Final Review for 8th Grade

Woohoo! You did it! You made it through all of the content in the program, and now you're ready to graduate from the Supercharged Math program! Congratulations!!

We're going to do a full-blown review for all eighth graders over a series of 10 sessions. Students will start by doing two short review problems as a warm-up before class starts. Each day we will begin by going over the warm-ups, covering math content from one specific area, and finish with a two-page test.

We will work through the content (see schedule below) using the pages in the packet.

Schedule:

- Day 1: Rational Number Operations
- Day 2: Proportionality & Scale Drawings
- Day 3: Rates and Percents
- Day 4: Functions and Slope
- Day 5: Proportional Relationships
- Day 6: Linear Relationships
- Day 7: Equations and Inequalities
- Day 8: Linear Equations
- Day 9: Angles & 2D Geometry
- Day 10: Surface Area, Volume & Pythagoras

For each session, use the content in this packet to get the most out of the review sessions. Each session will follow this structure:

1. Warm up exercises (you may start these before class starts or do them in-class with the teacher)
2. Main Content (use your own math notebook to copy down the work)
3. Review Test (2 pages, which starts in-class and you will finish afterwards)

Included is this packet are also "cheat sheets", which are a page of notes that will help you remember important math concepts and skills. Feel free to use these during our review sessions anytime.

Special note regarding Algebra 1: There is a *separate* Algebra 1 Full Session Review here at the bottom of the page, including step-by-step instructional videos to guide you through every part of Algebra 1, since it's such a big course on its own.

Please let me know if you have any questions. Let's get started!

Aurora & Doug

aurora@superchargedscience.com
doug@superchargedscience.com

RATIONAL NUMBER OPERATIONS
CHEAT SHEET - A

Name _____

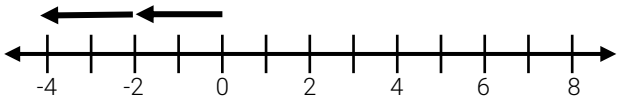
Date _____ Pd_____

INTEGERS

ADDITION

- If the signs are the **SAME**, then **ADD** and use the same sign.
- If the signs are **DIFFERENT**, then **SUBTRACT** and **TAKE THE SIGN** of the number with the **GREATEST ABSOLUTE VALUE**.

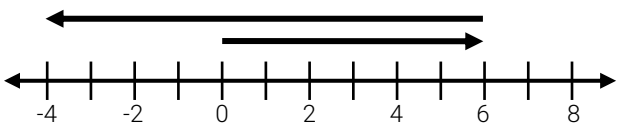
$-2 + -2 = -4$



SUBTRACTION

- Rewrite the problem to **ADD THE OPPOSITE**. Then, follow the rules for adding rational numbers.

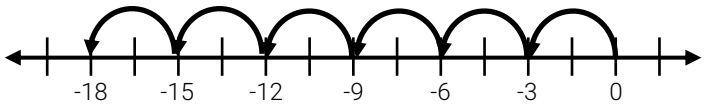
$6 - 10 = -4$



MULTIPLICATION & DIVISION

- If there is an **EVEN NUMBER** of signs, then the solution is **POSITIVE**.
- If there is an **ODD NUMBER** of signs, then the solution is **NEGATIVE**.

$-3 \cdot 6 = -18$



INTEGER OPERATIONS

$8 - 11 =$ -3

$-3 - 13 =$ -16

$15 \div -3 =$ -5

$-4 + -6 =$ -10

$8 + -2 =$ 6

$6 \cdot -9 =$ -54

$-27 \div 9 =$ -3

$8 \cdot 11 =$ 88

$12 - (-9) =$ 21

RATIONAL NUMBER OPERATIONS

$-9.6 \cdot 5 = -48$

$-60.8 \div 4 = -15.2$

$-4\frac{1}{5} - 2\frac{1}{10} = -6\frac{3}{10}$

$2\frac{1}{4} - 3\frac{1}{2} = -1\frac{1}{4}$

$-12.7 \cdot -3 = 38.1$

$100 \div 2.5 = 40$

$\frac{2}{3} \cdot \frac{3}{2} = 1$

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

RATIONAL NUMBER OPERATIONS

WARM-UP

Name _____

Date _____ Pd_____

1. Convert the following fraction to a decimal. Determine if it terminates or repeats.

$\frac{7}{8}$ _____

$\frac{1}{6}$ _____

$\frac{11}{12}$ _____

2. Amanda is reading a 208-page novel for her English class. On Monday she reads $\frac{3}{8}$ of the novel. On Tuesday she reads 28 pages, and on Wednesday she reads $\frac{1}{4}$ of the novel. How many more pages does Amanda have until she finishes the novel?

RATIONAL NUMBER OPERATIONS
QUICK CHECK

Name _____

Date _____ Pd_____

1. A size 8 kid's shoe measures $9\frac{2}{3}$ inches. If 5 size 8 shoes are lined end to end, then how many inches will they cover?

A. $36\frac{2}{3}$ B. $48\frac{1}{3}$ C. $77\frac{1}{3}$ D. 62

2. The record low temperature in Fargo, ND is -37°F. The record high is 109°F. What is the difference in the record high and the record low temperatures?

F. 72
G. 109
H. 33
J. 146

3. The local volleyball team hosts a concession stand to raise money. They can spend $120 to purchase popcorn, candy, and drinks. They purchase 95 bags of popcorn at $0.75 each and 35 bags of candy at $1.20 each. How much money does the volleyball team have left to spend on drinks?

A. $7.25 B. $15.50 C. $6.75 D. $20.25

4. Mrs. Sloan is purchasing 3.4 pounds of trail mix that costs $4.25 per pound. How much change will Mrs. Sloan receive if she gives the cashier $20.00?

F. $14.45
G. $12.55
H. $5.55
J. $7.45

5. There are 24 people in a fitness studio. $\frac{3}{8}$ of the people are lifting weights, $\frac{1}{3}$ are cross training, and the remaining people are running. What fraction of the people are running?

A. $\frac{7}{24}$ B. $\frac{17}{24}$ C. $\frac{5}{12}$ D. $\frac{7}{8}$

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓕ Ⓖ Ⓗ Ⓙ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓕ Ⓖ Ⓗ Ⓙ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓕ Ⓖ Ⓗ Ⓙ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓕ Ⓖ Ⓗ Ⓙ
9. Ⓐ Ⓑ Ⓒ Ⓓ
10. Use the grid below.

					.		
⊕	⓪	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①	①		①	①
	②	②	②	②		②	②
	③	③	③	③		③	③
	④	④	④	④		④	④
	⑤	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨

6. The weather report shows the 5-day forecast in St. Paul, Minnesota. What is the sum of the various temperatures over the period of five days?

DAY	TEMPERATURE (°F)
MONDAY	-6°
TUESDAY	3°
WEDNESDAY	4°
THURSDAY	-2°
FRIDAY	-1°

F. -4°

G. 2°

H. -3°

J. -2°

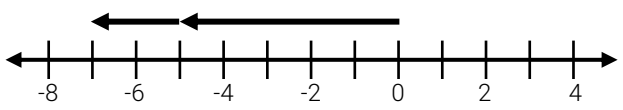
7. A 9-pound bag of sugar is being split into containers that hold $\frac{2}{3}$ of a pound. How many containers of sugar will the 9-pound bag create?

A. $13\frac{1}{2}$ B. $15\frac{1}{3}$ C. $13\frac{1}{3}$ D. 27

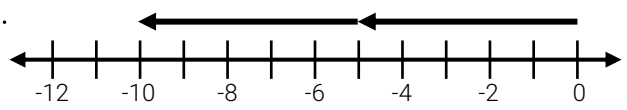
8. Which diagram correctly depicts the expression below?

-5 – 2

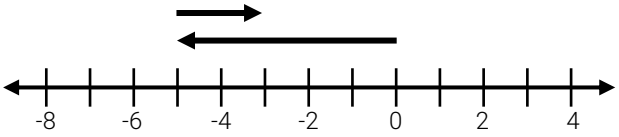
F.



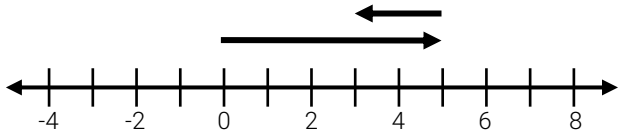
G.



H.



J.



9. A spool with 18 feet of ribbon will be cut into 8-inch segments. How many 8-inch segments can be cut from the spool of ribbon?

A. 10

B. 27

C. 2.25

D. 14.8

10. The parent teacher association is raising money for a new swing set. They need $682.56 to purchase the swing set and receive a $200.00 donation. The remaining amount will be equally divided among 8 different student groups to raise. How much money will each student group need to raise in order to purchase the swing set? Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

PROPORTIONALITY & SCALE DRAWINGS
CHEAT SHEET - A

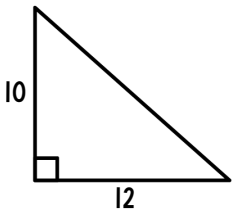
Name _____

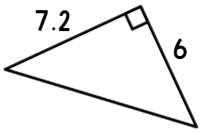
Date _____ Pd_____

similarity

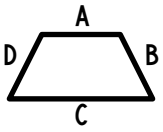
SIMILAR FIGURES have **CORRESPONDING**:

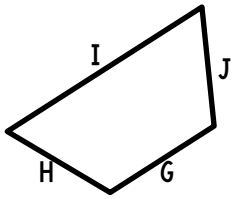
1. **PROPORTIONAL** sides
2. **EQUAL** angles





$$\frac{10}{12} = \frac{6}{7.2}$$





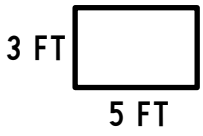
$$\frac{A}{G} = \frac{B}{H}$$

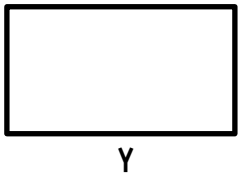
scale factor

$$\frac{\text{NEW}}{\text{ORIGINAL}}$$

The **SCALE FACTOR** is the ratio in which a figure is **DILATED**.

ENLARGEMENT	REDUCTION
scale factor is greater than 1	scale factor is less than 1





SCALE FACTOR OF 1.5 ⇒ **X = 4.5 FT**, **Y = 7.5 FT**

scale drawings

SCALE DRAWING: uses a **SCALE** to convert measurements

1 CM = 2.5 MILES **1 IN = 300 FEET**

Frequently used on **MAPS** and **BLUEPRINTS**

- Label the various units
- The conversion will be given
- Set up and solve the proportion

$$\frac{\text{IN}}{\text{FT}} = \frac{2}{75} = \frac{7}{X}$$

$$525 = 2X$$

$$262.5 = X$$

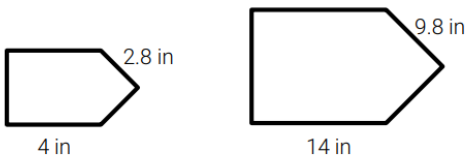
7 IN = 262.5 FT

PROPORTIONALITY & SCALE DRAWINGS
WARM-UP

Name _____

Date _____ Pd_____

1. Determine if the two regular pentagons below are proportional.



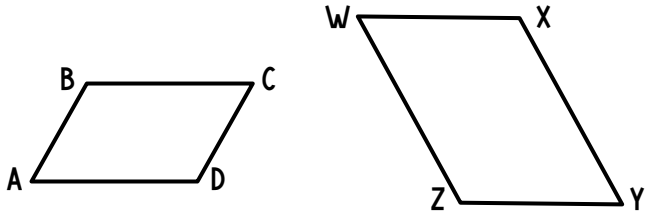
2. The distance between home and school is 4.5 miles. On a map it shows the distance to be 9 cm. What is the scale?

PROPORTIONALITY & SCALE DRAWINGS
QUICK CHECK

Name _____

Date _____ Pd_____

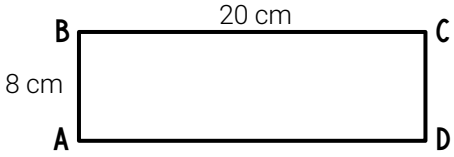
1. Figure ABCD is similar to figure WXYZ. Which proportion must be true for these figures?



A. $\frac{AB}{BC} = \frac{ZW}{WZ}$ B. $\frac{BD}{DC} = \frac{ZY}{XY}$ C. $\frac{AB}{DC} = \frac{WX}{ZY}$ D. $\frac{DA}{ZY} = \frac{CD}{XY}$

2. The rectangle is being reduced by a scale factor of $\frac{3}{4}$. What is the area of the new image?

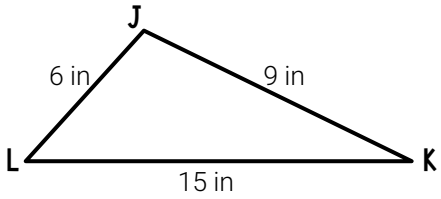
F. 180 cm^2
G. 90 cm^2
H. 160 cm^2
J. 75 cm^2

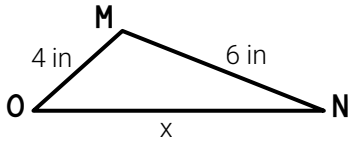


3. Micah made a scale model of the Empire State Building. The building has an actual height of 381 meters. Micah's model used a scale in which 1 cm represents 50 meters. What is the height in centimeters of Micah's model?

A. 3.2 cm
B. 19.05 cm
C. 36.83 cm
D. 7.62 cm

4. Triangle JKL is similar to triangle MNO. What is the perimeter of triangle MNO?





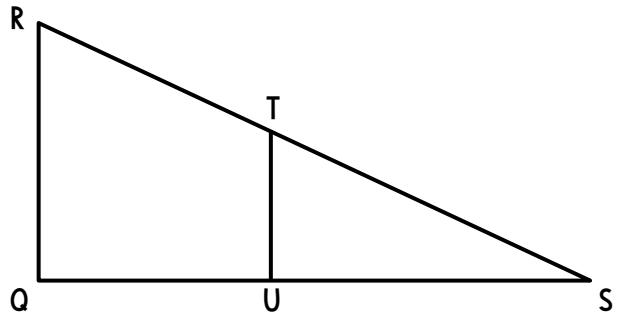
F. 9 in G. 27 in H. 20 in J. 11 in

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓕ Ⓖ Ⓗ Ⓙ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓕ Ⓖ Ⓗ Ⓙ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓕ Ⓖ Ⓗ Ⓙ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓕ Ⓖ Ⓗ Ⓙ
9. Ⓐ Ⓑ Ⓒ Ⓓ

10. Use the grid below.

					•		
⊕	⓪	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①	①		①	①
	②	②	②	②		②	②
	③	③	③	③		③	③
	④	④	④	④		④	④
	⑤	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨

5. Triangle QRS is similar to triangle UTS. Which line segment corresponds to $\overline{RS}$?



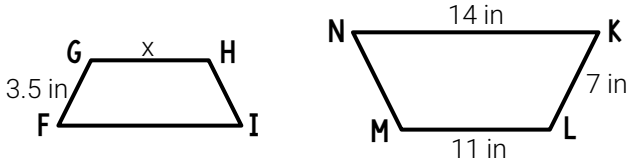
A. $\overline{RT}$

B. $\overline{TS}$

C. $\overline{OS}$

D. $\overline{UT}$

6. Trapezoid FGHI is similar to trapezoid KLMN. What is the length of GH?



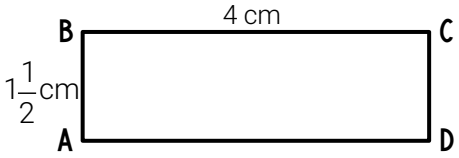
F. 8.5 in

G. 7 in

H. 6.75 in

J. 5.5 in

7. The rectangle below is dilated by a scale factor of 3.6 to create a new rectangle. Which of the following could be the dimensions of the new rectangle?



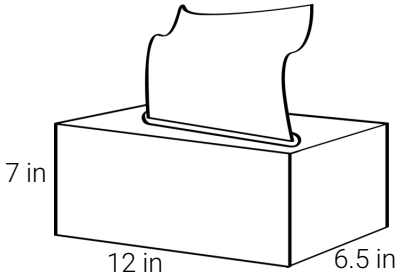
A. 14.4 cm x 5.4 cm

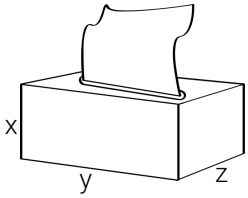
B. 5.4 cm x 7.2 cm

C. 7.2 cm x 1.8 cm

D. 14.4 cm x 7.2 cm

8. Two boxes of tissues are similar in shape and size. The larger tissue box is dilated by a scale factor of 0.5 to create the smaller tissue box. What are the measurements of the smaller tissue box?





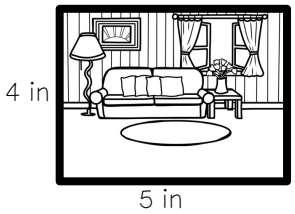
F. y = 6 in, z = 3.5 in

G. x = 3.25 in, y = 6 in

H. x = 3.5 in, y = 6 in

J. y = 6 in, z = 2.75 in

9. The picture below is being enlarged by a scale factor of 2.5. How many inches of framing will the picture require?



A. 12.5 in

B. 20 in

C. 45 in

D. 65 in

10. A map uses the scale $\frac{3}{4}$ of an inch to represent 3 miles. If the actual distance between two cities is 25 miles, then what is the length on the map?

RATES AND PERCENTS
CHEAT SHEET - A

Name _____

Date _____ Pd_____

Rates

RATE: a ratio with **TWO DIFFERENT UNITS**

$\frac{\$5.25}{6\ LB}$ $\frac{250\ MI}{4\ HRS}$ $\frac{49\ FT}{5\ SEC}$

UNIT RATE: a ratio with a quantity of **ONE**

$\frac{PRICE}{1\ LB}$ $\frac{MILES}{1\ HR}$ $\frac{FEET}{1\ SEC}$

FRACTIONAL UNIT RATE

- Will result in a complex fraction
- Follow the steps for dividing fractions

$$\frac{MILES}{HR} = \frac{\frac{1}{3}}{\frac{1}{4}} = \frac{1}{3} \cdot \frac{4}{1} = 1\frac{1}{3}$$

$1\frac{1}{3}$ **MILES IN 1 HOUR**

Interest & Error

SIMPLE INTEREST: $I = prt$

I = interest
p = principal
r = annual interest rate (as a decimal)
t = time (in years)

- Be sure to change the rate to a decimal and convert any number of months to years.

PERCENT ERROR

$$\frac{|A - X|}{|X|} = \frac{\%}{100}$$

A = approximate

X = exact

Percent Vocabulary

INCREASE	DECREASE	OTHER
tax	sale price	commission
tip	amount off	interest
mark up	decrease	
gratuity	mark down	
increase	discount	
	wholesale	

Percent

PERCENT: a **QUANTITY** out of **100**

- Set up a percent proportion or an equation
- Solve for the missing quantity
- Reread the problem to make sure you answer the question

$$\frac{\%}{100} = \frac{PART}{WHOLE} \qquad PART = \% \cdot WHOLE$$
(as a decimal)

PERCENT OF CHANGE: the percent **GAINED** or **LOST** over a period of time

- Determine the change
- Set up a percent proportion
- Solve for the missing quantity
- Reread the problem to make sure you answer the question

$$\frac{\%}{100} = \frac{CHANGE}{ORIGINAL}$$

RATES AND PERCENTS
WARM-UP

Name _____

Date _____Pd_____

1. A group of 400 town residents is asked to attend a town hall meeting. Of the 400 residents asked to attend, 36 were able to attend. What percentage of the town residents were able to attend?

2. Jason worked the following hours in the month of June. What was the percent increase from week 1 to week 3?

WEEK	HOURS
1	18
2	26
3	24
4	33

RATES AND PERCENTS
QUICK CHECK

Name _____

Date _____Pd_____

1. Todd plans to swim 18 laps in the pool. Each lap is 50 yards. So far Todd has swam 738 yards. What percentage of the total has Todd completed?

   A. 18%
   B. 82%
   C. 62%
   D. 77%

2. Jameson is seeking a loan with a simple interest rate of 3% per year. If he wants to borrow $8,000, then how much will he be charged in interest after 4 years?

   F. $1,280.00
   G. $960.00
   H. $240.00
   J. $9,600.00

3. A hot air balloon travels 18 miles in 3 hours. At this rate, how many miles will the hot air balloon travel in $\frac{3}{4}$ hour?

   A. 4.5 mi B. 6 mi C. 11.5 mi D. 13.5 mi

4. The price of a tablet was increased from $180 to $207. By what percentage was the price of the table increased?

   F. 33% H. 27%
   G. 8% J. 15%

5. Margie has a $50.00 budget to purchase a $45.00 pair of boots. If there is an 8% sales tax rate, then how much under budget will Margie be?

   A. $8.60
   B. $5.00
   C. $1.40
   D. $4.20

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓕ Ⓖ Ⓗ Ⓙ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓕ Ⓖ Ⓗ Ⓙ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓕ Ⓖ Ⓗ Ⓙ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓕ Ⓖ Ⓗ Ⓙ
9. Ⓐ Ⓑ Ⓒ Ⓓ
10. Use the grid below.

					.		
⊕	⓪	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①	①		①	①
	②	②	②	②		②	②
	③	③	③	③		③	③
	④	④	④	④		④	④
	⑤	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨

6. Edgar pays $67.86 for 7.8 pounds of fertilizer. What is the price per pound of fertilizer?

F. $6.98

H. $5.65

G. $8.70

J. $10.26

7. Mr. Mathewson increased the amount of weight he lifted each morning from 80 pounds to 90 pounds. By what percentage did Mr. Mathewson increase the amount of weight he lifted?

A. 12.5%

B. 10%

C. 15%

D. 18.5%

8. Margo missed 24.6% of her free throw shots in a season. During the season, she shot a total of 90 free throws. Which of the following is the best estimate of the number of free throws Margo missed?

F. 18

G. 12

H. 22

J. 25

9. A hospital bill is estimated to be $462.00. It ends up actually costing the patient $525.00. What is the percent of error in the bill?

A. 7%

B. 15%

C. 9%

D. 12%

10. Jameson pays $39.90 for 3.8 pounds of almonds. What is the price per pound of almonds? Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

FUNCTIONS AND SLOPE
CHEAT SHEET - A

Name _____

Date _____Pd_____

FUNCTIONS

FUNCTION: A relationship in which every input (x) has exactly one output (y).

TO CHECK IF IT'S A FUNCTION:

✓**ORDERED PAIRS & TABLES**: Each x-value must correspond with exactly one y-value. Check for repeating x-values.

✓**EQUATIONS**: See if any input would result in more than one output. For example, $y^2 = x$ could result in $\pm y$.

✓**GRAPHS**: Must pass the "vertical line test", where any vertical line touches the graph at only one point.

SLOPE

Also called the **"RATE OF CHANGE"**

POSITIVE: Increases left to right

NEGATIVE: Decreases left to right

ZERO: A horizontal line

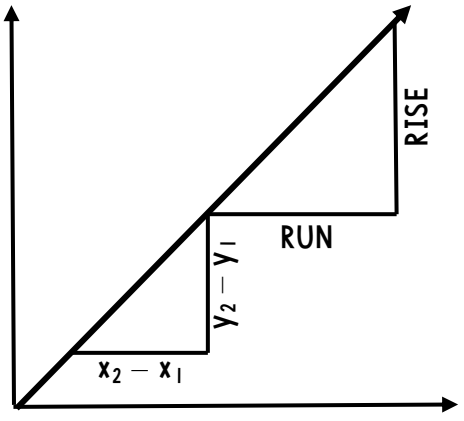
UNDEFINED: A vertical line

THE FORMULA:

$$\frac{y_2 - y_1}{x_2 - x_1}$$

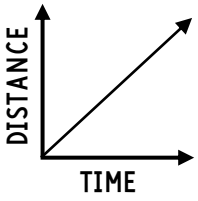
or

$$\frac{\text{RISE}}{\text{RUN}}$$

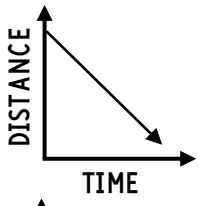


Triangles on the same line have the same **SLOPE** and are **SIMILAR** triangles. The ratios of their corresponding sides are **EQUAL**.

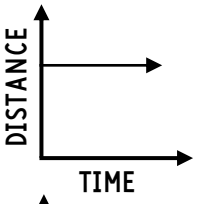
distance vs. time graphs



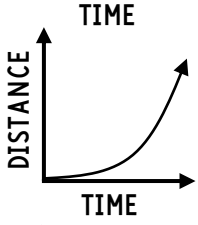
Moving away at a constant speed



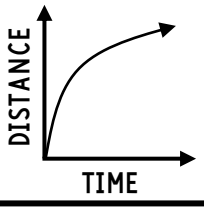
Moving closer at a constant speed



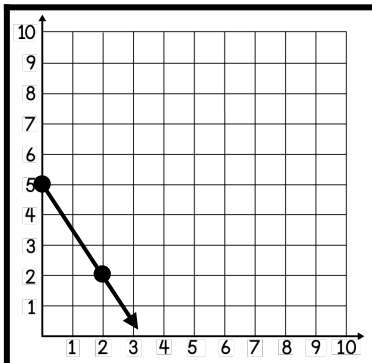
At rest; not changing distance



Moving away and increasing speed



Moving away and decreasing speed



The slope of the graph is $-\frac{3}{2}$.

x	y
0	-2
2	1.4
4	4.8
6	8.2

The slope of the table is 1.7.

(2, 6) and (-2, 7)

The slope between the ordered pairs is -0.25.

FINDING SLOPE

FUNCTIONS AND SLOPE
WARM-UP

Name _____

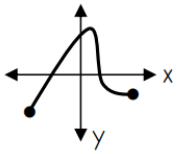
Date _____Pd_____

1. Label each representation below as "Function" or "Not a Function". Explain your reasoning.

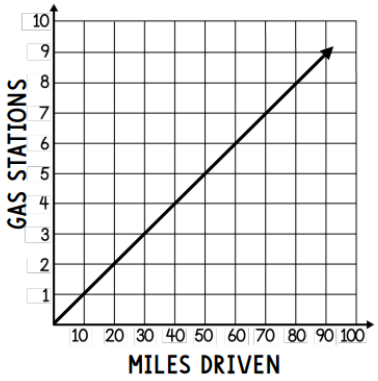
a. {(0, 2), (9, -1), (7, 3), (-4, 8), (-4, -8)}

b. $y = -5x^2 + 10$

c.



2. The graph below shows the number of gas stations Jude passed based on the number miles he'd driven.



What is the unit rate of the graph, and what does it mean in the context of the situation?

FUNCTIONS AND SLOPE
QUICK CHECK

Name _____

Date _____ Pd_____

1. The table below shows Vanessa's height in inches for two different years.

YEAR (x)	2000	2005
HEIGHT (y)	48 inches	54 inches

Which is a correct conclusion about the rate of change shown in the table?

A. Vanessa grows about 41.7 inches per year.

B. Vanessa grows about 6 inches per year.

C. Vanessa grows about 1.2 inches per year.

D. Vanessa grows about .83 inches per year.

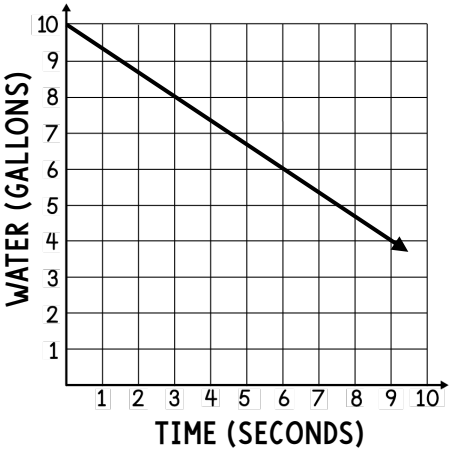
2. Ariel is emptying the water from a 10 gallon cooler. The graph shows the water level in the cooler as she empties it. Which best describes the rate of change shown in the graph?

F. The water level decreases 10 gallons per second.

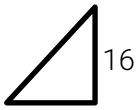
G. The water level decreases 1 gallon every 2 seconds.

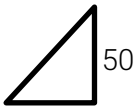
H. The water level decreases 3 gallons every 2 seconds.

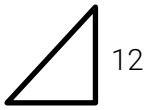
J. The water level decreases 2 gallons every 3 seconds.

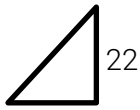


3. The slope of a graphed line is $\frac{2}{5}$. Which of the following triangles could lie on the line?

A. 

B. 

C. 

D. 

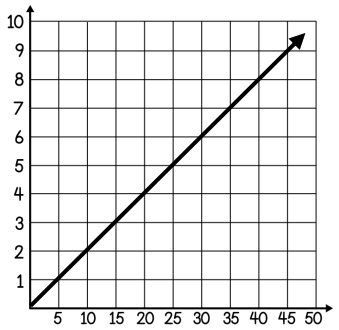
4. Which of the following situations does not have the same unit rate as the graph shown?

F. Asher buys gum for $0.20 a piece.

G. A daycare has six workers for every 30 children.

H. Melanie reads 9 pages of her book every 45 minutes.

J. Richie earns $10 every 2 hours to pet sit for his neighbor.

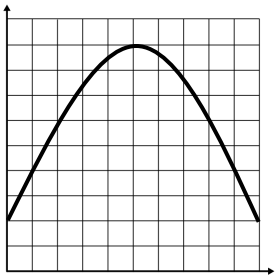


1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓕ Ⓖ Ⓗ Ⓙ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓕ Ⓖ Ⓗ Ⓙ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓕ Ⓖ Ⓗ Ⓙ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓕ Ⓖ Ⓗ Ⓙ
9. Ⓐ Ⓑ Ⓒ Ⓓ

10. Use the grid below.

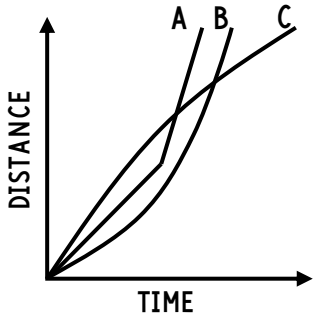
					.		
⊕	⓪	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①	①		①	①
	②	②	②	②		②	②
	③	③	③	③		③	③
	④	④	④	④		④	④
	⑤	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨

5. Which of the following is true about the graph shown below?



A. The graph is not a function because it does not start at (0, 0).
B. The graph is a function because it passes the vertical line test.
C. It is not a function because it is not linear.
D. It is a function because it has a constant rate of change.

6. The graph below shows the distance of three runners compared to the time during a race. Which of the following is **not** a true statement based on the graph?



F. Runner B gradually increased his speed.
G. Runner A started in 2nd place and finished 1st.
H. Runner C ran the furthest distance.
J. Runner C gradually decreased his speed.

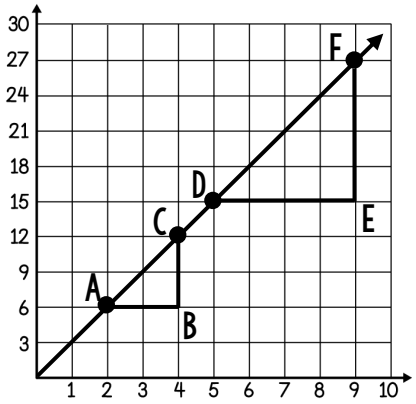
7. Which is true about triangles ABC and DEF?

A. The triangles are congruent because $\frac{12-6}{4-2} = \frac{27-15}{9-5}$.

B. The triangles are congruent because $\frac{12-6}{4-2} = \frac{15-27}{9-5}$.

C. The triangles are similar because $\frac{6-12}{4-2} = \frac{27-15}{9-5}$.

D. The triangles are similar because $\frac{12-6}{4-2} = \frac{27-15}{9-5}$.

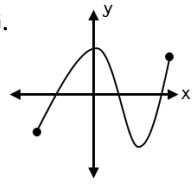


8. Which of the following representations shows y as a function of x?

F.

x	0	-1	0	-2
y	5	8	-5	-4

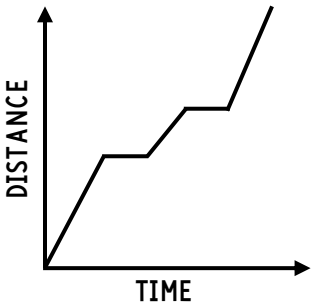
G.



H. $x^2 + y^2 = 144$

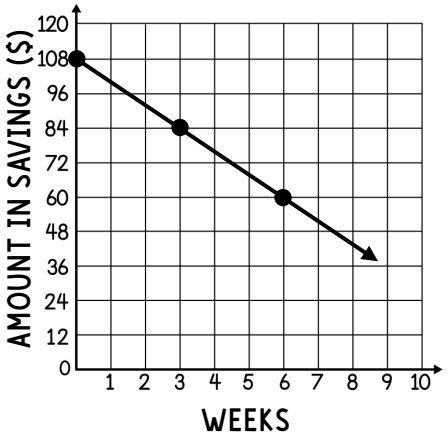
J. {(0, 4), (1, 6), (2, 8), (0, 9)}

9. The graph below represents Randy's drive to school. Which of the following is a correct conclusion based on the graph?



A. Randy stopped twice on the way to school.
B. Randy drove uphill most of the drive.
C. Randy increased his speed the entire drive.
D. Randy did not make any stops on the way to school.

10. The graph shows the amount in Harold's savings account over a certain number of weeks. Find the rate of change and record it in the grid.



PROPORTIONAL RELATIONSHIPS
CHEAT SHEET - A

Name _____

Date _____Pd_____

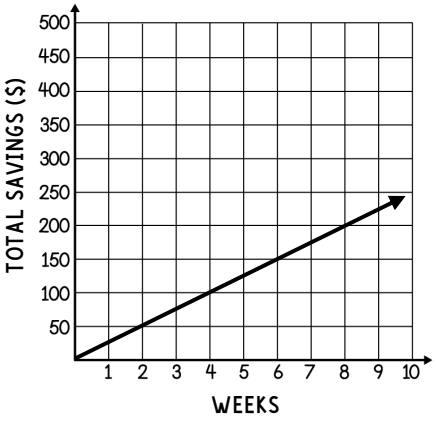
PROPORTIONAL VS. NON-PROPORTIONAL

- An equation, table, graph, or verbal description can describe the relationship between x and y.

PROPORTIONAL RELATIONSHIP

$y = ax$

X	Y
0	0
1	25
2	50
3	75
4	100

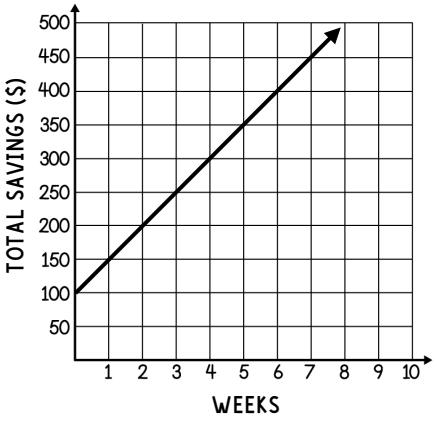


- Passes through the origin, (0, 0)
- Straight line

NON-PROPORTIONAL RELATIONSHIP

$y = x + a$

X	Y
0	100
1	150
2	200
3	250
4	300



- Does not pass through the origin, (0, 0)
- Not a straight line

CONSTANT OF PROPORTIONALITY

$$k = \frac{y}{x}$$

CONSTANT OF PROPORTIONALITY:

the ratio of the y-value to the x-value, represented by "k", it is equal to the rate of change

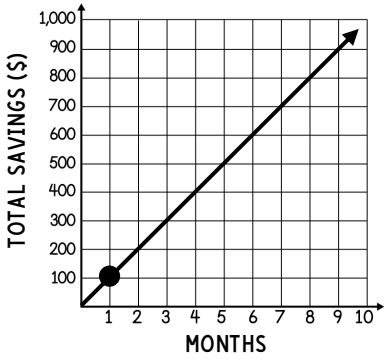
EXAMPLE:

X	2	4	6
Y	62	124	186

$$k = \frac{62}{2}$$

$$k = 31$$

X-VALUE	Y-VALUE
• independent • measured • x-axis • left side of table • top row of table	• dependent • varies • y-axis • right side of table • bottom row of table



(1, r)
r = UNIT RATE

tables & graphs

PROPORTIONAL RELATIONSHIPS
WARM-UP

Name _____

Date _____Pd_____

1. The cost of 2 pounds of potatoes is $3.78. What is the constant of proportionality that represents the relationship between the cost, *y*, to the number of pounds of potatoes, *x*?

2. Rebecca's piano lessons cost $45 per month. Complete the table below to show the cost over the next eight months.

MONTH	TOTAL COST ($)
1	
2	
3	
4	
5	
6	
7	
8	

PROPORTIONAL RELATIONSHIPS
QUICK CHECK

Name _____

Date _____ Pd_____

1.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2.	Ⓕ	Ⓖ	Ⓗ	Ⓙ
3.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4.	Ⓕ	Ⓖ	Ⓗ	Ⓙ
5.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6.	Ⓕ	Ⓖ	Ⓗ	Ⓙ
7.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8.	Ⓕ	Ⓖ	Ⓗ	Ⓙ
9.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
10.	Ⓐ	Ⓑ	Ⓒ	Ⓓ

1. Burger Town sells cheeseburgers for $7.95 each plus an additional $1.00 for each extra topping, *t*. Which of the following equations best represents the cost, *c*, of a cheeseburger?

A. $c = 7.95t$

B. $c = 8.95t$

C. $c = 7.95t + 1.00$

D. $c = 7.95 + 1.00t$

2. A standard bathtub holds 60 gallons of water. A full tub drains 12 gallons per minute. Which of the following tables best represents the situation?

F.

X	1	2	4	5
Y	60	48	24	12

H.

X	1	3	4	5
Y	48	24	12	0

G.

X	0	2	4	5
Y	60	48	24	12

J.

X	1	2	3	4
Y	12	24	36	48

3. Which of the following represents the constant of proportionality in the table below?

MONTHS	2	4	6	8	10
TOTAL REVENUE	$190	$380	$570	$760	$950

A. k = 85

B. k = 95

C. k = 190

D. k = 125

4. The table below shows the relationship between the number of miles traveled, *x*, and the number of gallons of gas used, *y*. Which of the following equations best represents the relationship?

X	35	70	105	140	175
Y	1	2	3	4	5

F. $35 = 1x$

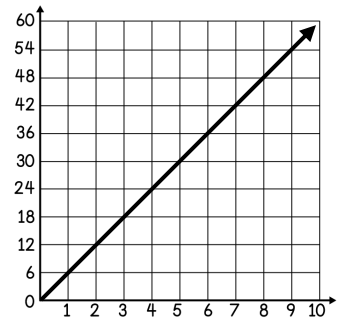
G. $y = \frac{1}{35}x$

H. $y = 35x$

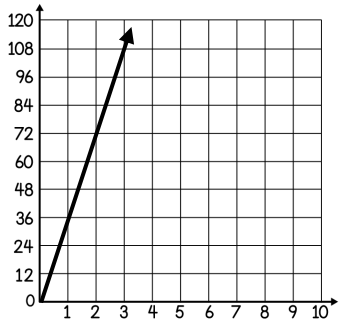
J. $y = 3.5x$

5. Which of the following graphs does **not** represent a proportional relationships?

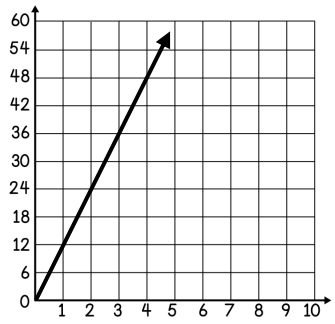
A.



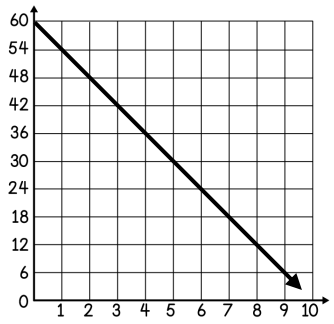
B.



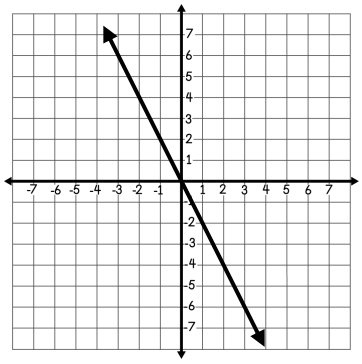
C.



D.



6. Which of the following equations best represents the relationship between x and y?



F. $y = -2x$

G. $y = 2x$

H. $y = \frac{1}{2}x$

J. $y = -\frac{1}{2}x$

7. Marcy has earned 18 rewards points at the movie theater and will earn 3 points for each additional movie. Which equation represents the relationship between y, the total points, and x the number of movies?

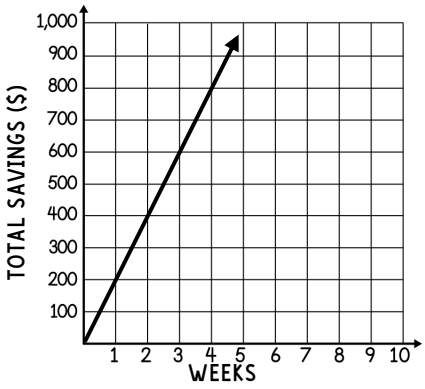
A. $y = 18 + 3x$

B. $y = 3x - 18$

C. $y = 18 - 3x$

D. $y = 18x + 3$

8. The graph shows the amount of money that Janice saves each week from her summer job. Which best represents the unit rate?



F. (0, 0)

G. (1, 200)

H. (200, 1)

J. (2, 200)

9. The table represents some points on a linear function. Which situation can be modeled by this function?

X	3	5	7	11
Y	228	380	532	836

A. The cost of buying *x* number of concert tickets for $76 each.

B. The number of pages *y* that can be read in 76 minutes.

C. The number of gallons of fuel *x* that can be used to travel 228 miles.

D. The amount of money spent from a savings account with *y* dollars.

10. Which of the following situations represents a proportional relationship?

F. A pizza is $7.95 plus $1.00 for each additional topping.

G. A pool fills at a rate of 90 gallons per hour.

H. A health club charges a $40.00 membership fee plus $25.00 per month.

J. A bank account begins with $350.00 and gains $30.00 per month.

LINEAR RELATIONSHIPS
CHEAT SHEET - A

Name _____

Date _____Pd_____

SLOPE-INTERCEPT FORM

$$y = mx + b$$

SLOPE — Y-INTERCEPT

- A line with a slope of 8 and a y-intercept of -10 would have an equation of $y = 8x - 10$.
- An equation of $y = -3x + 5$ means the slope of the line is -3 and the y-intercept is 5.

MULTIPLE REPRESENTATIONS

Linear relationships can be represented verbally, with an equation, with a graph and with a table. View the example below.

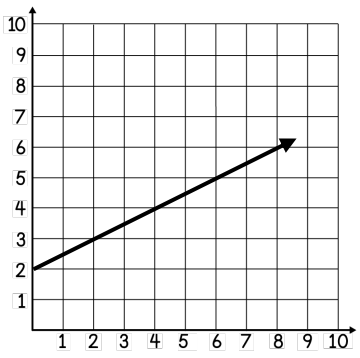
VERBAL: A puppy weighs 2 pounds at birth and gains half a pound each week.

EQUATION: $y = 0.5x + 2$

TABLE:

WEEKS (X)	WEIGHT (Y)
0	2
1	2.5
2	3
3	3.5

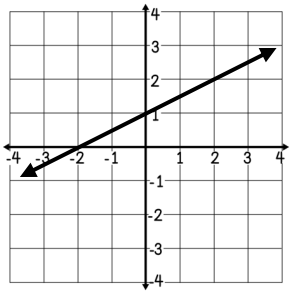
GRAPH:



WRITING EQUATIONS

1. Find the **SLOPE** by using $\frac{y_2 - y_1}{x_2 - x_1}$
2. Find the **Y-INTERCEPT** by finding the value of y when x = 0, or where a graphed line crosses the y-axis.
3. Write an equation in **SLOPE-INTERCEPT FORM**. ($y = mx + b$)

EXAMPLE 1:



SLOPE: $\frac{1}{2}$

Y-INTERCEPT: 1

EQUATION: $y = \frac{1}{2}x + 1$

EXAMPLE 2:

X	Y
0	-9
2	-1
4	7

SLOPE: 4

Y-INTERCEPT: -9

EQUATION: $y = 4x - 9$

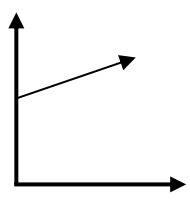
IS IT LINEAR?

- If an equation is linear, it will be written in the form of **Y = MX + B**.

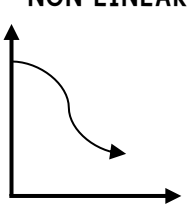
  LINEAR: $y = 0.75x - 11$

  NON-LINEAR: $y = 3x^2 + 2$
- If a graph is linear, it will look like a **STRAIGHT LINE**.

LINEAR



NON-LINEAR



LINEAR RELATIONSHIPS
WARM-UP

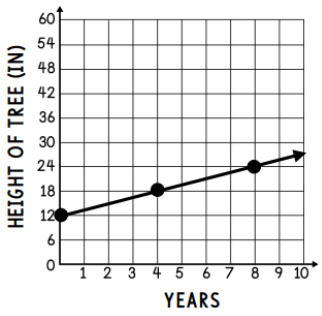
Name _____

Date _____Pd_____

1. Write an equation in slope-intercept form to represent the total cost of a cab ride (y) for a certain number of miles (x).

MILES	TOTAL COST
2	$9.50
4	$15.50
6	$21.50
8	$27.50

2. Keith bought a tree for his backyard. The graph shows the height of the tree after a certain number of years.



a. At what rate is the tree growing?

b. Write an equation for the graph.

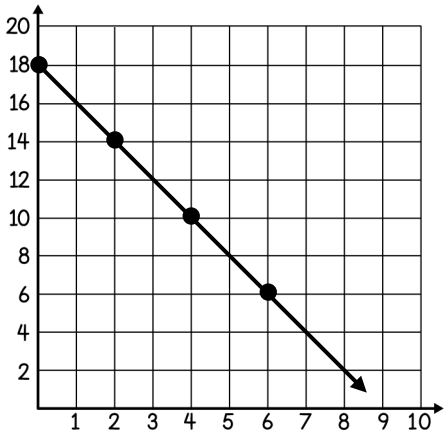
c. Is the relationship shown in the graph linear?

LINEAR RELATIONSHIPS
QUICK CHECK

Name _____

Date _____Pd_____

1. Which of the statements about the graph below is true?



A. The graph is non-linear and has an equation of y = -x + 18.

B. The graph is linear and has an equation of y = -x + 18.

C. The graph is linear and has an equation of y = -2x + 18.

D. None of the above statements are true.

2. The table below shows the amount that a catering company charges based on the number of people at an event. Which of the following equations shows the relationship between c, the amount the company charges based on p, the number of people at the event?

F. c = 16p

G. c = 75p + 13

H. p = 13c + 75

J. c = 13p + 75

PEOPLE (P)	TOTAL CHARGE (C)
25	$400
50	$725
75	$1,050
100	$1,375

3. Which of the following gives an example of an equation that is non-linear?

A. $y = x^2 - 1$ B. $y = 2x - 1$ C. $y = \frac{x}{4}$ D. $y = -2x$

4. Kit charges customers an initial fee plus a certain amount per hour to walk their pets. The table below shows the amount of money that Kit earns at her job based on the number of hours that she works. Which of the following equations represents a scenario where Kit would charge customers a higher hourly rate to walk their pets than what is shown in the table?

F. y = 7.25x + 20

G. y = 8x + 10

H. y = 7.5x

J. y = -10x + 15

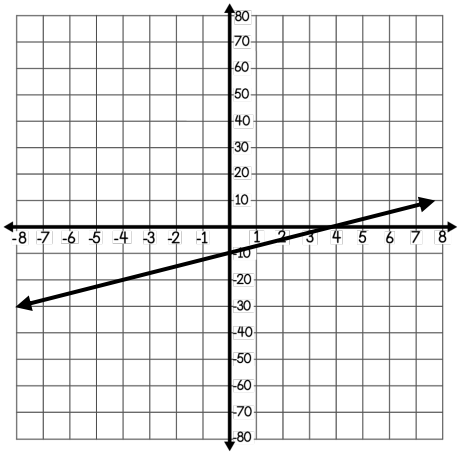
HOURS	EARNINGS ($)
0	15
1	22.5
2	30
3	37.5

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓕ Ⓖ Ⓗ Ⓙ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓕ Ⓖ Ⓗ Ⓙ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓕ Ⓖ Ⓗ Ⓙ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓕ Ⓖ Ⓗ Ⓙ
9. Ⓐ Ⓑ Ⓒ Ⓓ

10. Use the grid below.

					.		
⊕	⓪	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①	①		①	①
	②	②	②	②		②	②
	③	③	③	③		③	③
	④	④	④	④		④	④
	⑤	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨

5. Find the slope and the y-intercept of the linear function shown below.



A. Slope: $\frac{5}{2}$
y-intercept: -10

B. Slope: $\frac{1}{4}$
y-intercept: -10

C. Slope: $\frac{1}{4}$
y-intercept: 4

D. Slope: $-\frac{5}{2}$
y-intercept: -10

6. Allen buys the same number of baseball cards each month to add to a card collection he was given. Use the table to determine how many baseball cards he was given and how many he buys each month.

MONTHS	2	5	7	10
CARDS	44	80	104	140

F. Allen was given 44 cards and he buys 36 cards each month.
G. Allen was given 14 cards, and he buys 15 cards each month.
H. Allen was given 20 cards, and he buys 12 cards each month.
J. Allen was given 24 cards, and he buys 10 cards each month.

7. Write an equation in slope-intercept form of the line that passes through the points (4, 13) and (8, 18).

A. $y = 2.5x + 3$
B. $y = 1.5x + 7$
C. $y = 2x + 5$
D. $y = 1.25x + 8$

8. Which table shows a relationship between x and y, where y is always equal to 8 less than the product of x and 3?

F.

x	y
-5	-43
-1	-11
3	21
7	53

G.

x	y
-5	-23
-1	-11
3	1
7	13

H.

x	y
-5	-16
-1	-12
3	-8
7	-4

J.

x	y
-5	23
-1	11
3	-1
7	-13

9. Zane owes his dad money for his cell phone that he lost. So far, Zane has paid his dad $23, and he will pay his dad an additional $45 each month until he has repaid him for the phone. Which equation shows the relationship between m, the number of months that Zane has been making payments and t, the total amount he has paid his dad?

A. $t = 45m + 23$
B. $m = 45t + 23$
C. $t = 23m + 45$
D. $t = 68m$

10. Preston needs to write an equation in slope-intercept form to represent the relationship between x and y in the table below. What will be the value of the y-intercept in his equation? Record your answer on the grid.

x	2	4	6	8
y	-9	-6	-3	0

EQUATIONS AND INEQUALITIES
CHEAT SHEET - A

Name _____

Date _____ Pd_____

SOLVING EQUATIONS

Use **INVERSE OPERATIONS** to **UNDO** the equation.

- undo addition or subtraction
- undo multiplication or division
- isolate the variable
- check your work

$6x + 7 = 31$

$6x = 24$

$x = 4$

$6(4) + 7 = 31$

GRAPHING INEQUALITIES

GRAPH the inequality statement on a number line to represent **THE POSSIBLE SOLUTIONS**.

● **VALUE IS INCLUDED**

○ **VALUE IS NOT INCLUDED**

INEQUALITIES

SAME STEPS as **SOLVING EQUATIONS!**

- When dividing by a negative number, flip the inequality symbol.
- To check your work, choose a value that is within the constraints of the inequality and plug in the number.
- If it is correct, then you should get a true statement.

$-\frac{1}{2}x - 5 > -25$

$-\frac{1}{2}x > -20$

$x < 40$

CHECK✓

$-\frac{1}{2}(10) - 5 > -25$

$-5 - 5 > -25$

$-10 > -20$

INEQUALITY VOCABULARY

- Remember that each term can represent a different inequality symbol when writing inequalities.

<	≤	≥	>	=
• less than • is fewer than • is smaller than • below	• less than or equal to • maximum • at most • is not more than • is not greater than	• greater than or equal to • minimum • at least • is not less than • is not smaller than	• greater than • is more than • is larger than • above	• equal • is • same

PROPERTIES OF OPERATIONS

ORIGINAL EXPRESSION	PROPERTY	EQUIVALENT EXPRESSION
$8 \cdot 1$	IDENTITY	8
$6 \cdot 3 \cdot 2$	COMMUTATIVE	$3 \cdot 2 \cdot 6$
$6 + (3 + 2)$	ASSOCIATIVE	$(6 + 3) + 2$
$8(x + 7)$	DISTRIBUTIVE	$8x + 56$

PROPERTIES OF OPERATIONS RESULT IN EQUIVALENT EXPRESSIONS

The **RECIPROCAL** of a number results in a **PRODUCT OF 1.**

FLIP

$\frac{5}{6} \cdot \frac{6}{5} = 1$

EQUATIONS AND INEQUALITIES
WARM-UP

Name _____

Date _____Pd_____

1. Coach Emanuel is trying to lose weight. He starts 2017 weighing 296 pounds. If he plans to burn enough calories to lose 3 pounds per week, then how many weeks will pass before Coach Emanuel is at most 251 pounds?	2. What is the value of x in this equation? $-5x - 12 = 72$

EQUATIONS AND INEQUALITIES
QUICK CHECK

Name _____

Date _____ Pd_____

1. Ms. Hernandez is taking her children and their friends to the movies. She will pay $10 for her adult ticket and $7 for each child ticket. Ms. Hernandez does not want to spend more than $40. Which inequality can be used to find c, the number of child tickets Ms. Hernandez can purchase?

A. $7 + 10c > 40$ **B.** $10c - 7 \leq 40$ **C.** $10 + 7c > 40$ **D.** $10 + 7c \leq 40$

2. If x = -3, then which inequality is true?

F. $-5x + 2 \leq 12$ **G.** $3x - 7 \geq -16$ **H.** $14 + 2x < 5$ **J.** $\frac{1}{2}x + 6 > 11$

3. Which two expressions are equivalent?

A. $4(2 + x)$ and $4 \cdot 2 + 2 \cdot x$ **B.** $4 + 2 + x$ and $(4 + 2) + x$ **C.** $4 \cdot x + 2$ and $4 \cdot (x + 2)$ **D.** $4 \div (2 - x)$ and $4 - 2 \div x$

4. Which expression is equivalent to $9y - \frac{1}{2}(4y + 20)$?

F. $11y - 10$

G. $7y - 10$

H. $7y + 10$

J. $11y + 10$

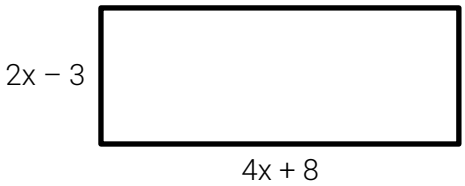
5. If the perimeter of the rectangle is 118 units, then what is the value of x?

A. x = 9

B. x = 13

C. x = 18

D. x = 21



1.	Ⓐ Ⓑ Ⓒ Ⓓ
2.	Ⓕ Ⓖ Ⓗ Ⓙ
3.	Ⓐ Ⓑ Ⓒ Ⓓ
4.	Ⓕ Ⓖ Ⓗ Ⓙ
5.	Ⓐ Ⓑ Ⓒ Ⓓ
6.	Ⓕ Ⓖ Ⓗ Ⓙ
7.	Ⓐ Ⓑ Ⓒ Ⓓ
8.	Ⓕ Ⓖ Ⓗ Ⓙ
9.	Ⓐ Ⓑ Ⓒ Ⓓ

10. Use the grid below.

					.		
⊕	⓪	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①	①		①	①
	②	②	②	②		②	②
	③	③	③	③		③	③
	④	④	④	④		④	④
	⑤	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨

6. A courier service charges a $5 pickup fee, plus $0.15 per mile. The total charge to deliver a package was $7.85. How many miles did the courier service travel to deliver the package?

F. 52 miles **G.** 19 miles **H.** 85 miles **J.** 33 miles

7. Which situation best represents the equation below?

$$26 = 179 - 9k$$

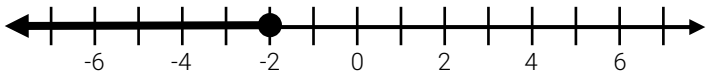
A. A pool has 26 gallons of water in it. It is filled at a rate of 9 gallons per minute, until there are 179 gallons.

B. A dairy farm has 179 cows in it. All of the cows are placed in groups of nine. There are 26 groups of cows.

C. There were 26 boxes for delivery at the post office one morning. By the end of the day, 179 boxes had been added to the delivery pile. The boxes will be delivered in groups of *k*.

D. A school assembly has 179 students in it. Nine teachers escort *k* number of students out of the assembly, until there are 26 students remaining.

8. The number line below represents the solution to which inequality?



F. $-2x + 7 \geq 8$

G. $7x + 11 \leq 4$

H. $6x - 9 \leq -21$

J. $-3x - 15 \leq -27$

9. A home improvement store advertises 60 square feet of flooring for $253.00, plus an additional $80.00 installation fee. What is the cost per square foot for the flooring?

A. $4.95

B. $5.25

C. $5.55

D. $6.06

10. What is the value of x in this equation?

$$-4x + 8 = 42$$

Use the bubbles in the answer section to mark your answer.

LINEAR EQUATIONS
CHEAT SHEET - A

Name _____

Date _____Pd_____

Parts of an Equation

$$-12x + 4 = 40$$

COEFFICIENT **VARIABLE** **CONSTANT**

COEFFICIENT: the number in front of a variable (multiplying the variable)

CONSTANT: a fixed value, or a number on its own

VARIABLE: a letter used to represent an unknown value

Multi-Step Equations

STEPS TO SOLVE:

❶ Distribute (if necessary)

❷ Combine **LIKE TERMS** (if necessary)

❸ Collect **VARIABLES** on the same of the equal sign

❹ Collect **CONSTANTS** on the same side of the equal sign

❺ Isolate the **VARIABLE** with inverse operations

Check your answer by **PLUGGING IT IN!**

Special Cases

NO SOLUTION: An equation where **NO** value for x will make the equation true.
- Work ends in a false statement, such as "7 = 5".
- Graph shows two **PARALLEL** lines.

ALL REAL NUMBERS: An equation where **ANY** value for x will make the equation true.
- Work ends in a **TRUE** statement, such as "7 = 7".
- Graph shows the **SAME** line.

Solving Systems by Substitution

❶ Solve one of the equations for "y = ", if necessary.

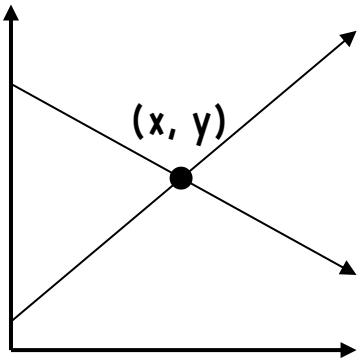
❷ Substitute the value for "y" in the second equation.

❸ Solve the new equation to find "x".

❹ Substitute the value for "x" in either of the original equations to find "y".

Solving Systems by Graphing

To solve a system of equations by graphing, graph both linear equations and find the point of **INTERSECTION**.



LINEAR EQUATIONS
WARM-UP

Name _____

Date _____Pd_____

1. Kia's plant is $8\frac{1}{5}$ inches tall and is growing $\frac{2}{3}$ inch each week. Lyric's plant is $10\frac{7}{10}$ inches tall and is growing $\frac{1}{6}$ inch each week. Write and solve an equation to find how many weeks it will take for the height of the two plants to be the same.

Equation: _____

Solution: _____

2. Trey and Sammy are both solving different equations.

a. Trey is solving his equation, and the last line of his work is "-2 = 2". What does this mean?

b. Sammy is solving his equation, and the last line of his work is "-4 = -4". What does this mean?

LINEAR EQUATIONS
QUICK CHECK

Name _____

Date _____Pd_____

1. Gym A charges a registration fee of $75, plus $35.75 per month for members. Gym B charges a registration fee of $164, plus $17.95 for members. After how many months would the total cost at Gym A and Gym B to be the same for members?

A. 10 months

B. 5 months

C. 7 months

D. The total cost will never be the same.

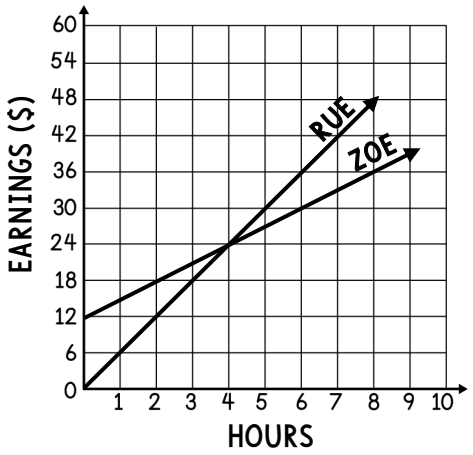
2. The graph below shows the number of hours that Rue and Zoe have been working at their jobs, as well as how much money they've earned. Which is a correct conclusion about the information shown in the graph?

F. After 24 hours, Rue and Zoe will have earned the same amount of money.

G. After 4 hours, Zoe will have earned $12 more than Rue.

H. After 4 hours, Rue will have earned $12 more than Zoe.

J. After 4 hours, Rue and Zoe will have earned the same amount of money.



3. Find the value of x needed to make the equation below true.

$$\frac{3}{4}(20x - 8) - 3 = 54$$

A. x = 3.8

B. x = 4.2

C. x = 4

D. x = 3.3

4. The area of the rectangle shown below is 36 square units. Set up and solve an equation to find the value of x.

F. x = 4.4

G. x = 3.45

H. x = 3

J. x = 5

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓕ Ⓖ Ⓗ Ⓙ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓕ Ⓖ Ⓗ Ⓙ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓕ Ⓖ Ⓗ Ⓙ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓕ Ⓖ Ⓗ Ⓙ
9. Ⓐ Ⓑ Ⓒ Ⓓ

10. Use the grid below.

					.		
⊕	⓪	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①	①		①	①
	②	②	②	②		②	②
	③	③	③	③		③	③
	④	④	④	④		④	④
	⑤	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨

5. Puppy A weighs $4\frac{1}{6}$ pounds at birth and gains $\frac{3}{4}$ pound each week. Puppy B weighs $5\frac{2}{3}$ pounds at birth and gains $\frac{1}{2}$ pound each week. After how many weeks will the puppies weigh the same amount?

A. 6 weeks
B. 12 weeks
C. 2 weeks
D. 7 weeks

6. Which of the following equations would have no solution?

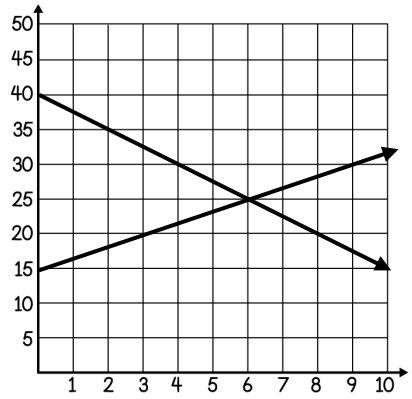
F. $13 - 7x = -7x + 13$

G. $\frac{1}{3}(6x + 9) = 12$

H. $\frac{1}{4}(8x + 4) = 2x - 4$

J. $-10x + 5 = 3 - 10x + 2$

7. Which of the following can be determined from the graph below?



A. The ordered pair (6, 25) is a solution to both $y = -\frac{5}{2}x + 40$ and $y = \frac{5}{3}x + 15$.

B. The ordered pair (25, 6) is a solution to both $y = -\frac{5}{2}x + 40$ and $y = \frac{5}{3}x + 15$.

C. The ordered pair (6, 25) is a solution to both $y = \frac{5}{2}x + 40$ and $y = -\frac{5}{3}x + 15$.

D. The ordered pair (6, 25) is a solution to both $y = -\frac{1}{2}x + 40$ and $y = \frac{1}{3}x + 15$.

8. Solve the system of equations shown by substitution.

$$y = x - 5$$
$$5x + 2y = 4$$

F. (10, 5)
G. (-1, -6)
H. (0, -5)
J. (2, -3)

9. Kameron has a combination of quarters and nickels in his wallet. The number of nickels is three times the number of quarters he has. If the total value of the coins is $2.00, how many quarters does Kameron have in his wallet?

A. 15
B. 5
C. 7
D. 10

10. At Sunrise Donuts you can buy 6 donuts and 2 kolaches for $8.84. One kolache and 4 donuts would cost $5.36. What is the price of one donut at Sunrise Donuts? Record your answer in the grid.

ANGLE RELATIONSHIPS
CHEAT SHEET - A

Name _____

Date _____Pd_____

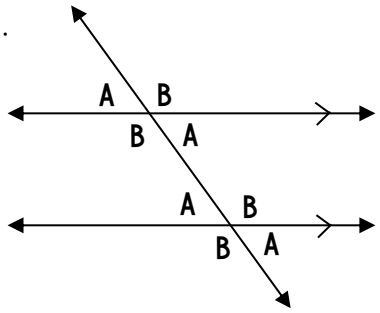
Parallel Lines and Transversals

When parallel lines are cut by a transversal, 8 different angles are formed.

An angle labeled "**A**" is **CONGRUENT** to any other angle labeled "**A**".

An angle labeled "**B**" is **CONGRUENT** to any other angle labeled "**B**".

An angle labeled "**A**" is **SUPPLEMENTARY** to any angle labeled "**B**".

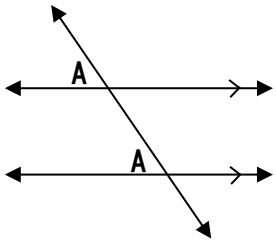


Types of Angle Pairs

CORRESPONDING ANGLES

-In the same relative position

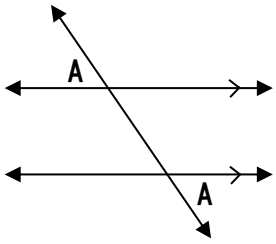
-**CONGRUENT** angles



ALTERNATE EXTERIOR ANGLES

-Opposite sides of transversal and outside parallel lines

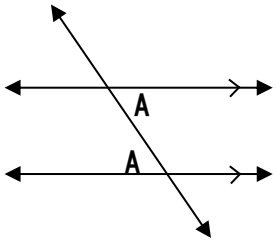
-**CONGRUENT** angles



ALTERNATE INTERIOR ANGLES

-Opposite sides of transversal and inside parallel lines

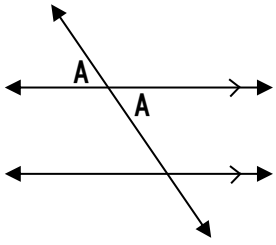
-**CONGRUENT** angles



VERTICAL ANGLES

-Opposite angles formed by intersecting lines

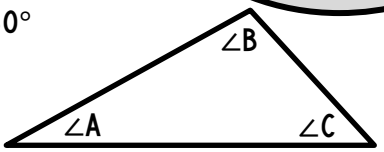
-**CONGRUENT** angles



Angles in Triangles

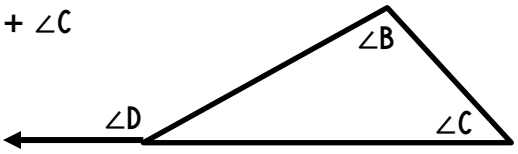
INTERIOR ANGLES:
The sum of the three interior angles in any triangle will add up to 180°.

$\angle A + \angle B + \angle C = 180°$



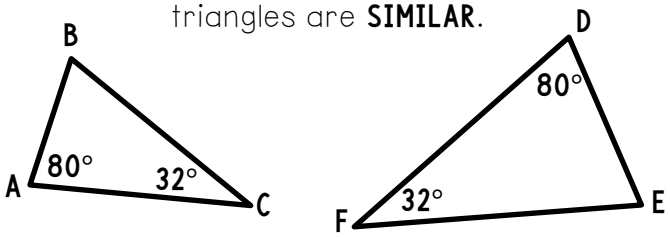
EXTERIOR ANGLES:
Any exterior angle of a triangle is equal to the sum of its two remote interior angles.

$\angle D = \angle B + \angle C$



Angle-Angle Criterion

If two triangles have **TWO** pairs of corresponding angles that are **CONGRUENT**, the triangles are **SIMILAR**.



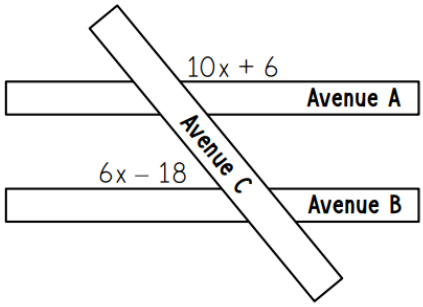
TRIANGLE ABC ~ TRIANGLE DEF

ANGLE RELATIONSHIPS
WARM-UP

Name _____

Date _____Pd_____

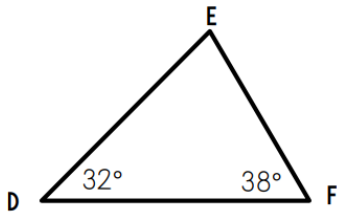
1. Avenue A runs parallel to Avenue B, and Avenue C runs diagonally across the two streets. Use the marked angles to write and solve an equation to find the value of x.



Equation: _____

Solution: _____

2. Gloria is comparing two triangles. In triangle ABC, she knows that angle A measures 32° and angle B measures 60°. Triangle DEF, the second triangle, is shown below.



Are triangles ABC and DEF similar triangles? Explain your reasoning.

ANGLE RELATIONSHIPS
QUICK CHECK

Name _____

Date _____Pd_____

1. Two angles in a triangle measure (2.3x + 25)° and (5.8x +11)°. What is the value of x if the two angles are congruent to one another?

A. x = 34.2 **B.** x = 10.3 **C.** x = 6.6 **D.** x = 4

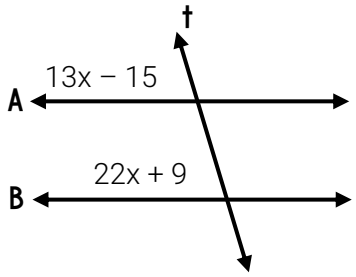
2. Lines A and B are parallel lines cut by transversal, t. Which of the following equations could be used to find the value of x?

F. 35x – 6 = 180

G. 9x + 24 = 180

H. 13x – 15 = 22x + 9

J. 13x + 9 = 22x – 15



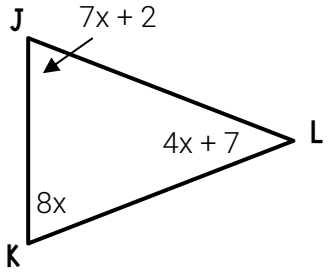
3. Triangle JKL is shown below. Which of the following is not a true statement about the angles in the triangle?

A. The sum of ∠J + ∠K + ∠L = 180°.

B. The measure of ∠J is 65°.

C. The measure of ∠K is 89°.

D. The measure of ∠L is 43°.



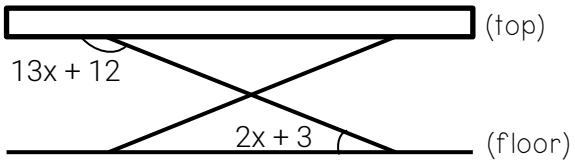
4. The top of Lucy's dining table is parallel to the floor as shown. Using the two marked angles, write and solve an equation to find the value of x.

F. $x = -\frac{9}{11}$

G. x = 11

H. x = 25

J. x = 9



5. Jose constructed Triangle DCE, where m∠D = 103° and m∠C = 22°. Remy constructed triangle PQT, where m∠Q = 22°, and m∠T = 55°. Are the two triangles similar to one another?

A. Yes, because two pairs of corresponding angles in the triangles are congruent.

B. No, because none of the corresponding pairs of angles in the triangles are congruent.

C. No, because 103 + 22 ≠ 22 + 55.

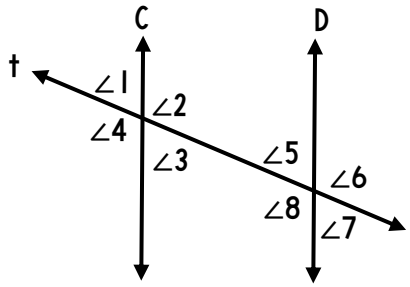
D. There is not enough information to determine if the two triangles are similar to one another.

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓕ Ⓖ Ⓗ Ⓙ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓕ Ⓖ Ⓗ Ⓙ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓕ Ⓖ Ⓗ Ⓙ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓕ Ⓖ Ⓗ Ⓙ
9. Ⓐ Ⓑ Ⓒ Ⓓ

10. Use the grid below.

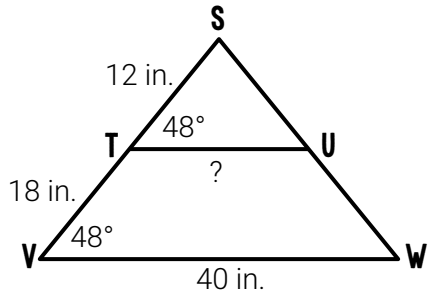
					.		
⊕	⓪	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①	①		①	①
	②	②	②	②		②	②
	③	③	③	③		③	③
	④	④	④	④		④	④
	⑤	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨

6. Lines C and D are cut by transversal, t. Which of the following is true about the angles formed?



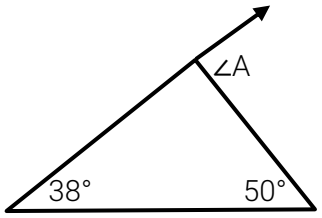
F. m∠1 = m∠6
G. m∠8 = m∠2
H. m∠4 = m∠7
J. m∠3 = m∠2

7. Use the triangles below to find the missing length of segment TU.



A. 26.7 inches
B. 34 inches
C. 16 inches
D. 22 inches

8. What is the measure of ∠A, the exterior angle of the triangle shown below?



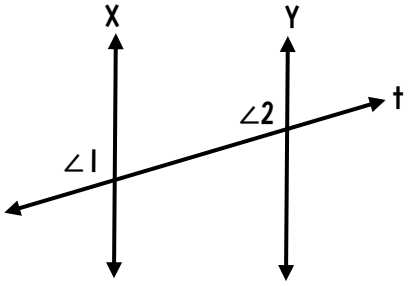
F. m∠A = 92°, because 180 – (50 + 38) = 92.

G. m∠A = 272°, because 180 – (50 + 38) = 92 and 92 + 180 = 272.

H. m∠A = 78°, because 50 – 38 = 12 and 90 – 12 = 78.

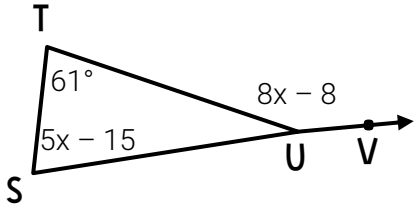
J. m∠A = 88°, because 50 + 38 = 88.

9. Lines X and Y are parallel lines crossed by transversal, t. If ∠1 = (4x – 28)° and ∠2 = (x + 68)°, then find the measure of ∠1 and ∠2.



A. m∠1 = 100° and m∠2 = 100°
B. m∠1 = 100° and m∠2 = 80°
C. m∠1 = 32° and m∠2 = 148°
D. m∠1 = 84° and m∠2 = 84°

10. Find the measure of exterior angle TUV below. Record your answer on the grid.



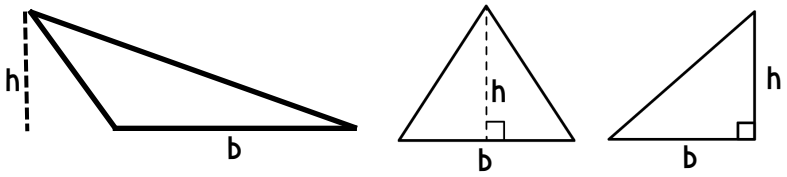
2D GEOMETRY
CHEAT SHEET - A

Name _____

Date _____ Pd_____

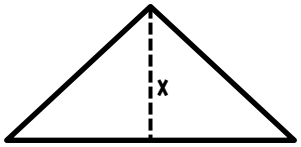
triangles

AREA OF A TRIANGLE = $\frac{b \cdot h}{2}$



EXAMPLE

A triangle has an area of 108 in^2. The base measures 18 inches. What is the height of the triangle?

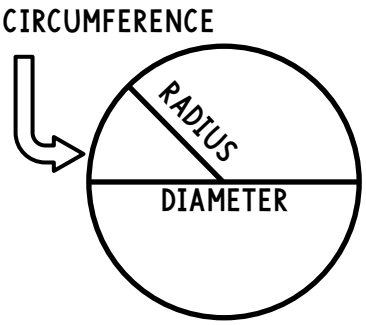


$108 = \frac{18x}{2}$

$216 = 18x$

$12 = x$

circles



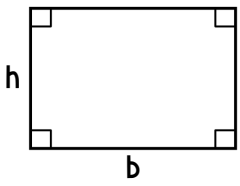
$C = \pi d$ $A = \pi r^2$

The **AREA** of a **SEMICIRCLE** can be found by **DIVIDING THE AREA** of the whole circle by **TWO**.

$\pi \approx 3.14$ $\pi \approx \frac{22}{7}$

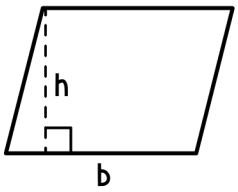
quadrilateral

RECTANGLE



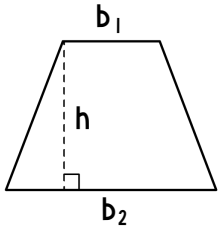
$A = b \cdot h$

PARALLELOGRAM



$A = b \cdot h$

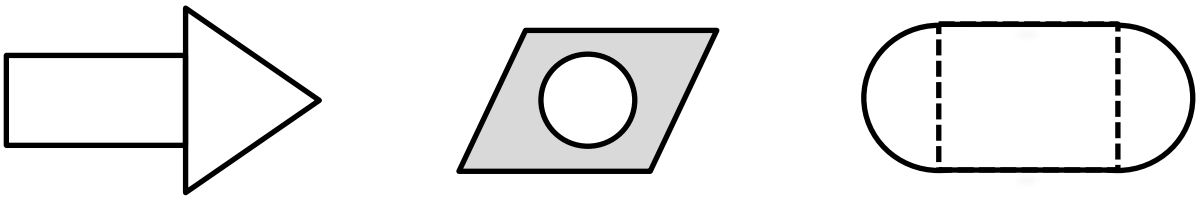
TRAPEZOID



$A = \frac{1}{2}(b_1 + b_2)h$

composite figures

COMPOSITE FIGURE: a figure that can be **DECOMPOSED** into basic shapes.



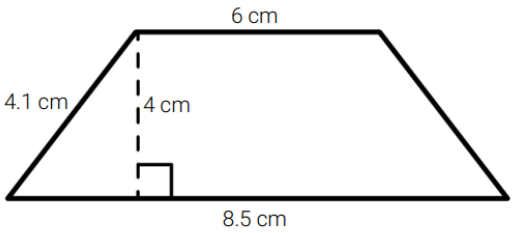
Find the **AREA** of the various shapes and then **ADD** or **SUBTRACT**.

2D GEOMETRY
WARM-UP

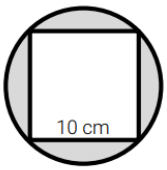
Name _____

Date _____Pd_____

1. What is the area of the trapezoid below?



2. A square is inscribed within a circle with a radius of 6 cm. What is the area of the shaded portion of the figure below?



2D GEOMETRY
QUICK CHECK

Name _____

Date _____Pd_____

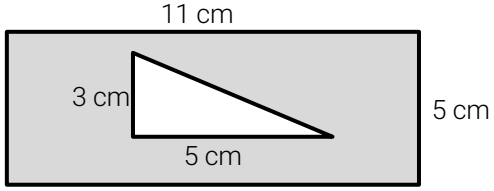
1. In PE, a parachute is laid out on the gym floor. The parachute has a radius of 16 feet. Which measurement is closest to the circumference of the parachute in feet?

A. 100.48 ft **B.** 198.4 ft **C.** 49.6 ft **D.** 803.84 ft^2

2. A coffee shop sign is in the shape of a circle. The sign measures 18 inches across in diameter. Which measurement is closest to the area of the sign in square inches?

F. 56.52 in^2 **G.** 101.36 in^2 **H.** 188.78 in^2 **J.** 254.34 in^2

3. A triangle is inscribed in a rectangle, as shown below. What is the area of the shaded region?



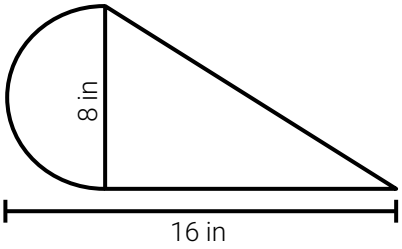
A. 40 cm^2

B. 62.5 cm^2

C. 47.5 cm^2

D. 22.75 cm^2

4. Using various puzzle pieces, Marco forms the figure below. What is the best estimate of the area of the figure?

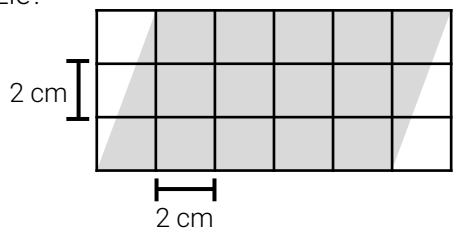


F. 146 in^2 **G.** 73 in^2 **H.** 57 in^2 **J.** 123 in^2

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓕ Ⓖ Ⓗ Ⓙ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓕ Ⓖ Ⓗ Ⓙ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓕ Ⓖ Ⓗ Ⓙ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓕ Ⓖ Ⓗ Ⓙ
9. Ⓐ Ⓑ Ⓒ Ⓓ
10. Use the grid below.

					.		
⊕	⓪	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①	①		①	①
	②	②	②	②		②	②
	③	③	③	③		③	③
	④	④	④	④		④	④
	⑤	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨

5. A puzzle is shown below. Which of the following is the closest to the area of the shaded portions of the puzzle?



A. 18 cm^2

B. 72 cm^2

C. 24 cm^2

D. 60 cm^2

6. The area of a parallelogram measures 171 cm^2. The base of the parallelogram is 18 cm in length. Which of the following best represents the height of the parallelogram?

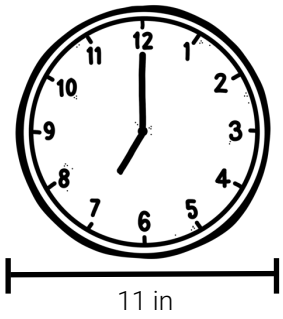
F. 11 cm

G. 9.5 cm

H. 13.5 cm

J. 8 cm

7. A round clock is shown below. Which of the following is closest to the number of inches around the clock?



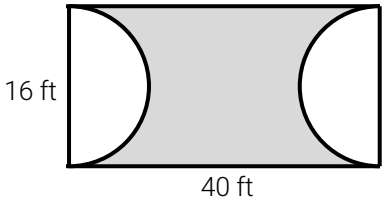
A. 20.8 in

B. 43.36 in

C. 16.2 in

D. 34.56 in

8. Janice is painting a portion of a gymnasium court. If Janice paints the shaded area, then how many square feet will she paint?



F. 527.58 ft^2

G. 861.7 ft^2

H. 439.04 ft^2

J. 378.6 ft^2

9. A circular rug has a radius of 4 feet. Which of the following is closest to the number of square inches the rug covers?

A. 55.26 ft^2

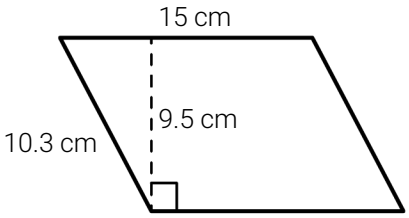
B. 50.24 ft^2

C. 29.7 ft^2

D. 33.6 ft^2

10. What is the area of the figure below?

Record you answer and fill in the bubbles on your answer document. Be sure to use the correct place value.



VOLUME AND SURFACE AREA
CHEAT SHEET - A

Name _____

Date _____Pd_____

VOLUME

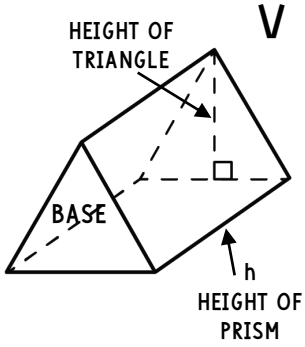
THE AMOUNT OF SPACE A 3D OBJECT OCCUPIES

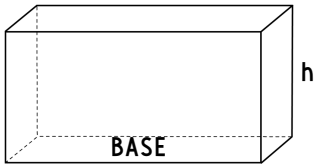
(UNITS³)

PRISMS

- A prism has two parallel bases that do not touch.
- Named according to the shape of the base
- B = the area of the base

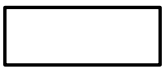
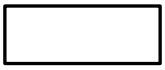
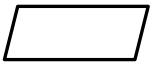
$$V = Bh$$





CROSS SECTIONS

The shape formed by
SLICING A THREE-DIMENSIONAL
an object in various directions

SLICE	RECTANGULAR PRISM
parallel to the base	
perpendicular to the base	
at an angle	

SURFACE AREA

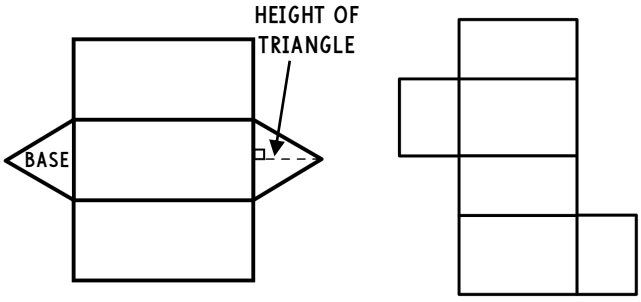
THE TOTAL COVERING ON THE FACES OF A 3D OBJECT

EX: WRAPPING A PRESENT, A CARDBOARD NET, PAINTING THE SIDES OF A 3D FIGURE

(UNITS²)

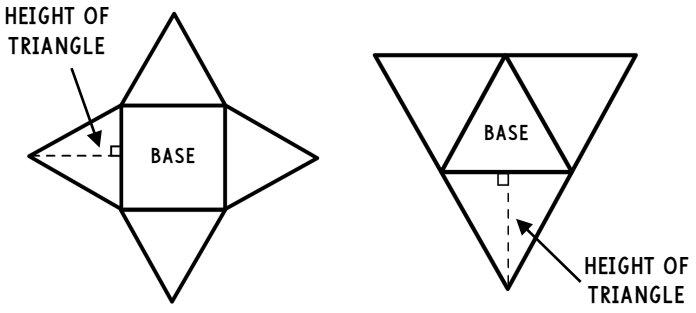
TOTAL SURFACE AREA

- The sum of the area of all of the faces and bases in a 3D figure



LATERAL SURFACE AREA

- The sum of the area of all of the faces, not including bases, in a 3D figure



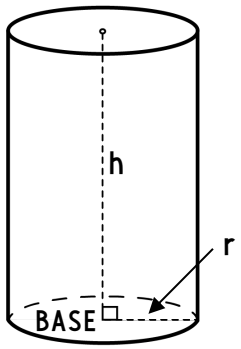
VOLUME
CHEAT SHEET - A

Name _____

Date _____Pd_____

VOLUME OF CYLINDERS

FORMULA: V = Bh

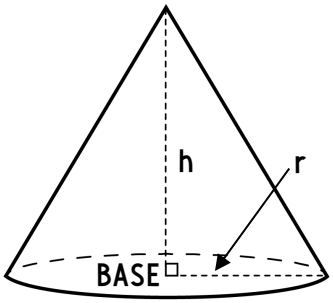


Multiply the **AREA OF THE BASE** by the **HEIGHT** of the cylinder.

*If given the diameter of the base, divide by 2 to find the radius.

B = Area of the base (πr^2)

VOLUME OF CONES



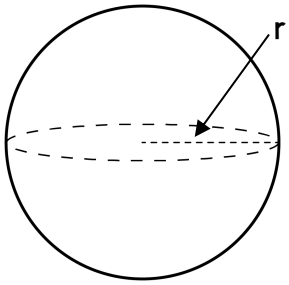
B = Area of the base (πr^2)

FORMULA: V = $\frac{1}{3}$Bh

Multiply the **AREA OF THE BASE** by the **HEIGHT** of the cone. Then multiply by $\frac{1}{3}$ or divide by 3.

*If given the diameter of the base, divide by 2 to find the radius.

VOLUME OF SPHERES



FORMULA: V = $\frac{4}{3}\pi r^3$

Multiply $\frac{4}{3}$ times **PI** by times the **RADIUS** to the **THIRD** power.

*If given the diameter of the sphere, divide by 2 to find the radius.

WORKING BACKWARDS

When given the volume of a 3D figure, use the formula to find missing pieces of information.

Ex. 1: A cylinder has a volume of 5,024 inches^3. If the height of the cylinder is 16 inches, find the radius of the cylinder.

$V = 3.14(r^2)(h)$
$5{,}024 = 3.14(r^2)(16)$
$314 = 3.14(r^2)$
$100 = r^2$
$10 = r$

Ex. 2: A cone has a volume of 4,710 inches^3. If the height of the cone is 20 inches, find the radius of the cone.

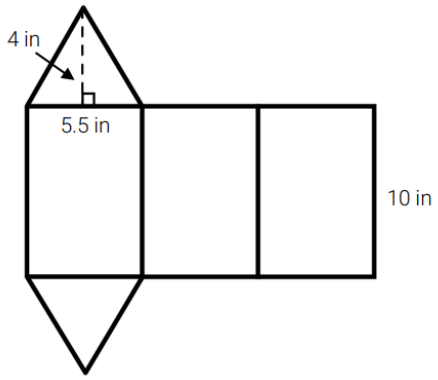
$V = (1/3)(3.14)(r^2)(h)$
$4{,}710 = (1/3)(3.14)(r^2)(20)$
$14{,}130 = (r^2)(20)$
$4{,}500 = (r^2)(20)$
$225 = r^2$
$15 = r$

VOLUME AND SURFACE AREA
WARM-UP

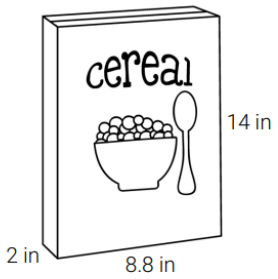
Name _____

Date _____Pd_____

1. What is the total surface area of the triangular prism below?



2. A box of cereal is halfway full. How much cereal is in the box below?



VOLUME
WARM-UP

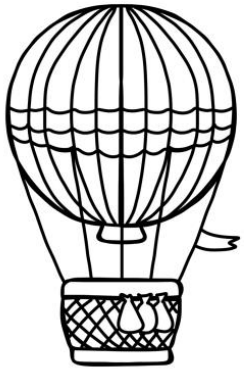
Name _____

Date _____Pd_____

1. Tony is drinking soda out of a cylindrical glass with a radius of 3 centimeters and a height of 8 centimeters. If the glass is 60% full of soda, how many cubic centimeters of soda are in the glass? Use 3.14 for pi, and round your answer to the nearest tenth.

_____

2. Shelby is in a hot air balloon where the balloon is shaped like a sphere with a diameter of 50 feet. Find the amount of space occupied by the balloon. Use 3.14 for pi and round your answer to the nearest tenth.



_____

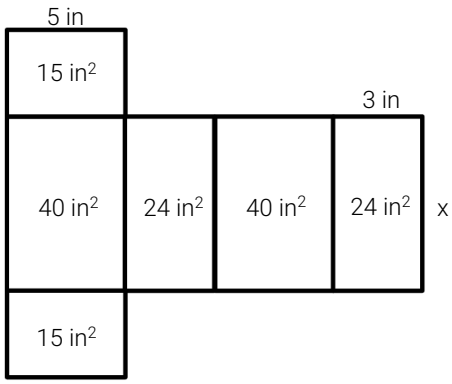
VOLUME AND SURFACE AREA
QUICK CHECK

Name _____

Date _____Pd_____

1.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2.	Ⓕ	Ⓖ	Ⓗ	Ⓙ
3.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4.	Ⓕ	Ⓖ	Ⓗ	Ⓙ
5.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6.	Ⓕ	Ⓖ	Ⓗ	Ⓙ
7.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8.	Ⓕ	Ⓖ	Ⓗ	Ⓙ

1. The rectangular prism below has a total surface area of 158 in^2. Use the net below to determine the missing dimension, x.

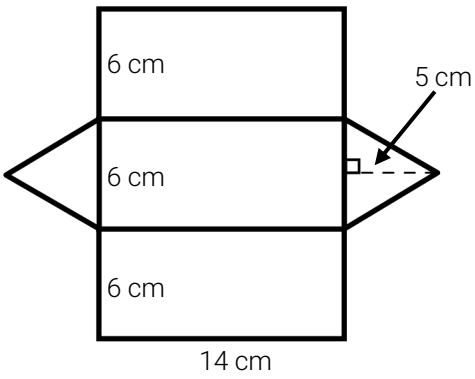


A. 6 in **B.** 8 in **C.** 12 in **D.** 10 in

2. A tissue box measures 6 inches wide and 6 inches long. If the volume of the tissue box is 252 inches, then what is the height of the tissue box?

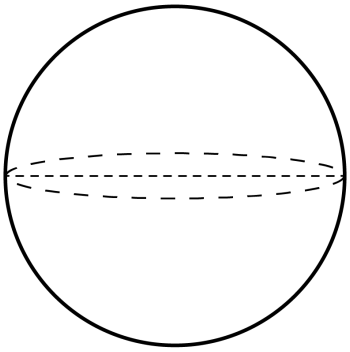
F. 11 in
G. 4 in
H. 7 in
J. 5 in

3. The net below depicts a triangular prism. What is the total surface area of the prism?



A. 282 cm^2
B. 210 cm^2
C. 312 cm^2
D. 624 cm^2

5. Oscar needs to fill a sphere-shaped balloon with helium. If the balloon has a diameter of 8 inches, what is the total amount of helium that the balloon will hold to the nearest tenth?



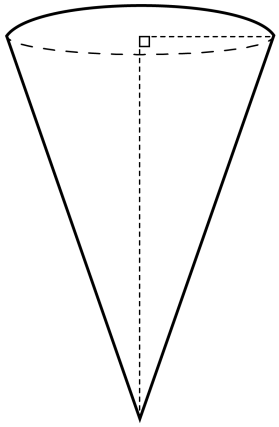
A. 2,143.6 in^3

B. 714.5 in^3

C. 267.9 in^3

D. 150.7 in^3

6. Joyce has a cone shaped planter hanging on her back porch. If the planter has a radius 6.8 inches and a height of 12.2 inches, what is the total amount of soil that the planter will hold to the nearest tenth?



F. 590.5 in^3

G. 1,771.4 in^3

H. 145.2 in^3

J. 196.8 in^3

7. Stan is serving lemonade at the school's dance from a cylindrical container with a diameter of 20 inches and a height of 36 inches. If the lemonade is poured into cone-shaped cups with a radius of 2 inches and a height of 5 inches, how many full cups can be filled from the cylindrical container?

A. 180 cups

B. 270 cups

C. 540 cups

D. 2,160 cups

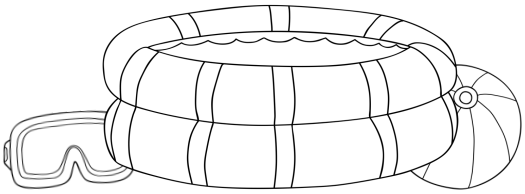
8. A cylinder-shaped kid's pool has a diameter of 12 feet and a height of 2 feet. If each cubic foot holds 7.48 gallons of water, about how many gallons of water can the kid's pool hold?

F. 2,255 gallons

G. 6,764 gallons

H. 564 gallons

J. 1,691 gallons



9. Erica has a sphere-shaped bouncy ball with a diameter of 2 inches. Michelle has a sphere-shaped bouncy ball with a diameter of 4 inches. To the nearest tenth, how much more space is occupied by Michelle's bouncy ball than Erica's?

A. 29.3 in^3

B. 33.5 in^3

C. 4.2 in^3

D. 12.4 in^3

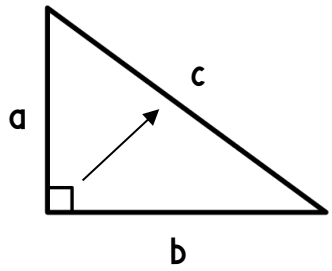
10. A sphere has a volume of 7,234.56 $units^3$. Using 3.14 for pi, find the radius of the sphere. Record your answer on the grid.

PYTHAGOREAN THEOREM
CHEAT SHEET - A

Name _____

Date _____Pd_____

parts of right triangles



LEGS: the two sides touching the right angle, known as "**a**" and "**b**".

HYPOTENUSE: the side opposite the right angle, known as "**c**".

The hypotenuse is always the longest of the three sides.

the pythagorean theorem

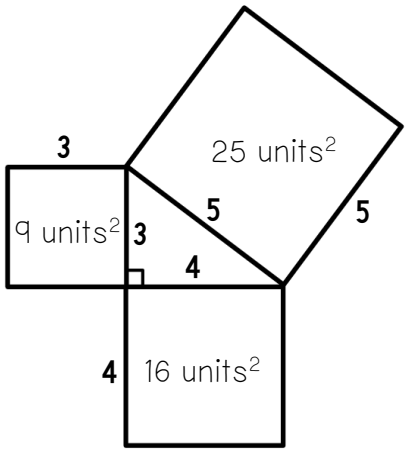
In any **RIGHT** triangle, the **SUM** of the **SQUARES** of the shorter sides (a and b) will equal the **SQUARE** of the longest side, c. In other words...

$$a^2 + b^2 = c^2$$

To visualize the theorem, picture "a^2", "b^2" and "c^2" as actual squares with side lengths equal to the side lengths of a, b and c:

The **AREAS** of the two smaller squares **($a^2 + b^2$)** will always equal the **AREA** of the largest square **(c^2)**.

$3^2 + 4^2 = 5^2$
$9 + 16 = 25$
$25 = 25$



pythagorean converse

The converse states that **IF $a^2 + b^2 = c^2$**, then the triangle is a **RIGHT** triangle.

EXAMPLE 1:
Can the lengths 16, 30 and 34 make a right triangle? Plug it into the theorem:

$16^2 + 30^2 = 34^2$

$256 + 900 = 1156$

$1156 = 1156$

Yes!

EXAMPLE 2:
Can the lengths 12, 12 and 24 make a right triangle? Plug it into the theorem:

$12^2 + 12^2 = 24^2$

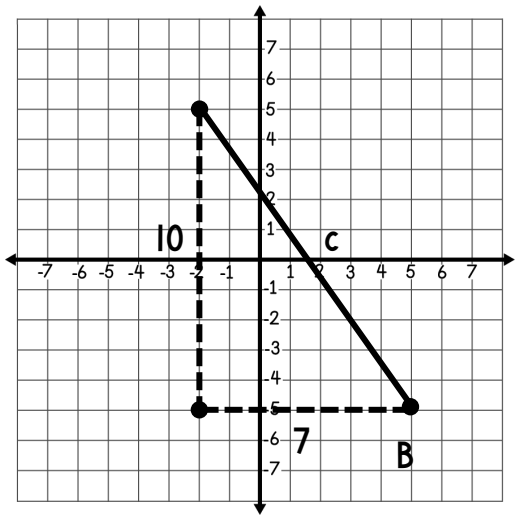
$144 + 144 = 576$

$288 \neq 576$

No!

the coordinate plane

The Pythagorean Theorem can be used to find the diagonal distance between points on a graph. Create a **RIGHT** triangle where the diagonal is c, the **HYPOTENUSE**.



$10^2 + 7^2 = c^2$
$100 + 49 = c^2$
$149 = c^2$
$\sqrt{149} = c$
$12.2 = c$

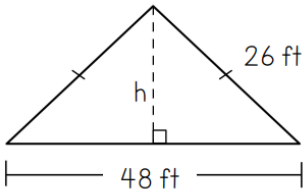
The distance from point A to point B is about 12.2 units.

PYTHAGOREAN THEOREM
WARM-UP

Name _____

Date _____Pd_____

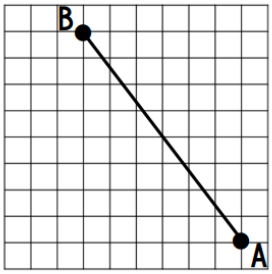
1. The side view of Mrs. Marigold's roof on her house is shown below.



Find h, the height of Mrs. Marigold's roof.

_____

2. Point A on the graph below represents Nate's house, and Point B represents Nate's favorite restaurant.



If each unit on the graph represents $\frac{3}{4}$ of a mile, how many miles does Nate live from his favorite restaurant?

_____

PYTHAGOREAN THEOREM
QUICK CHECK

Name _____

Date _____Pd_____

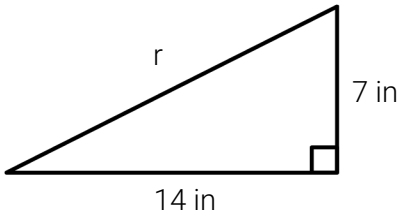
1. The side view of a ramp that Jessie built for his race cars is shown below. Find r, the length of the ramp to the nearest tenth.

A. 21 inches

B. 15.7 inches

C. 6.5 inches

D. 17.4 inches



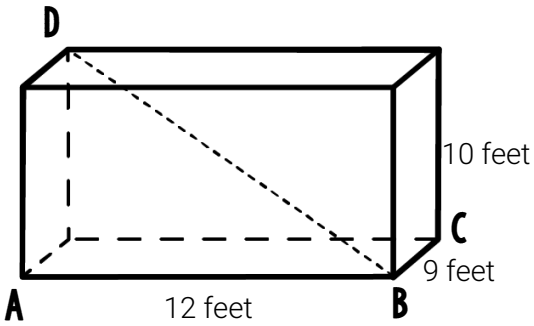
2. Use the diagram below to find the approximate length of diagonal BD.

F. 18 feet

G. 11.2 feet

H. 15 feet

J. 21.2 feet



3. Titus is building a triangular frame with three pieces of wood that measure 3 inches, 5 inches and 10 inches. Which of the following is true about the frame?

A. The frame will be a right triangle because $5(2) + 3(2) < 10(2)$.

B. The frame will be a right triangle because $5^2 + 3^2 < 10^2$.

C. The frame will not be a right triangle because $5^2 + 3^2 \neq 10^2$.

D. The frame will not be a right triangle because $5(2) + 3(2) \neq 10(2)$.

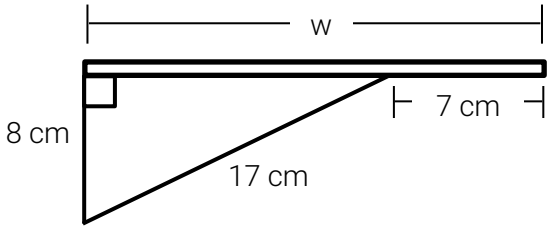
4. The side view of a wall shelf in Luke's office is shown below. The diagonal support piece is 17 centimeters, and the piece against the wall is 8 centimeters. What is the approximate measure of w, the total width of the shelf?

F. 8 centimeters

G. 15 centimeters

H. 22 centimeters

J. 26 centimeters

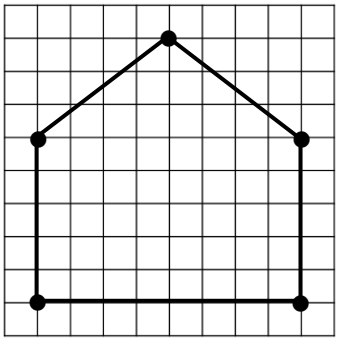


1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓕ Ⓖ Ⓗ Ⓙ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓕ Ⓖ Ⓗ Ⓙ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓕ Ⓖ Ⓗ Ⓙ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓕ Ⓖ Ⓗ Ⓙ
9. Ⓐ Ⓑ Ⓒ Ⓓ

10. Use the grid below.

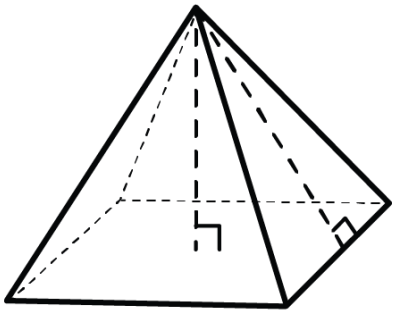
					.		
⊕	⓪	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①	①		①	①
	②	②	②	②		②	②
	③	③	③	③		③	③
	④	④	④	④		④	④
	⑤	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨

5. The graph below shows the design for the front view of a doghouse that Jeremy plans to build. If each square on the graph represents 1 foot, find the perimeter of the design.



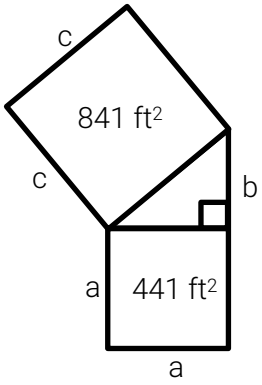
A. 32 feet
B. 26 feet
C. 35 feet
D. 28 feet

6. The base of the square pyramid shown has an area of 576 units^2. If the slant height of the pyramid is 20 units, what is the height of the pyramid?



F. 16 units
G. 13.4 units
H. 18 units
J. 31.2 units

7. The model below is used to show the relationship between the side lengths of a right triangle. Which describes the square that could be connected to side b of the triangle to correctly complete the model?

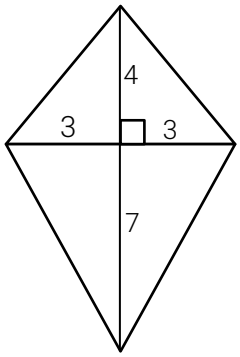


A. A square with side lengths of 400 feet.
B. A square with side lengths of 100 feet.
C. A square with side lengths of 50 feet.
D. A square with side lengths of 20 feet.

8. Neil wants to join three pieces of metal to form a right triangle. Which of the following lengths could he use?

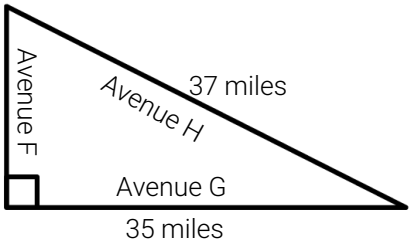
F. 4, 4 and 8 feet
G. 7.5, 10 and 12.5 feet
H. 9, 11 and 23 feet
J. 6, 12.5 and 96 feet

9. Find the total perimeter of the kite shown below. Round to the nearest tenth.



A. 34 units
B. 25.2 units
C. 12.6 units
D. 27.8 units

10. Greta takes a cab ride along Avenue F and Avenue G. Jack takes a cab ride along Avenue H. How many miles shorter is Jack's cab ride than Greta's? Record your answer on the grid.



EXPONENTS AND SCIENTIFIC NOTATION
CHEAT SHEET - A

Name _____

Date _____ Pd_____

exponent rules

MULTIPLYING LIKE BASES

$x^a \cdot x^b = x^{a+b}$

EX: $2^2 \cdot 2^3 = 2^5$ or 32

DIVIDING LIKE BASES

$\frac{x^a}{x^b} = x^{a-b}$

EX: $\frac{7^6}{7^4} = 7^2$ or 49

A POWER TO A POWER

$(x^a)^b = x^{a \cdot b}$

EX: $(2^2)^3 = 2^6$ or 64

INTEGER EXPONENTS

$x^{-n} = \frac{1}{x^n}$

EX: $7^{-2} = \frac{1}{7^2}$ or $\frac{1}{49}$

square & cube roots

SQUARE: Raise a number to a power of 2
SQUARE ROOT: Inverse of squaring a number

SQUARES	SQUARE ROOTS
$9^2 = 81$	$\sqrt{81} = 9$
$(-11)^2 = 121$	$\sqrt{121} = 11$
$(\frac{2}{3})^2 = \frac{4}{9}$	$\sqrt{\frac{4}{9}} = \frac{2}{3}$

CUBE: Raise a number to a power of 3
CUBE ROOT: Inverse of cubing a number

CUBES	CUBE ROOTS
$4^3 = 64$	$\sqrt[3]{64} = 4$
$(-10)^3 = -1{,}000$	$\sqrt[3]{1{,}000} = 10$
$(\frac{2}{3})^3 = \frac{8}{27}$	$\sqrt[3]{\frac{8}{27}} = \frac{2}{3}$

scientific notation

A value written as the product of a number between 1-10 and a power of ten.

8.52×10^6

Between 1-10 ← 8.52 x 10^6 → Power of 10

*Remember to check the sign of the exponent!

SCIENTIFIC TO STANDARD

$4.235 \times 10^7 = 42{,}350{,}000$

$6.88 \times 10^{-7} = 0.000000688$

STANDARD TO SCIENTIFIC

$129{,}200 = 1.292 \times 10^5$

$0.000097 = 9.7 \times 10^{-5}$

operations with sci. not.

ADDING/SUBTRACTING: Numbers must have the same power of 10. Add or subtract the numbers in front and keep the power of 10.

$(5.3 \times 10^4) + (2.6 \times 10^4)$

$(5.3 + 2.6) \times 10^4$

7.9×10^4

MULTIPLYING/DIVIDING: Rearrange the problem and apply your exponent rules.

$(1.2 \times 10^3)(3 \times 10^6)$

$(1.2 \times 3)(10^3 \times 10^6)$

3.6×10^9

EXPONENTS AND SCIENTIFIC NOTATION
WARM-UP

Name _____

Date _____ Pd_____

1. In 2015, a high paid actress made $52,000,000. A second actress made 3.55×10^7 dollars. Find the combined amount of their salaries, and express your answer in both standard and scientific notation.	2. Simplify each of the following expressions. Leave your answers as a variable raised to a positive exponent.
Standard: _____ Scientific: _____	a. $b^5 \times (b^{-3})^3$ _____ b. $w^4 \times \frac{w^2}{w^8}$ _____ c. $m^{-4} \times (m^2)^5$ _____

EXPONENTS AND SCIENTIFIC NOTATION
QUICK CHECK

Name _____

Date _____Pd_____

1. Which of the following is true?

   A. $n^9 \times n^3 = n^{27}$

   B. $\frac{n^{12}}{n^4} = n^8$

   C. $(n^6)^2 = n^8$

   D. $n^{-4} = -n^4$

2. Which value is equal to $\sqrt[3]{729}$?

   F. $\sqrt[3]{729} = 243$ because $729 \div 3 = 243$.

   G. $\sqrt[3]{729} = 81$ because $729 \div 3 = 243$ and $243 \div 3 = 81$.

   H. $\sqrt[3]{729} = 3$ because $(3^3)^2 = 729$.

   J. $\sqrt[3]{729} = 9$ because $9 \times 9 \times 9 = 729$.

3. Shantel read that the distance between the sun and Mercury is about 36,000,000 miles. Which of the following correctly represents this distance in scientific notation?

   A. 0.36×10^8 B. 3.6×10^7 C. 3.6×10^{-7} D. 3.6×10^6

4. In one year, a theme park had approximately 2×10^7 guests. In the same year, a second theme park had approximately 4×10^6 guests. Which is a true statement about the number of guests each theme park had?

   F. The first theme park had about 5 times as many guests than the second.

   G. The second theme park had about 2 times as many guests than the first.

   H. The first theme park had about 10 times as many guests than the second.

   J. The first theme park had about 2 times as many guests than the second.

5. Jett knows that $x^2 = 64$. Which of the following represents the step that Jett should take to find the correct value of x?

   A. $64 \div 2 = x$

   B. $64 \div 4 = x$

   C. $\sqrt{64} = x$

   D. $\sqrt[3]{64} = x$

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓕ Ⓖ Ⓗ Ⓙ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓕ Ⓖ Ⓗ Ⓙ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓕ Ⓖ Ⓗ Ⓙ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓕ Ⓖ Ⓗ Ⓙ
9. Ⓐ Ⓑ Ⓒ Ⓓ

10. Use the grid below.

					.		
⊕	⓪	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①	①		①	①
	②	②	②	②		②	②
	③	③	③	③		③	③
	④	④	④	④		④	④
	⑤	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨

6. A single piece of paper weighs about 9.9×10^{-3} pounds. Millie bought 5 packages of paper, and each package holds 300 pieces of paper. Find the total weight of the 5 packages expressed in standard notation.

F. 0.0495 pounds G. 2.97 pounds H. 14.85 pounds J. 16.5 pounds

7. Simplify the expression. Leave your answer as a variable raised to a positive exponent.

$$\frac{y^6}{y^{10}} \times y^2$$

A. $\frac{1}{y^8}$

B. $\frac{1}{y^6}$

C. $\frac{1}{y^2}$

D. y^0

8. Andrew is at an airport where the largest airplane weighs 3×10^5 pounds, and the smallest airplane weighs 12,500 pounds. How many times heavier is the largest airplane than the smallest airplane?

F. 24 times

G. 2.4 times

H. 0.04 times

J. 41 times

9. A professional basketball stadium can hold 21,000 people. A motor racing venue can hold 8.5×10^4 people. How many more people can the motor racing venue hold than the basketball stadium? Express your answer in scientific notation.

A. 8.29×10^5

B. 4.04×10^1

C. 6.4×10^3

D. 6.4×10^4

10. Find the value of x needed to make the equation true. Record the value of x on the grid.

$$\frac{(7^{10})^2}{7^4} = \frac{7^9 \cdot 7^{10}}{7^x}$$