divisor

Quotient

Ex. $(-15) \div 5$

Distance = 3 jumps

Jumped to the left (negative side) = -3



Questions

Use the number line to solve the questions

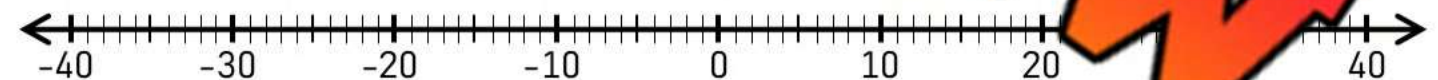
1) $(-25) \div (-5) =$



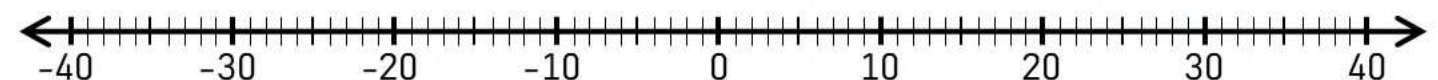
2) $12 \div (-4) =$



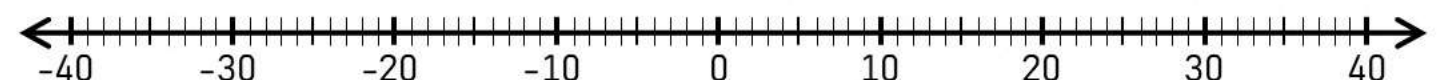
3) $(-32) \div 4 =$



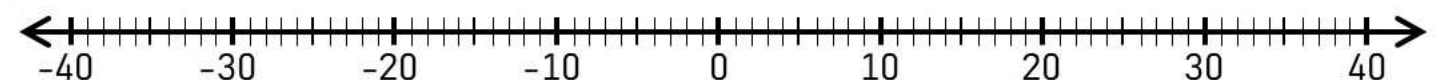
4) $(-18) \div (-6) =$



5) $24 \div (-8) =$



6) $(-36) \div (-3) =$



Division Squares

Part 1

Fill in the squares by dividing the integers

1)

÷	5	-3
-15		
-30		

2)

÷	-6	3
18		
-12		

3)

÷	7	-2
28		
-56		

4)

÷	12	-4	-8
-48			
36			

6)

÷	-2	-12
-60		
96		

7)

÷	5	15
-75		
-105		

8)

÷	-22	1	3	-9
-88				
66				

Part 2

Fill in the squares by dividing the integers

1)

÷	2	-6	-10
-60			
90			
-180			

2)

÷	-3	-6	9
18			
-54			
90			

3)

÷	-5	15	-25
-75			
-150			
225			

Dividing Integers - Word Problems

Questions

Answer the questions below

1) A debt of $-\$1,800$ is to be divided equally among 6 friends. How much money does each friend have in relation to this debt?



2) An elevator starts on the ground floor (0) and goes down 16 floors in 4 minutes. What is the rate at which the elevator is descending in terms of floors per minute?

3) A hiker is descending a mountain trail at a constant rate of -100 meters per hour. If the hiker needs to descend a total of -300 meters to reach the base of the mountain, how many hours will it take to complete the descent?



4) A company recorded a loss of $-\$45,000$ in a year. If they lost the same amount of money each month, what was their monthly loss?

Math Jeopardy – Integer Operations

Objective

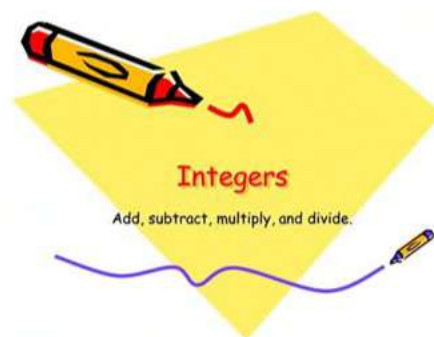
What are we learning about?

Students will practice adding, subtracting, multiplying, and dividing numbers, while solving word problems using all four operations in a fun and engaging way.

Materials

What you will need for the activity.

- Jeopardy board and questions
- Buzzer or bell

**Instructions**

How you will complete the activity

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

Name: _____

238

Jeopardy Questions

Ask students the questions below:

\$100	\$200	\$300	\$400	\$500
$12 + (-5) + 3$	$20 + (-7) + 9$	$(-15) + 25 + (-10)$	$(-45) + 30 + (-20)$	$78 + (-45) + 62$
$24 - (-8)$	$(-15) - 9$	$43 - (-17) - 12$	$(-75) - (-20) - 33$	$108 - 45 - (-18)$
$4 \times (-3)$	$(-5) \times (-8)$	$(-9) \times 12 \times (-2)$	$25 \times (-6) \times 4$	$(-11) \times (-12) \times (-5)$
$20 \div (-5)$	$(-72) \div 9$	$180 \div (-6) \div 5$	$(-1440) \div (-12) \div 6$	$(-360) \div 8 \div (-3)$
You start with 120 points. You lose 20 points, then gain 8 points. How many points do you have now?	A hiker descends 20 meters, then ascends 15 meters. How far below sea level is he now?	A submarine is 120 meters below sea level. It rises 15 meters and then descends 50 meters. How far below sea level is it now?	A snowstorm causes the temperature to drop by -3°C every hour. After 10 hours, what's the total temperature change?	A glacier retreats by -2.5 meters every month. How far will it retreat in 2 years?
A diver is 12 meters below sea level. She descends another 8 meters. How far below sea level is she now?	The stock market drops 12 points one day, 6 the next day, and then another 8 points the next day. How much did the stock market drop in total?	A debt of $-\$1,500$ is to be divided equally among 5 people. How much debt does each person take on?	A company loses $\$75$ per week for 10 weeks. How much money did the company lose in total?	A scuba diver descends -4 meters per second. How far will the diver descend in 2 minutes?
The temperature was -5°C in the morning. By noon, it rose by 7°C . What's the temperature now?	You start with -40 points in a quiz competition. You earn 55 points in the first round and lose 10 points in the second round. What's your final score?	A mountain climber descends -200 meters per hour. How far has the climber descended after 7 hours?	A company's value decreases by $-\$350$ per day. How much will the company's value decrease in 20 days?	A company experiences a daily loss of $-\$5,000$ for 14 days. What's the total loss over the 14 days?

Name: _____

240

Curriculum Connection
N8.5

Order of Operations - Integers

Questions

Calculate the answers to the equations using BEDMAS

1) $7 + (-3) \times (-9)$

2) $11 \times (-4 + -6)$

3) $(-5)(-9) + (4 - 2)$

4) $(-4 \times 8) \div (-12) - (-2 \times 1)$

6) $(-66 \div 6)(4)$

7) $12 \times (-3) + (-6)$

8) $15 \div (-3) + (-12) \times (3 + 5)$

10) $18 \div 3 + (-16 - 7)$

11) $(-4)(-7) \div 4 + 8$

12) $18 + (-11) - 2 \times (-5)$

Exit Cards

Cut Out

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

Name: _____

Calculate the answers to the equations using BEDMAS

a) $(-15 \div 3) + (4 \times -2) = \underline{\hspace{2cm}}$

b) $(-9) \times (-4) - (6 + -7) = \underline{\hspace{2cm}}$

Name: _____

Calculate the answers to the equations using BEDMAS

a) $(-15 \div 3) + (4 \times -2) = \underline{\hspace{2cm}}$

b) $(-9) \times (-4) - (6 + -7) = \underline{\hspace{2cm}}$

Name: _____

Calculate the answers to the equations using BEDMAS

a) $(-15 \div 3) + (4 \times -2) = \underline{\hspace{2cm}}$

b) $(-9) \times (-4) - (6 + -7) = \underline{\hspace{2cm}}$

Name: _____

Calculate the answers to the equations using BEDMAS

a) $(-15 \div 3) + (4 \times -2) = \underline{\hspace{2cm}}$

b) $(-9) \times (-4) - (6 + -7) = \underline{\hspace{2cm}}$

Order of Operations - Word Problems

Questions

Write an equation that represents the situation and solve

1) An elevator starts at the ground floor. It travels up 8 floors before going down halfway to the ground. Next, it travels back up 12 more floors before going down 13 floors. What floor is the elevator on now?



2) A deep-sea diver returning from his world record diving adventure. He travelled 320m down. He came up at a rate of 10 metres a minute for 32 minutes. How many metres was he from the sea at the end of the 10 minutes?



3) Chase is the running back for his football team. In the first quarter, he rushed 5 times for an average of +8 yards per rush. He had 12 yards in the second quarter and -15 yards in the third. In the last quarter, he had +2 yards. How many yards did he rush for?



4) Vincent golfed 10 times last month. He had 6 rounds of -3 golf and 3 rounds of +2. His last round he scored a -8. What was his total score for the month?



Name: _____

243

Curriculum Connection
TQ

Integers Quiz

Part 1

Solve the questions below

1) $9 + (-5) =$

2) $11 + (-9) =$

3) $(-15) + 6 =$

4) $(-13) +$

5) $(-31) + 19 =$

6) $(-43) + 15 =$

Part 2

Solve the questions below

1) $11 + (-4) + 4$

2) $10 + 3 + (-17)$

3) $25 + (-18) + 13$

4) $(-16) +$

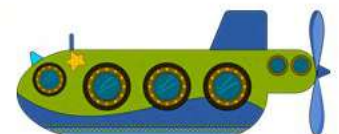
Part 3

Answer the word problems below. Write the answer in the box.

- 1) You start at point A and take 17 steps forward to point B. Then, you take 15 steps backward to point C, followed by 25 steps backward to point D. Finally, you take 19 steps forward to point E. How many steps are you away from the starting point, point A?



- 2) A submarine starts at sea level and dives 17m down before coming up 11m. It makes another plunge down 43m and then rises 27m. How many meters is it below sea level?



Part 4

Solve the subtraction equations below

1) $15 - (-6) =$

2) $(+18) - (+13) =$

3) $27 - (-13) =$

4) $(+45) - (-31) =$

5) $(-51) - (-8) =$

6) $(-84) - (-55) =$

Part 5

Answer the word problems below. Write the equation for each question

- 1) The winner of a golf tournament scored a -28 after four rounds. The last place golfer scored a $+12$. What is the difference between these two scores?



- 2) The average temperature at the South Pole is -49 degrees Celsius. The average temperature in the North Pole is -20 degrees Celsius. What is the difference in temperatures between the two Poles?



Part 6

Solve the multiplication equations below

1) $6 \times (-3) =$

2) $(-13) \times (-5) =$

3) $(-7) \times (-12) =$

4) $(-7) \times 9 =$

5) $8 \times (-6) =$

6) $4 \times (-9) =$

7)

$(8) \times (-5) \times 2$

8)

$7 \times (-4) \times (-2) \times 1$

Part 7

Fill in the tables below

1)

x	5	-4
-20		
-40		

2)

x	-6	3
30		
-12		

3)

÷	7	-2
42		
-56		

Part 8

Fill in the input/output tables by following the rules

1)

Input	Output
-12	
-8	
4	
7	
11	
Multiply by -3	

2)

Input	Output
-52	
28	
1	
2	
Divide by	

3)

Input	Output
-11	
-7	
-4	
2	
12	
Multiply by -8	

Part 9

Calculate the answers to the equations using the order of operations (PEMDAS)

1) $9 + (-5) \times (-3)$

2) $7 \times (-5 + -8)$

3) $(-12 \div 3) + (-4 \times 2)$

4) $(-5 \times 9) \div (5 \times 1)$

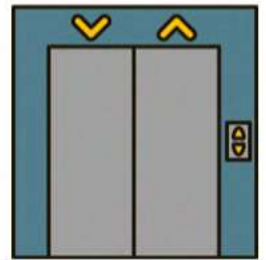
5) $(\frac{-36}{6}) - (-3 \times 1)$

6) $(-48 \div 6)(4)$

Part 10

Write an expression that represents the situation and solve

1) An elevator starts at the ground floor. It travels up 12 floors before going down 8 floors. Next, it travels twice as high as it is now. What floor is the elevator on now?



2) Nate golfed 6 rounds. Last week he scored a -2 for 3 of the rounds. For each of his other 3 rounds, he scored a $+5$. What was his total score for all 6 rounds?



3) Neil rushed for -8 yards in the first quarter of his football game. He rushed for $+22$ yards in the second quarter. In the last two quarters, he rushed for $+13$ yards in each quarter. How many total yards did he rush for?

