RATIONAL NUMBER OPERATIONS
CHEAT SHEET - A

Name _____

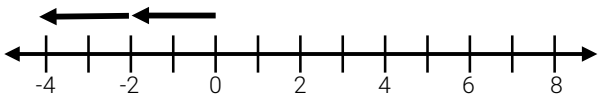
Date _____ Pd_____

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**.

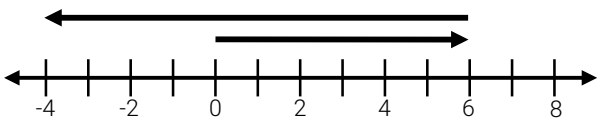
$-2 + -2 = -4$



SUBTRACTION

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

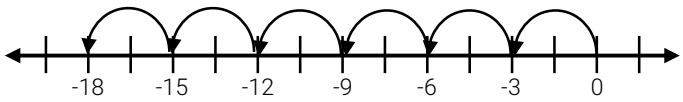
$6 - 10 = -4$



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

$-9.6 \cdot 5 = -48$

$-60.8 \div 4 = -15.2$

$\frac{3}{5} \cdot \frac{1}{4} = \frac{3}{20}$

$\frac{5}{8} \div \frac{3}{4} = \frac{5}{6}$

$-12.7 \cdot -3 = 38.1$

$100 \div 2.5 = 40$

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

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

RATIONAL NUMBER OPERATIONS
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°

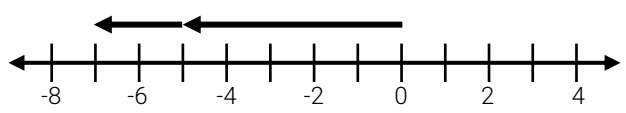
7. A 9-pound bag of sugar is being split into containers that hold $\frac{2}{3}$ of a pound. How many containers of sugar will the 9-pound bag create?

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

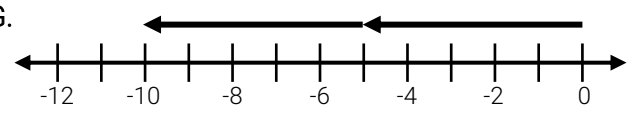
8. Which diagram correctly depicts the expression below?

$$-5 - 2$$

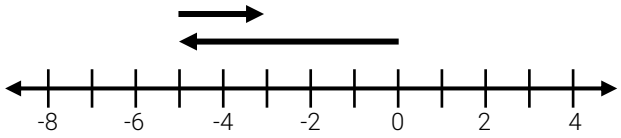
F.



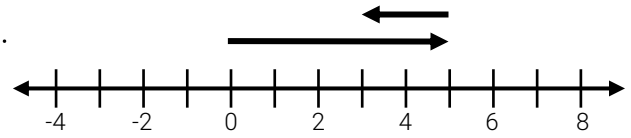
G.



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

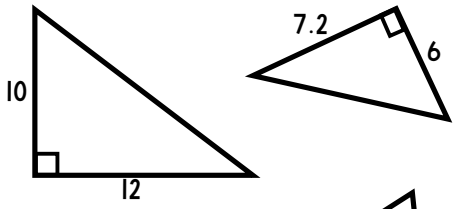
Name _____

Date _____ Pd_____

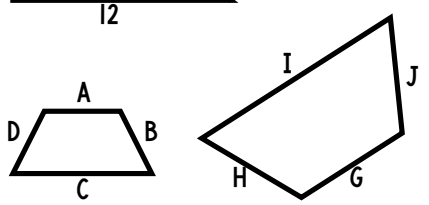
similarity

SIMILAR FIGURES have **CORRESPONDING**:

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



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



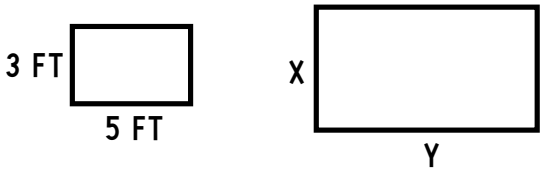
$$\frac{A}{G} = \frac{B}{H}$$

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

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

$$525 = 2X$$

$$262.5 = X$$

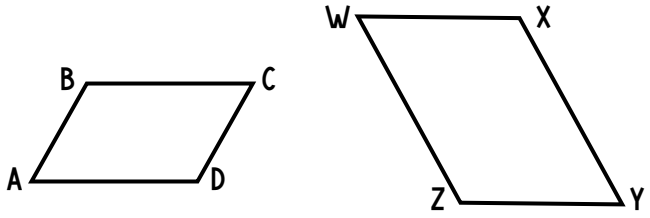
7 IN = 262.5 FT

PROPORTIONALITY & SCALE DRAWINGS
QUICK CHECK

Name _____

Date _____ Pd_____

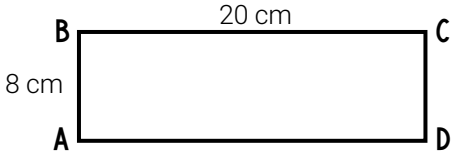
1. Figure ABCD is similar to figure WXYZ. Which proportion must be true for these figures?



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?

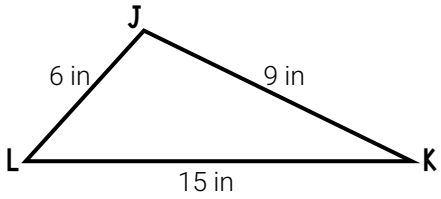
F. 180 cm^2
G. 90 cm^2
H. 160 cm^2
J. 75 cm^2

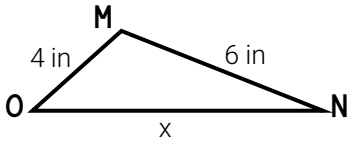


3. Micah made a scale model of the Empire State Building. The building has an actual height of 381 meters. Micah's model used a scale in which 1 cm represents 50 meters. What is the height in centimeters of Micah's model?

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?





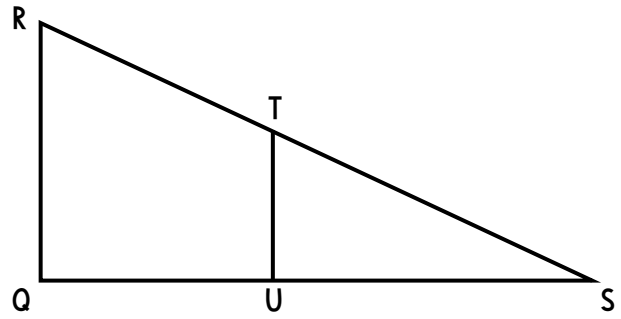
F. 9 in G. 27 in H. 20 in J. 11 in

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

10. Use the grid below.

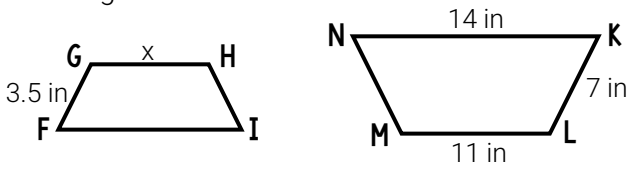
					•		
⊕	⓪	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①	①		①	①
	②	②	②	②		②	②
	③	③	③	③		③	③
	④	④	④	④		④	④
	⑤	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨

5. The triangles shown below are similar. Which line segment corresponds to $\overline{RS}$?



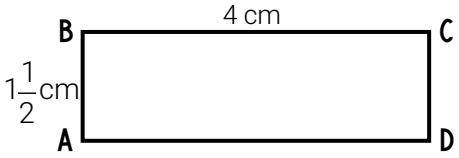
A. $\overline{RT}$
B. $\overline{TS}$
C. $\overline{OS}$
D. $\overline{UT}$

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



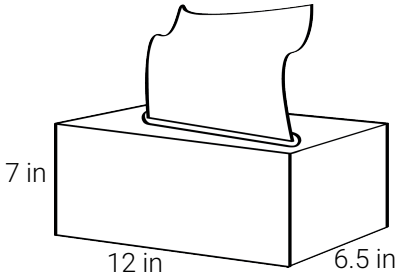
F. 8.5 in
G. 7 in
H. 6.75 in
J. 5.5 in

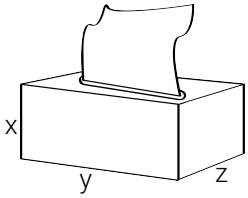
7. The rectangle below is dilated by a scale factor of 3.6 to create a new rectangle. Which of the following could be the dimensions of the new rectangle?



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

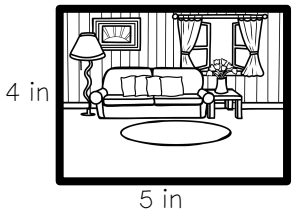
8. Two boxes of tissues are similar in shape and size. The larger tissue box is dilated by a scale factor of 0.5 to create the smaller tissue box. What are the measurements of the smaller tissue box?





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: $I = p \cdot r \cdot t$

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	
	whole sale	

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

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

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

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

Percent

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%
   G. 8%
   H. 27%
   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.

PROPORTIONAL RELATIONSHIPS
CHEAT SHEET - A

Name _____

Date _____Pd_____

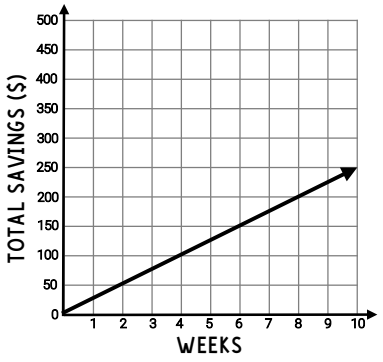
PROPORTIONAL VS. NON-PROPORTIONAL

- 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

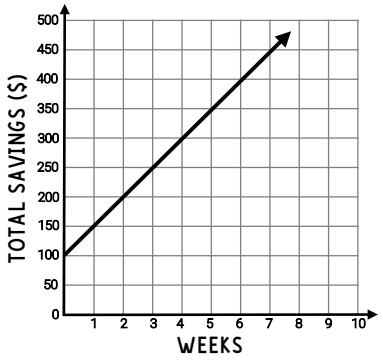


- Passes through the origin, (0, 0)
- Straight line

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

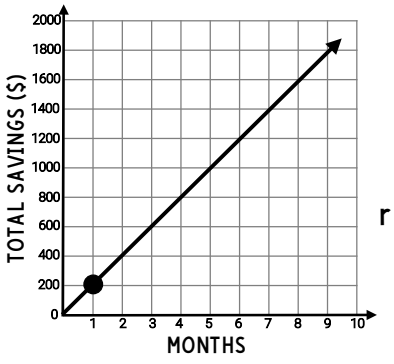
EXAMPLE:

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



(I, r)

r = UNIT RATE

tables & graphs

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. $35 = 1x$

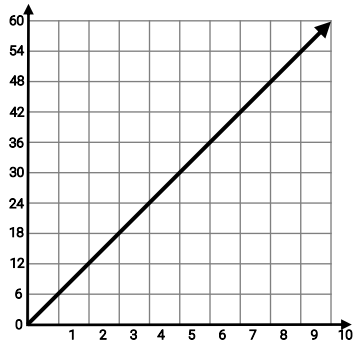
G. $y = \frac{1}{35}x$

H. $y = 35x$

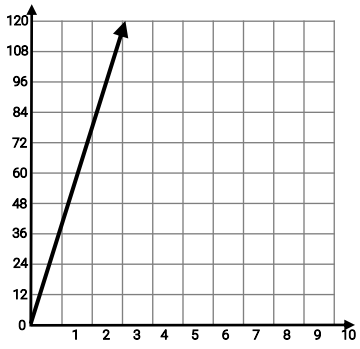
J. $y = 3.5x$

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

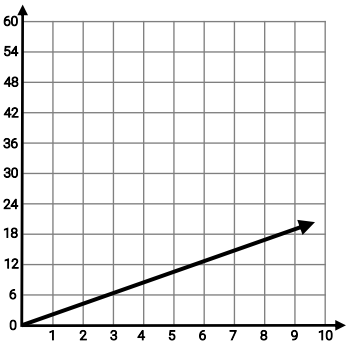
A.



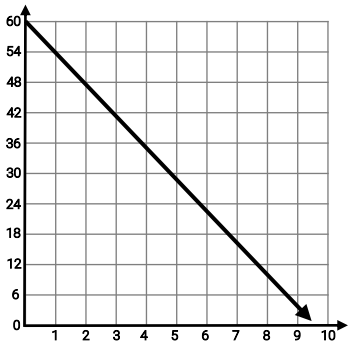
B.



C.

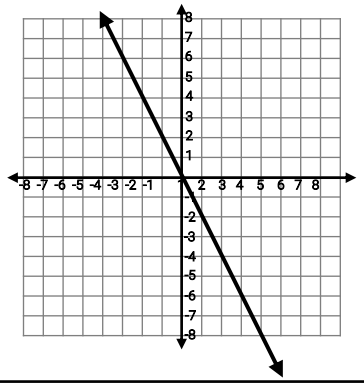


D.



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

F. y = -2x
G. y = 2x
H. y = 1/2x
J. y = -1/2x

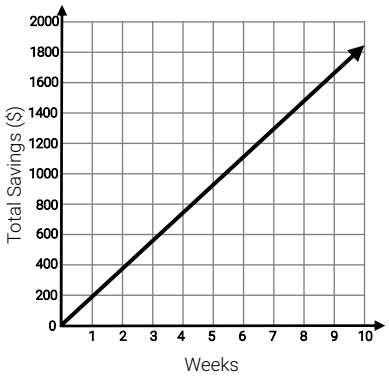


7. Marcy has earned 18 rewards points at the movie theater and will earn 3 points for each additional movie. Which equation represents the relationship between y, the total points, and x the number of movies?

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.

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	$8x + 7$

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
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. $11y + 10$

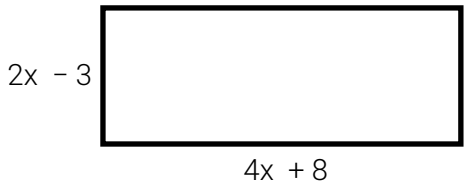
5. If the perimeter of the rectangle is 118 units, then what is the value of x?

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?

$$26 = 179 - 9k$$

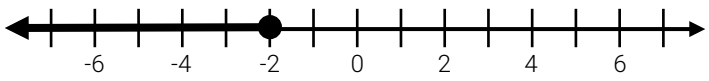
A. A pool has 26 gallons of water in it. It is filled at a rate of 9 gallons per minute, until there are 179 gallons.

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.

ANGLE RELATIONSHIPS
CHEAT SHEET - A

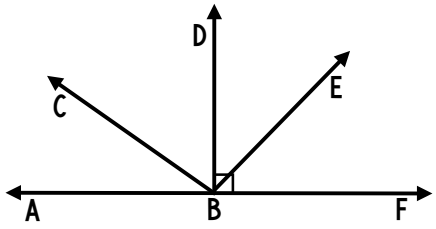
Name _____

Date _____Pd_____

types of angles

COMPLEMENTARY ANGLES: Sum of 90°

SUPPLEMENTARY ANGLES: Sum of 180°

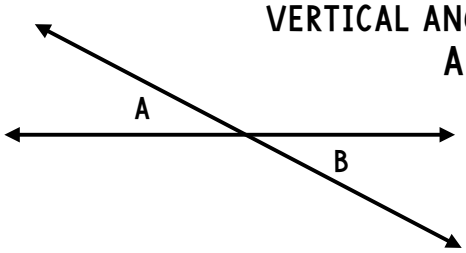


COMPLEMENTARY ANGLES: **<DBE** and **<EBF**

SUPPLEMENTARY ANGLES: **<ABC** and **<CBF**

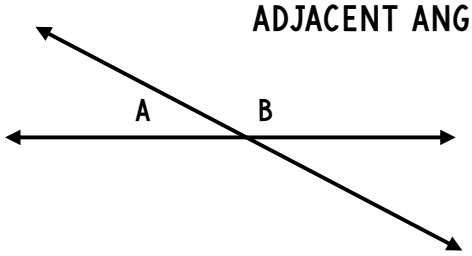
angle pairs

VERTICAL ANGLES
A ≅ B



Opposite angles formed by intersecting lines

ADJACENT ANGLES



Two angles that have a common side and a common vertex

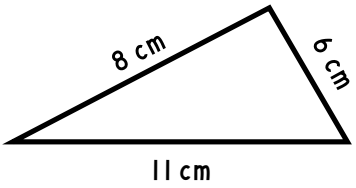
triangle constraints

The **SUM** of any two side lengths of a triangle must be **GREATER** than the third side length.

<A + <B + <C = 180°

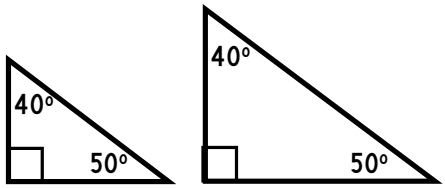
ONE UNIQUE TRIANGLE

6 + 8 > 11
8 + 11 > 6
11 + 6 > 8



Three side lengths that meet the requirements will always produce one unique triangle.

MORE THAN ONE TRIANGLE



Congruent angles will result in more than one triangle, called similar triangles.

NO TRIANGLE

4 + 2 > 6 FALSE
2 + 6 > 4 TRUE
6 + 4 > 2 TRUE

50° + 35° + 75° ≠ 180

ANGLE RELATIONSHIPS
QUICK CHECK

Name _____

Date _____Pd_____

1. A triangular garden is being formed with stones. The three sides measure 4 meters by 6 meters by 7 meters. Which of the following is a true statement about the side lengths of the triangle?

A. The side lengths will not form a triangle because 6 + 4 > 7.
B. The side lengths will form a triangle because 4 + 6 < 7.
C. The side lengths will not form a triangle because 7 + 4 < 6.
D. The side lengths will form a triangle because 6 + 7 > 4.

2. Two angles are supplementary to each other. If the first angle measures 58^o, then which of the following could be the measure of the second angle?

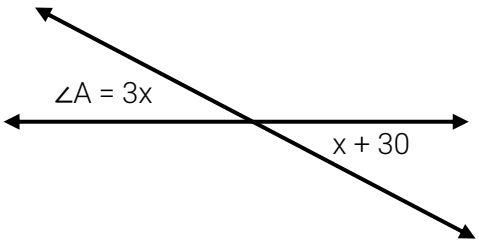
F. 122^o
G. 32^o
H. 58^o
J. 90^o

3. Which of the following will NOT produce a triangle?

A. Angle measures of 33^o, 67^o, and 80^o
B. Side lengths of 5 inches, 5 inches, and 9 inches
C. Angle measures of 90^o, 60^o, 30^o
D. Side lengths of 4 inches, 8 inches, and 12 inches

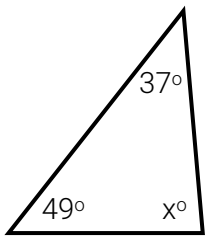
4. What is the measure of ∠A in the image shown below?

F. $m\angle A = 45^o$
G. $m\angle A = 30^o$
H. $m\angle A = 55^o$
J. $m\angle A = 35^o$



5. Triangle DEF is shown below. Which of the following equations could be used to find the value of x?

A. x + 37 + 49 = 360
B. x + 86 = 180
C. 180 − 90 = x
D. 86 − x = 180



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

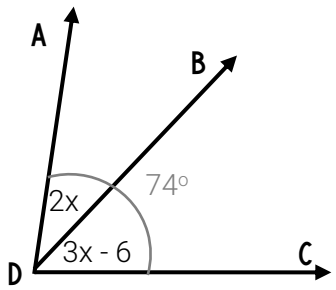
6. Angle ADB is adjacent to angle BDC. Which of the following is a true statement about the angles?

F. ∠ADB = 34° and ∠BDC = 45°

G. ∠ADB = 32° and ∠BDC = 42°

H. ∠ADB = 40° and ∠BDC = 54°

J. ∠ADB = 24° and ∠BDC = 30°



7. A teacher asked three different students to write the conditions that would result in a triangle. Which of the following students listed conditions that would result in more than one triangle?

STUDENT 1	STUDENT 2	STUDENT 3
△ABC AB is 5 cm ∠A is 50° ∠B is 70°	△ABC AB is 7 cm BC is 9 cm CA is 16 cm	△ABC ∠A is 62° ∠B is 36° ∠C is 82°

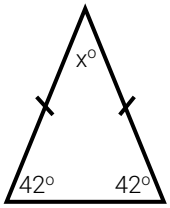
A. Student I and II

B. Student II only

C. Student III

D. Student I and III

8. Which of the following equations can be used to find the missing angle, x, in the triangle below?



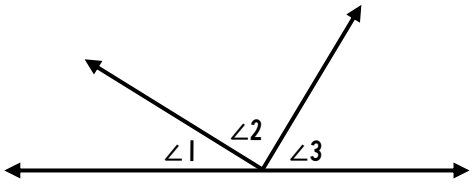
F. x + 84 = 180

G. x + 84 = 360

H. x + 42 = 90

J. x + 42 = 180

9. The measure of ∠2 is 90°. Which of the following statements is not true about the diagram below?



A. angle 2 is a right angle

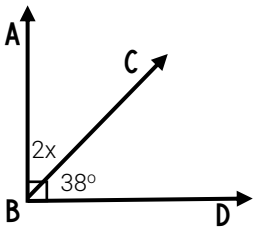
B. angles 1 and 3 are complementary

C. angles 1 and 3 are supplementary

D. angles 2 and 3 are adjacent

10. Angle ABC and angle CBD are complementary. What is the value of ***x***?

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



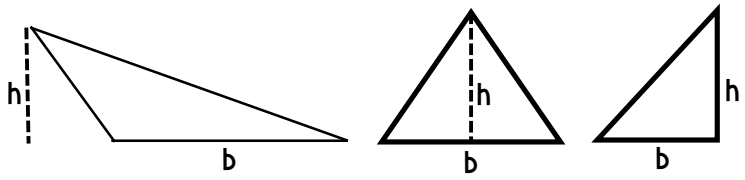
2D GEOMETRY
CHEAT SHEET - A

Name _____

Date _____ Pd_____

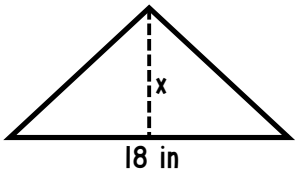
triangles

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?

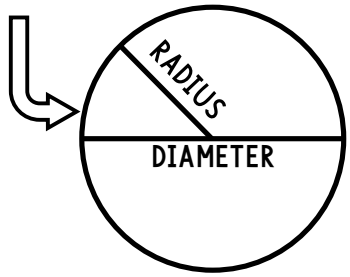


$108 = \frac{18x}{2}$

$216 = 18x$

$12 = x$

circles



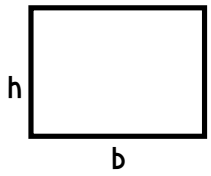
$C = \pi d$ $A = \pi r^2$

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

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

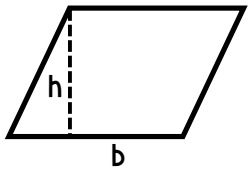
quadrilateral

RECTANGLE



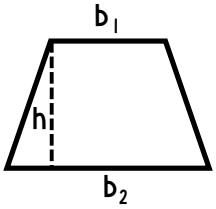
$A = b \cdot h$

PARALLELOGRAM



$A = b \cdot h$

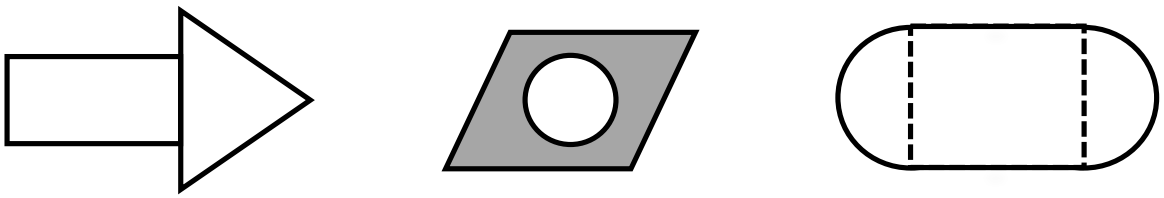
TRAPEZOID



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

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
QUICK CHECK

Name _____

Date _____Pd_____

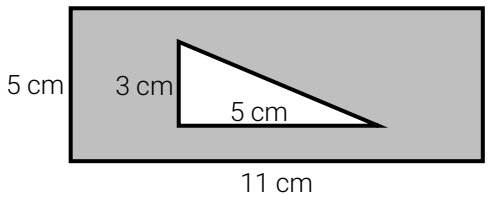
1. In PE, a parachute is laid out on the gym floor. The parachute has a radius of 16 feet. Which measurement is closest to the circumference of the parachute in feet?

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?



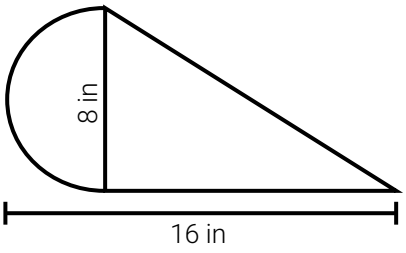
A. 40 cm^2

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?

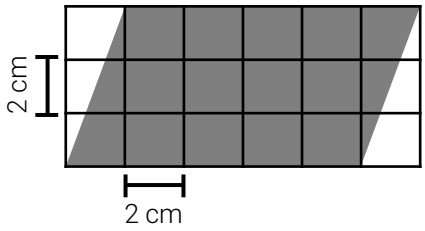


F. 146 in^2 **G.** 73 in^2 **H.** 57 in^2 **J.** 123 in^2

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?

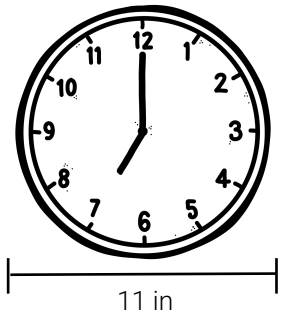
F. 11 cm

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?



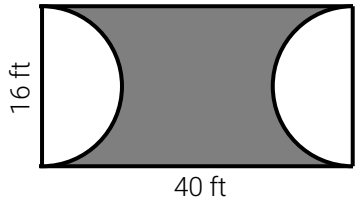
A. 20.8 in

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

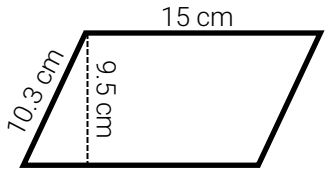
B. 50.24 ft^2

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

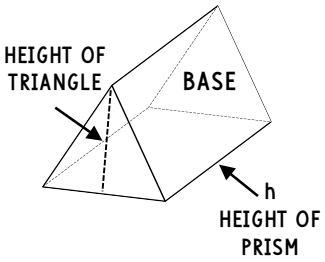
THE AMOUNT OF SPACE A 3D OBJECT OCCUPIES

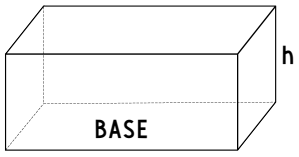
(UNITS^3)

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

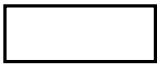
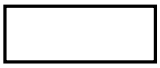
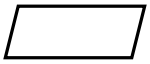
$$V = Bh$$





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

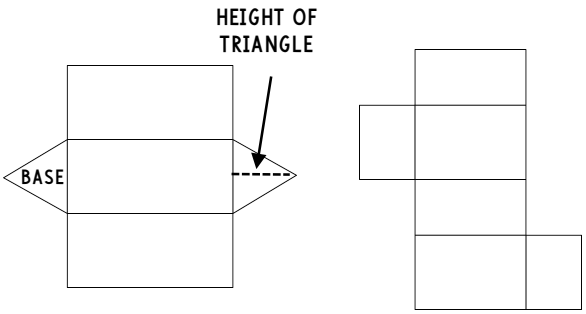
THE TOTAL COVERING ON THE FACES OF A 3D OBJECT

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

(UNITS^2)

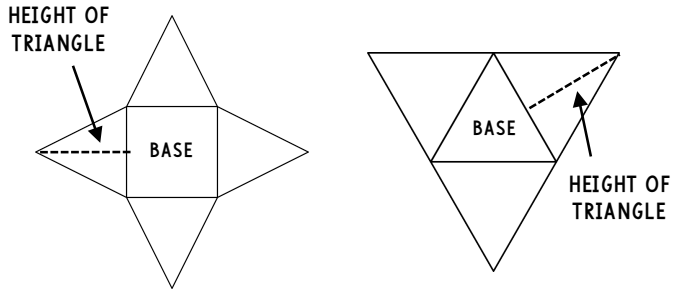
TOTAL SURFACE AREA

- 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



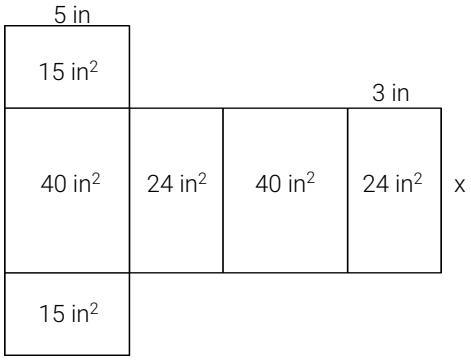
VOLUME AND SURFACE AREA
QUICK CHECK

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.

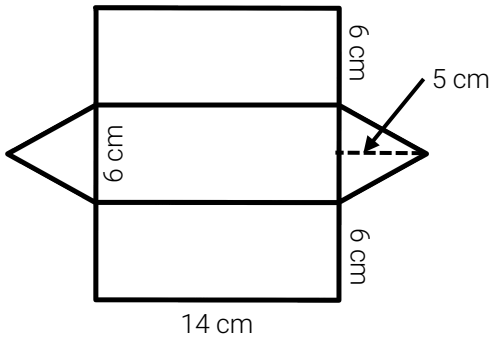


A. 6 in **B.** 8 in **C.** 12 in **D.** 10 in

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?

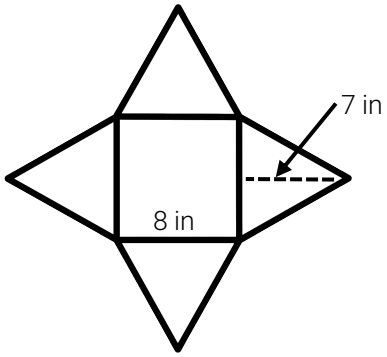
F. 11 in
G. 4 in
H. 7 in
J. 5 in

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

4. The net below shows a square pyramid. What is the lateral surface area?



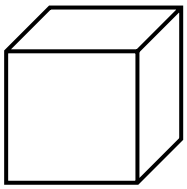
F. 176 in^2

H. 64 in^2

G. 112 in^2

J. 210 in^2

5. The volume of the cube below is 250.047 cm^3. The side length could be between which sets of numbers below?



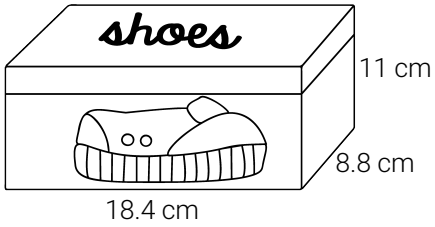
A. 4 cm and 5 cm

C. 6 cm and 7cm

B. 5 cm and 6 cm

D. 7 cm and 8 cm

6. Which of the following is closest to the volume of the shoe box?



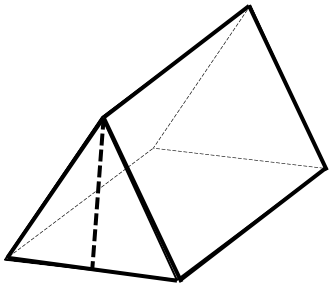
F. 1,490 cm^3

G. 2,134 cm^3

H. 1,782 cm^3

J. 1,962 cm^3

7. Which of the following shapes describes the 2D figure formed by slicing parallel to the base of a triangular prism?



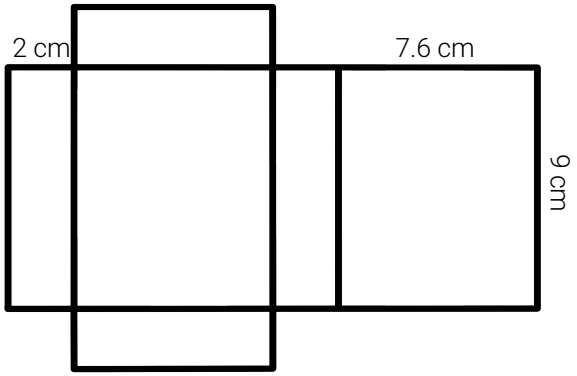
A. rectangle

B. parallelogram

C. trapezoid

D. triangle

8. The dimensions of the rectangular prism are shown on the net below. Which of the following is closest to the total surface area of the figure?



F. 101.6 cm^2

G. 203.2 cm^2

H. 285.1 cm^2

J. 178.7 cm^2

DATA AND STATISTICS
CHEAT SHEET - A

Name _____

Date _____Pd_____

STATISTICS VOCABULARY

MEAN: the average

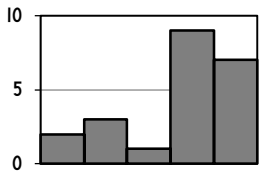
MEDIAN: middle value when ordered from least to greatest

MODE: most often repeated

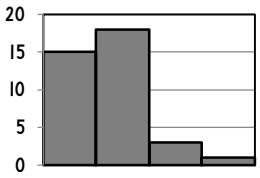
RANGE (SPREAD): the difference between the greatest and least values

SHAPE: describes the type of graph, including symmetric and skewed

SYMMETRICAL DATA: the data is evenly balanced around the mean



SKEWED LEFT



SKEWED RIGHT

SAMPLES

POPULATION: a set, group

SAMPLE: a portion of the population

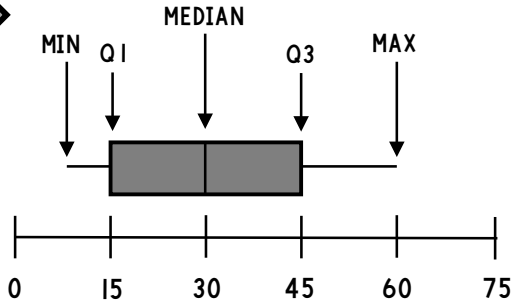
RANDOM SAMPLE: a portion of the population that is selected; each member of the population must have an equal chance of being chosen

A survey is taken to determine who will be elected as Senior Class President.

POPULATION	the Senior Class
SAMPLE	seniors on the volleyball team
RANDOM SAMPLE	twenty seniors whose name are drawn from a hat

BOX PLOTS

BOX PLOTS are used to compare the **SPREAD** and **DISTRIBUTION** in a set of data.

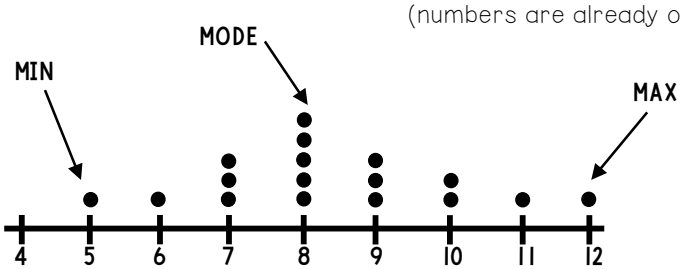


INTERQUARTILE RANGE: the difference between Q3 and Q1

RANGE: the difference between the maximum and the minimum

DOT PLOTS

MEDIAN: the middle value
(numbers are already ordered in a dot plot)



DOT PLOTS are used to display the **SPREAD OF THE DATA** along an axis.

DATA AND STATISTICS
QUICK CHECK

Name _____

Date _____Pd_____

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

1. Below is data collected from a random sample of 80 students regarding their fitness habits. If the entire school has 600 students, then what is a reasonable estimate for the number of students who consider themselves to have an average fitness habit?

FITNESS	POOR	AVERAGE	EXCELLENT
STUDENTS	16	44	20

A. 175 B. 120 C. 280 D. 330

2. The number of teachers from two different schools are shown below. The school district would like to survey staff members about the school dress code. Based on the data, which of the samples below would be considered random?

	6th GRADE TEACHERS	7th GRADE TEACHERS	8th GRADE TEACHERS
NORTH MS	16	14	19
WEST MS	11	10	12

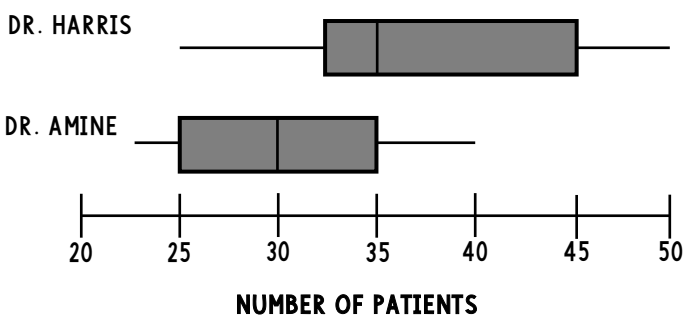
F. All of the teachers at North MS are sampled.

G. The seventh grade teachers at North MS and West MS are sampled.

H. The teachers are alphabetized by last name and every fifth teacher is sampled.

J. The teachers who attend the school board meeting are sampled.

3. The number of patients at a doctors office is tracked over a period of 10 days. Which statement best supports the data?



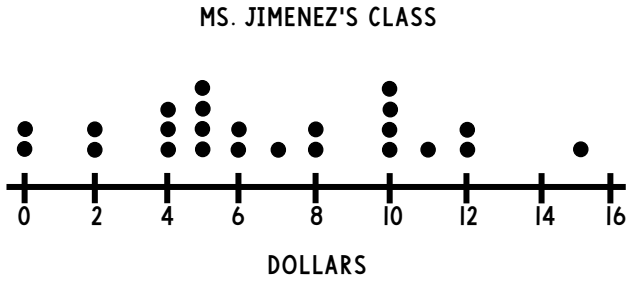
A. The data for Dr. Amine's office is more symmetrical than the data for Dr. Harris's office.

B. The interquartile range of the two offices is the same.

C. The median number of patients at Dr. Harris's office is less than the median number of patients at Dr. Amine's office.

D. The range of the data for Dr. Harris's office is less than the range of the data for Dr. Amine's office.

4. The dot plot below represents the number of dollars in allowance that students receive each week in Mrs. Jimenez's class. What is the median amount of allowance?



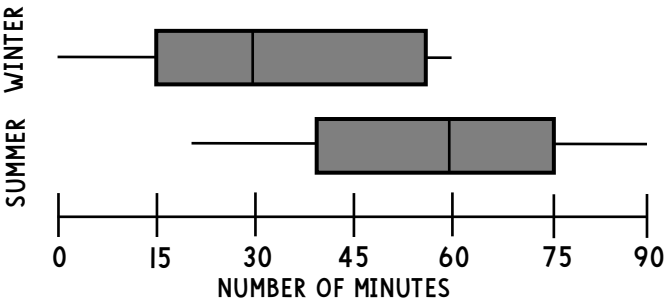
F. 5

G. 6

H. 7

J. 8

5. Twenty students in Mr. Martin's class each took a survey about the number of minutes they played outside. The box plots represent the amount of time the students spent outside playing in the summer and in the winter. Which statement is best supported by the data?



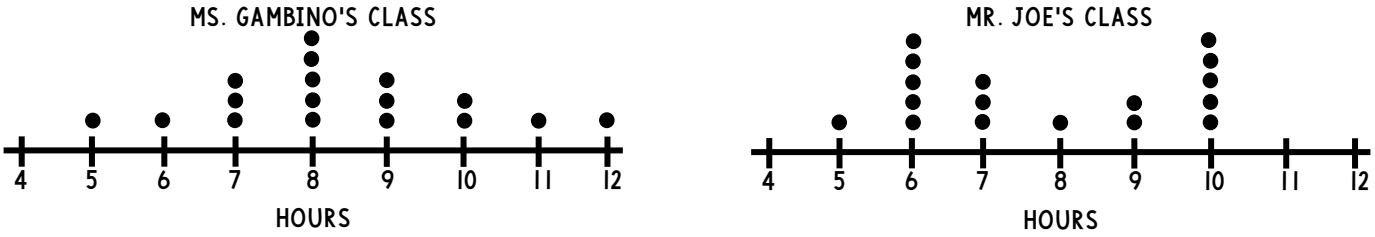
A. The range of number of minutes outside is the same in the summer and in the winter.

B. The median number of minutes outside in the summer is equal to the maximum number of minutes outside in the winter.

C. The interquartile range for the number of minutes outside is the same in the summer and in the winter.

D. The minimum number of minutes outside in the summer is the same as the first quartile in the winter.

6. The average number of hours of sleep of Ms. Gambino's and Mr. Joe's classes is shown below. Which of the following statements is best supported by the data?



F. The median number of hours slept in Ms. Gambino's class is less than the median number of hours in Mr. Joe's class.

G. The data for Ms. Gambino's class is symmetrical, while the data for Mr. Joe's class is skewed right.

H. The range of data in Mr. Joe's class is less than the range of data is Ms. Gambino's class.

J. The mode of the data in Ms. Gambino's class was equal to the mode of the data in Mr. Joe's class.

7. Which of the following groups is NOT considered a sample of the US population?

A. Women who live in the US

B. People who are registered to vote in the US

C. Europeans who vacation in the US

D. Students who attend public schools in the US

8. A local bank polls every twentieth customer to determine if they are satisfied with the helpfulness of the bank. Forty customers are surveyed and 26 are satisfied. What conclusion can be drawn for the 800 daily customers?

F. 65% of the customers are unsatisfied with the helpfulness of the bank

G. 26% of the customers are unsatisfied with the helpfulness of the bank

H. 40% of the customers are satisfied with the helpfulness of the bank

J. Of the 800 customers, 520 would be satisfied with the helpfulness of the bank

PROBABILITY
CHEAT SHEET - A

Name _____

Date _____Pd_____

PROBABILITY

PROBABILITY is the **LIKELIHOOD** of an event occurring.

$$P(\text{EVENT}) = \frac{\text{\# OF WAYS IT OCCURS}}{\text{POSSIBLE OUTCOMES}}$$

THE COMPLEMENT of an event is the probability of the event **NOT** occurring.

$$P'(\text{EVENT}) = \frac{\text{\# OF WAYS IT CANNOT OCCUR}}{\text{POSSIBLE OUTCOMES}}$$

SAMPLE SPACE is all of the possible outcomes.

- Create a list, a table, or a tree diagram
- Multiply the various numbers of options together to get the total outcomes

Types of Probability

EXPERIMENAL PROBABILITY

- The ratio of the number of times an event occurs to the total number of trials
- Based on data
- Often displayed in tables

A NUMBER CUBE IS ROLLED AND LANDS ON 4

3 OUT OF 17 SWITCHES ARE DEFECTIVE

THEORETICAL PROBABILITY

- The probability of an event happening based on possible outcomes
- Based on theory

THE PROBABILITY OF ROLLING A 4 IS $\frac{1}{6}$

A 50% CHANCE OF A COIN LANDING ON TAILS

As the **NUMBER OF TRIALS INCREASES**, the experimental probability **APPROACHES** the theoretical probability.

Independent vs. dependent

INDEPENDENT EVENTS

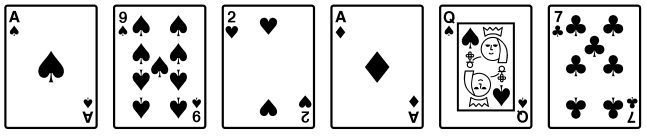
- Two or more events in which the results do not impact one another
- Events where the item is replaced

A SPINNER IS SPUN AND A NUMBER CUBE IS ROLLED

DEPENDENT EVENTS

- Two or more events in which the results of the first impact the results of the second
- Events where the item is not replaced

TWO NAMES ARE DRAWN FROM A HAT WITHOUT REPLACEMENT



ACE, NOT REPLACING IT, AND DRAWING A QUEEN

$$\underbrace{\frac{2}{6}}_{\text{(ace)}} \cdot \underbrace{\frac{1}{5}}_{\text{(queen)}} = \frac{1}{15}$$

SPADE, REPLACING IT, AND DRAWING A TWO.

$$\underbrace{\frac{3}{6}}_{\text{(spade)}} \cdot \underbrace{\frac{1}{6}}_{\text{(2)}} = \frac{1}{12}$$

PROBABILITY
QUICK CHECK

Name _____

Date _____Pd_____

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

1. In a survey, 7 out of 8 dentists recommend a ProTooth toothbrush. Based on this information, which can the toothbrush company predict about its recommendations?

A. In a survey of 24 dentists, 18 of them will recommend a ProTooth toothbrush.
B. In a survey of 40 dentists, 33 of them will recommend a ProTooth toothbrush.
C. In a survey of 64 dentists, 56 of them will recommend a ProTooth toothbrush.
D. In a survey of 88 dentists, 70 of them will recommend a ProTooth toothbrush.

2. At a pizza shop, you can choose thick or thin crust, red or white sauce, and toppings of pepperoni, cheese, or vegetarian. How many different combinations are possible for someone who does not care for meat or white sauce?

F. 3
G. 24
H. 9
J. 4

3. A basket of beads contains 8 red beads, 6 yellow beads, and 6 green beads. A bead will be drawn from the basket and replaced 150 times. What is a reasonable prediction for the number of times a green bead is drawn?

A. 45
B. 60
C. 36
D. 72

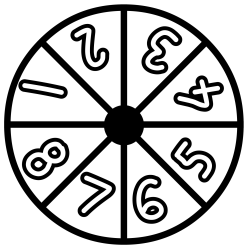
4. A student takes notes in class, completes the assignments, attends tutoring, and prepares for the test. Which best represents the likelihood of the student being successful on the exam?

F. certain G. likely H. unlikely J. impossible

5. The spinner below is spun two times in a row. What is the probability of spinning two prime numbers?

A. $\frac{9}{64}$ C. $\frac{25}{64}$

B. $\frac{1}{4}$ D. $\frac{1}{2}$



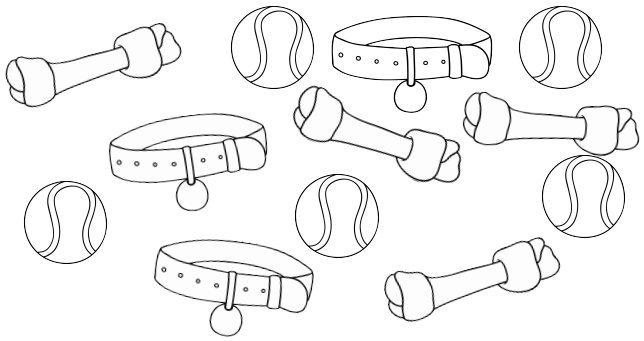
6. Audrey has the t-shirts listed below in her dresser drawer. She will randomly choose one t-shirt. Then she will replace it and choose a second t-shirt. What is the probability that she chooses a polka dot shirt and then a striped shirt?

- 5 striped t-shirts
- 6 solid t-shirts
- 2 floral t-shirts
- 2 polka dot t-shirts

F. $\frac{3}{5}$ G. $\frac{6}{45}$

H. $\frac{2}{15}$ J. $\frac{2}{45}$

7. Neil goes to the pet shop and selects a treat for his dog. He chooses one, then chooses another. What is the probability Neil selects a bone and then a ball?



A. $\frac{5}{33}$ C. $\frac{5}{12}$

B. $\frac{1}{3}$ D. $\frac{7}{33}$

8. Students standing in line for a theme park were surveyed about their favorite ride. Their responses are shown below. If one student is picked randomly, then which of the following is true?

RIDE	NUMBER OF STUDENTS
ROLLER COASTERS	28
CARNIVAL GAMES	14
LIVE SHOWS	8

F. The student's favorite ride is half as likely to be a live show than a roller coaster.

G. The student's favorite ride is more likely to be a carnival game than a roller coaster.

H. The student's favorite ride is twice as likely to be a roller coaster than the carnival games.

J. The student's favorite ride is twice as likely to be the carnival game than the live show.

9. A neighborhood watch association surveyed 40 neighbors about their feelings of safety in the neighborhood. They will survey an additional 80 neighbors. Based on the information, predict how many of the 80 neighbors will feel safe?

RESPONSE	NUMBER OF NEIGHBORS
UNSAFE	12
NEUTRAL	10
SAFE	18

A. 39 C. 36

B. 24 D. 40

10. The following playing cards are used in a game. What is the probability of **not** selecting a prime number?

F. $\frac{3}{7}$ H. $\frac{1}{6}$

G. $\frac{1}{3}$ J. $\frac{4}{7}$