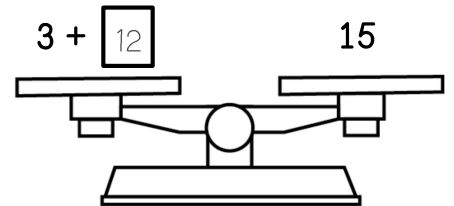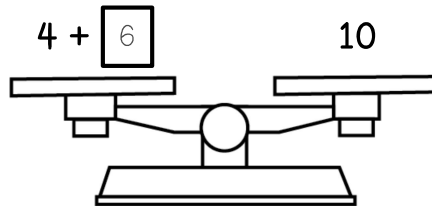Name _____

Date _____ Pd _____

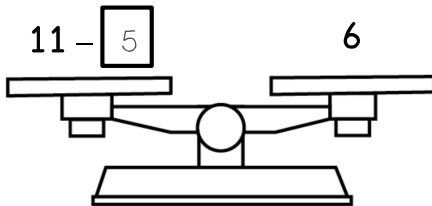# ONE-STEP EQUATIONS: ADDITION & SUBTRACTION

Fill in the missing number to keep the scales balanced.

| 11 – 5 | 6 | 4 + 6 | 10 | 3 + 12 | 15 |

SOLVING ONE-STEP EQUATIONS

- Solving equations allows you to find a missing value, or variable.

  - The _____variable_____ must be alone or _____isolated_____ on one side of the equation.

  - Isolate the variable by using _____inverse_____ operations.

  - Keep your equation _____balanced_____.

  - Check your _____solution_____ by plugging your answer back into the equation.

1. Use the key to write and solve the equation represented below.

KEY

x $-x$ 1 -1
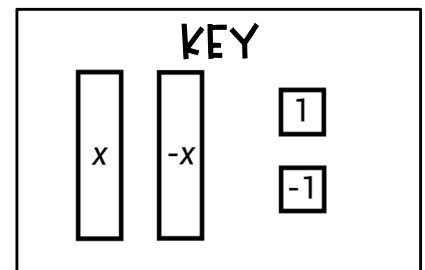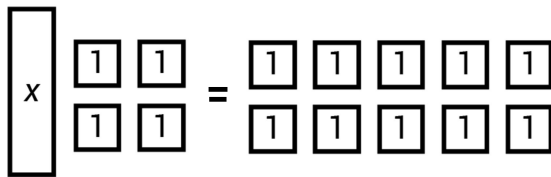
Equation: _____ $x + 4 = 10$ _____   Solution: _____ $x = 6$ _____

2. Write and solve the equation represented below.
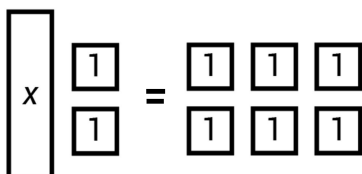
Equation: _____ $x + 2 = 6$ _____

Solution: _____ $x = 4$ _____

3. Write and solve the equation represented below.
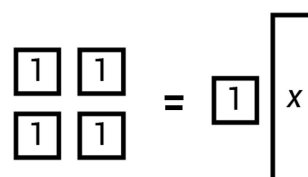
Equation: _____ $4 = 1 + x$ _____

Solution: _____ $3 = x$ _____

Use your understanding of solving one-step equations to answer the questions below.

4. Write and solve the equation represented below.	5. Write and solve the equation represented below.

4. Write and solve the equation represented below.

$$\boxed{x}\ \boxed{-1}\ \boxed{-1} = \boxed{1}\ \boxed{1}\ \boxed{1}\ \boxed{1}$$
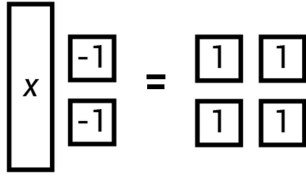
Equation: _____ $x - 2 = 4$ _____

Solution: _____ $x = 6$ _____

5. Write and solve the equation represented below.
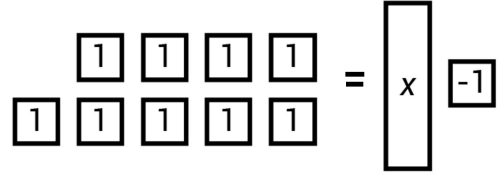
$$\boxed{1}\ \boxed{1}\ \boxed{1}\ \boxed{1}\ \boxed{1}\ \boxed{1}\ \boxed{1}\ \boxed{1}\ \boxed{1} = \boxed{x}\ \boxed{-1}$$

Equation: _____ $9 = x - 1$ _____

Solution: _____ $x = 10$ _____
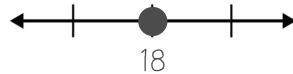
Solve the following one-step equations. Draw algebra tiles if needed, and then check your work.

6.

$x - 6 = 12$

_____ 18 _____

CHECK & GRAPH:

$18 - 6 = 12$
$12 = 12$

18

7.

$x + 5 = 11$

_____ 6 _____

CHECK & GRAPH:

$6 + 5 = 11$
$11 = 11$

6
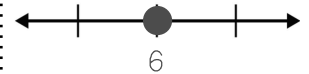
8.

$15 = x - 2$

_____ 17 _____

CHECK & GRAPH:

$15 = 17 - 2$
$15 = 15$

17

9.

$17 = x + 4$

_____ 13 _____

CHECK & GRAPH:

$17 = 13 + 4$
$17 = 17$

13
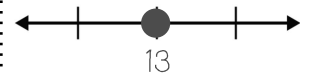
10.

$x + 19 = 35$

_____ 16 _____

CHECK & GRAPH:

$16 + 19 = 35$
$35 = 35$

16

11.

$46 = x - 22$

_____ 68 _____

CHECK & GRAPH:

$46 = 68 - 22$
$46 = 46$

68
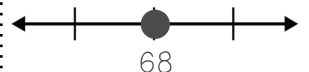
12.

$x - 27 = 31$

_____ 58 _____

CHECK & GRAPH:

$58 - 27 = 31$
$31 = 31$

58
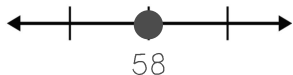
13.

$54 = x + 33$

_____ 21 _____

CHECK & GRAPH:

$54 = 21 + 33$
$21 = 21$

21
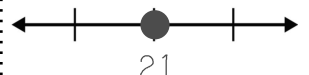
Summarize today's lesson:

ONE-STEP EQUATIONS: ADDITION & SUBTRACTION

Match each correct answer to a letter and complete the riddle below.

1 (W) $x - 7 = 4$

6 (T) $23 = x - 13$

2 (C) $9 + x = 14$

7 (O) $14 = x + 12$

3 (I) $x + 7 = 16$

8 (E) $9 = x - 6$

4 (D) $x + 3 = 28$

9 (S) $x - 2 = 21$

5 (A) $17 + x = 18$

10 (U) $x - 7 = 26$

I: 9	E: 15	R: 22	D: 25	B: 6	M: 8
J: 4	W: 11	H: 3	O: 2	A: 1	F: 10
T: 36	N: 18	C: 5	S: 23	U: 33	G: 19

WHY DIDN'T BOB DRINK A GLASS OF WATER WITH 8 PIECES OF ICE?

I	T	W	A	S	T	W	O	C	U	B	E	D
3	6	1	5	9	6	1	7	2	10		8	4

Name _____

Date _____ Pd_____

ONE-STEP EQUATIONS APPLICATION I

Remember the questions to ask yourself as you solve real-world problems:

What information are you given?

What are you solving for?

Does your solution make sense in the context of the problem?

Practice setting up an equation for each of the situations below. Do not solve.

---

1. The average cost of a school lunch today is $4.35, which is $2.85 more than the average cost of a lunch in 1990. What was the average cost of a school lunch in 1990?

4.35	
x	2.85

a. What does the variable represent? ___cost of school lunch in 1990___

b. Write an equation: ___$x + 2.85 = 4.35$___

---

2. Your little sister is too small to stand on the scale. You decide to get on the scale holding her and find your combined weight to be 112 pounds. You know that you weigh 94 pounds. How much does your little sister weigh?

112	
x	94

a. What does the variable represent? ___weight of sister___

b. Write an equation: ___$x + 94 = 112$___
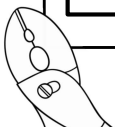
Practice setting up an equation and solving the real-world situations below.

---

3. The charge for a microwave repair was $81.21, including tax. If the tax was $6.70, then how much was the repair?

I KNOW:

tax = 6.70
total = 81.21

I NEED TO KNOW:

The cost of the microwave repair.

PLAN AND WORK:

81.21	
6.70	x

$6.70 + x = 81.21$
$x = 74.51$

SOLUTION:

It cost $74.51 to repair the microwave.

4. According to CBS, the average cost of a Super Bowl ticket in 2010 was $3,509. This is $441 less than the cost of a 2015 ticket. How much was a ticket in 2015?
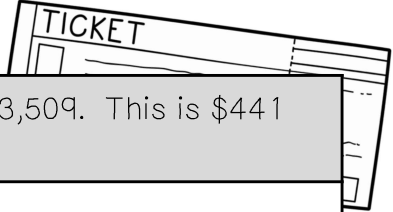
I KNOW:

2010 ticket $3,509
2015 - $441 more than 2010

I NEED TO KNOW:

The cost of a Super Bowl ticket in 2015.

PLAN AND WORK:

x	
3,509	441

$$x - 441 = 3,509$$
$$x = 3,950$$

SOLUTION:

A Super Bowl ticket in 2015 costs $3,950.

---

5. A fence surrounds two sides of a backyard. The total length of the fence is 86 feet, with the longest portion measuring 51.5 feet. What is the length of the second side of the fence?

I KNOW:

total fence is 86 feet
one side is 51.5 feet

I NEED TO KNOW:

The length of the second side of the fence.

PLAN AND WORK:

86	
51.5	x

$$x + 51.5 = 86$$
$$x = 34.5$$

SOLUTION:

The second side measures 34.5 feet long.

---

6. A skyscraper in Dubai is 2,722 feet high. A news station antenna in North Dakota measures 659 feet shorter than the Dubai skyscraper. How tall is the news station antenna?

I KNOW:

skyscraper 2,722 feet
antenna 659 shorter than skyscraper

I NEED TO KNOW:
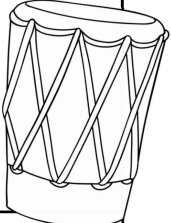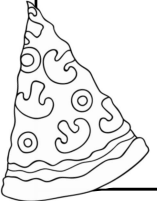
The height of the news station antenna.

PLAN AND WORK:

2,722	
x	659

$$x + 659 = 2,722$$
$$x = 2,063$$

SOLUTION:

The news station antenna is 2,063 feet tall.

Name _____

Date _____ Pd _____

ONE-STEP EQUATIONS APPLICATION I

Answer each of the questions below. Be sure to show your thinking.

1.	2.	3.
$9.5 + x = 14.2$	$x - 10.9 = 16.7$	$x - 5 = 17$
$x = 4.7$	$x = 27.6$	$x = 22$

4. The average annual precipitation in Berkeley, CA is 26.8 inches. Albany, NY has an average precipitation of 39.4 inches. What is the difference in the two cities' average annual precipitation?

Equation: _____ $39.4 - 26.8 = x$

Solution: _____ 12.6 in

5. The high school marching band has 196 members, and 28 of them are a part of the percussion. How many members are in the marching band but not a part of the percussion?

Equation: _____ $28 + x = 196$

Solution: _____ 168 members

6. On his lunch break, Crosby purchases a piece of pizza and a salad. The total order is $9.25. If the pizza cost $6.30, then how much was the salad?

Equation: _____ $x + 6.30 = 9.25$

Solution: _____ $2.95

7. According to CBS, in 2000 the average cost of a World Series ticket was $450. This is $180 more than the cost of a 2007 ticket. How much was a ticket in 2007?

Equation: _____ $x + 180 = 450$

Solution: _____ $270

8. Which equation has a solution of $x = 15$?

A. $x + 7 = 12$

B. $15 + x = 10$

C. $13 + x = 38$

D. $x + 24 = 39$

9. Liam ran 12 miles total over the weekend. He ran 5.5 miles on Saturday. Which equation can be used to find m, the number of miles he ran on Sunday?

A. $12 + 5.5 = m$

B. $5.5m = 12$

C. $m - 5.5 = 12$

D. $5.5 + m = 12$

MINI-QUIZ: ADDING & SUBTRACTING ONE-STEP EQUATIONS

Answer each question and be sure to show all work.

1. $x + 23.4 = 40.7$	2. $18 = x - 9$	5. On his lunch break, Calvin purchases a burger and a drink. The total order is $8.50, of which $1.08 is tax. How much was Calvin's meal before tax?
$x = 17.3$	$x = 27$	
3. $34 = 16 + x$	4. $x - 15 = 18$	
$x = 18$	$x = 33$	Equation: _____$x + 1.08 = 8.50$_____ Solution: _____$\$ 7.42$_____

- -

Name _____

Date _____ Pd _____

ONE-STEP EQUATIONS: MULTIPLICATION & DIVISION

Use your understanding of one-step equations to fill in the missing number to keep the scales balanced.
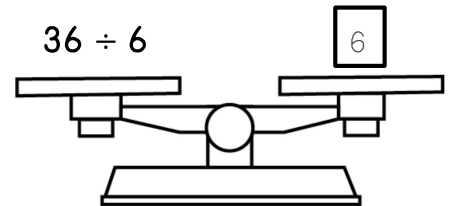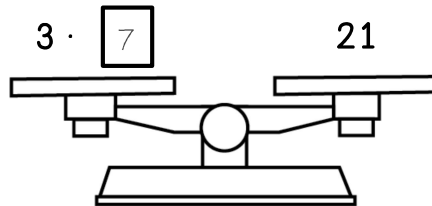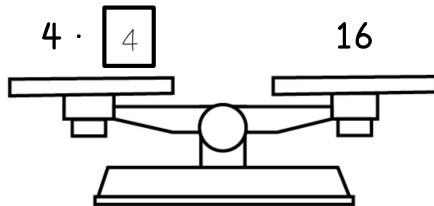
$4 \cdot \boxed{4}$ 16 $3 \cdot \boxed{7}$ 21 $36 \div 6$ $\boxed{6}$

SOLVING ONE-STEP EQUATIONS

- Solving equations allows you to find a missing value, or variable.

  - The ___variable___ must be alone or ___isolated___ on one side of the equation.

  - Isolate the variable by using ___inverse___ operations.

  - Keep your equation ___balanced___.

  - Check your ___solution___ by plugging your answer back into the equation.

1. Use the key to write and solve the equation represented below.

x x x = 1 1 1 1 1 1 / 1 1 1 1 1 1

KEY

x $-x$ 1 / -1
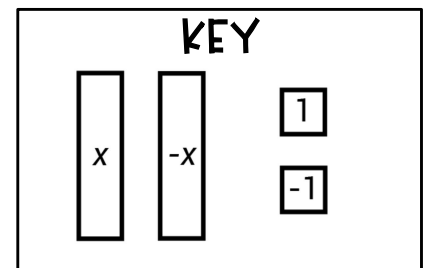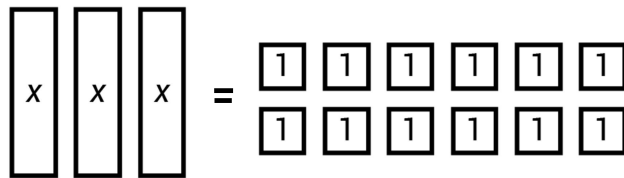
Equation: ___3x = 12___   Solution: ___x = 4___

2. Write and solve the equation represented below.

x x = 1 1 1 / 1 1 1
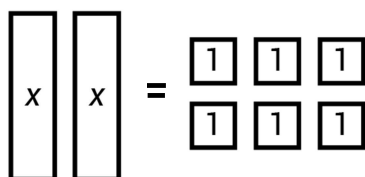
Equation: ___2x = 6___

Solution: ___x = 3___

3. Write and solve the equation represented below.

1 / 1 = x x x x
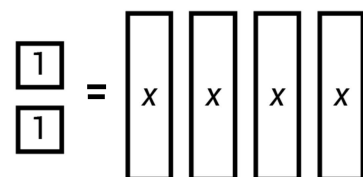
Equation: ___2 = 4x___

Solution: ___$x = \frac{1}{2}$___

Use your understanding of solving one-step equations to answer the questions below.

4. Write and solve the equation represented below.	5. Write and solve the equation represented below.

4.

15		
r	r	r
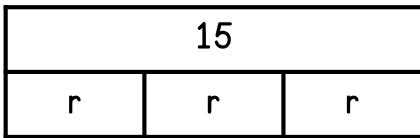
Equation: _____ $3r = 15$ _____

Solution: _____ $r = 5$ _____

5.

88.00							
t	t	t	t	t	t	t	t
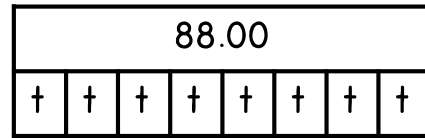
Equation: _____ $8t = 88$ _____

Solution: _____ $t = 11$ _____

Solve the following one-step equations. Draw algebra tiles if needed, and then check your work.

6.

$3x = 12$

_____ 4 _____

CHECK & GRAPH:

$3x = 12$
$3(4) = 12$

4

7.

$\dfrac{x}{2} = 16$

_____ 32 _____

CHECK & GRAPH:

$\dfrac{32}{2} = 16$
$16 = 16$

32

8.

$75 = 5x$

_____ 15 _____

CHECK & GRAPH:

$75 = 5(15)$
$75 = 75$

15

9.

$12 = \dfrac{x}{4}$

_____ 48 _____

CHECK & GRAPH:

$12 = \dfrac{48}{4}$
$12 = 12$

48

10.

$9x = 126$

_____ 14 _____

CHECK & GRAPH:

$9(14) = 126$
$126 = 126$

14

11.

$8 = \dfrac{x}{7}$

_____ 56 _____

CHECK & GRAPH:

$8 = \dfrac{56}{7}$
$8 = 8$

56

12.

$\dfrac{x}{15} = 7$

_____ 105 _____

CHECK & GRAPH:

$\dfrac{105}{15} = 7$
$7 = 7$

105

13.

$120 = 10x$

_____ 12 _____

CHECK & GRAPH:

$120 = 10(12)$
$120 = 120$

12

Summarize today's lesson:

Name _____

Date _____ Pd _____

ONE-STEP EQUATIONS: MULTIPLICATION & DIVISION

Franco is playing memory with different math cards. Solve for x on each card and record the matching sets below.

A $8x = 72$	**B** $9 + x = 33$	**C** $\dfrac{x}{5} = 12$	**D** $7 = x - 9$
E $\dfrac{x}{4} = 8$	**F** $16 + x = 34$	**G** $8x = 104$	**H** $x + 82 = 92$
I $x - 13 = 5$	**J** $20x = 200$	**K** $47 = x + 38$	**L** $\dfrac{x}{2} = 8$
M $\dfrac{x}{6} = 4$	**N** $96 = 3x$	**O** $x + 48 = 61$	**P** $x - 32 = 28$

A	K	**B**	M	**C**	P	**D**	L
x = 9		**x =** 24		**x =** 60		**x =** 16	

E	N	**F**	I	**G**	O	**H**	J
x = 32		**x =** 18		**x =** 13		**x =** 10	

Name _____

Date _____Pd_____

ONE-STEP EQUATIONS APPLICATION II

Remember the questions to ask yourself as you solve real-world problems.

What information are you given?

What are you solving for?

Does your solution make sense in the context of the problem?

Practice setting up an equation for each of the situations below. Do not solve.

1. In preparation for Thanksgiving dinner, Mrs. Waters orders an 18-pound turkey. She decides that this will be enough to feed 8 people. How many pounds of turkey is she planning per person?

18							
x	x	x	x	x	x	x	x
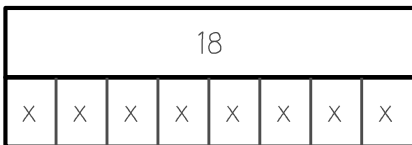
a. What does the variable represent? _pounds of turkey per person_

b. Write an equation: _____ $8x = 18$ _____

2. A deck of game cards was dealt equally among six players. Each player received 7 cards. How many cards were in the deck?

7	7	7	7	7	7	= x

a. What does the variable represent? _number of cards in the deck_

b. Write an equation: _____ $\dfrac{x}{6} = 7$ _____

Practice setting up an equation and solving the real-world situations below.

3. The cell phone bill recorded that Jeremiah sent 532 text messages last week. On average, how many text messages did he send each day?

I KNOW:

532 text messages in a week
7 days in a week

I NEED TO KNOW:

How many text messages did Jeremiah send per day?

PLAN AND WORK:

532						
x	x	x	x	x	x	x

$$\frac{532}{7} = \frac{7x}{7}$$
$$76 = x$$

SOLUTION:

Jeremiah sent 76 text messages per day.

4. On Friday afternoon, Maggie and her two friends washed their neighbor's cars in order to earn some money. They split the payment equally and each walked away with $3.50. How much did the neighbor pay them for washing the cars?

I KNOW:
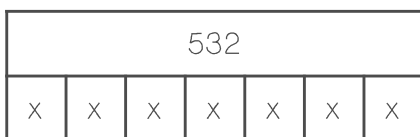
3 people
each person received $3.50

I NEED TO KNOW:

How much money did the neighbor pay?

PLAN AND WORK:

| 3.50 | 3.50 | 3.50 | $= x$

$$\frac{x}{3} = 3.50$$

SOLUTION:

The neighbor paid $10.50 to have the cars washed.

---

5. The perimeter of a square measures 26 cm. What is the length of one side of the square?

I KNOW:

perimeter of a square is 26 cm

I NEED TO KNOW:

The length of one side of the square.

PLAN AND WORK:

26 cm			
s	s	s	s

$4s = 26$
$x = 6.5$

SOLUTION:

The length of a side of the square is 6.5 cm.

---

6. An online streaming subscription is on sale for $41.94 for six months. What is the cost of the streaming subscription for one month?
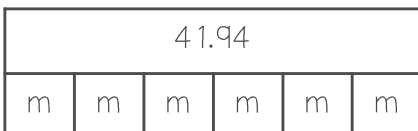
I KNOW:

$41.94 for 6 months of streaming

I NEED TO KNOW:

The cost of the online streaming service for one month.

PLAN AND WORK:

41.94					
m	m	m	m	m	m

$6m = 41.94$
$m = 6.99$

SOLUTION:

One month of streaming is $6.99.

ONE-STEP EQUATIONS APPLICATION II

Complete the table below by defining a variable, writing an equation, and then solving.

PROBLEM	EQUATION	WORK & SOLUTION
1. Hank and his two friends are attending a concert. They purchase tickets and parking for a total of $129.00. They decide it is easiest to split it evenly. How much does each person owe?	Variable: __cost per person__ Equation: ___$3x = 129$___	$43.00
2. A rectangle has an area of 135 ft². What is the length if the width is 9 ft?	Variable: __length of rectangle__ Equation: ___$9x = 135$___	15 ft
3. Jose has $34 to spend at the Texas State Fair. If the entrance ticket costs $12, then how much money does Jose have to spend on food and games?	Variable: __amount of spending money__ Equation: ___$x + 12 = 34$___	$22.00
4. Paul rode his bike 79 miles last month. He rode 23 miles during the last half of the month. How many miles did he ride during the first half of the month?	Variable: __number of miles__ Equation: ___$x + 23 = 79$___	56 miles
5. A wood beam is divided into four equal segments. Each segment measures 3.5 feet long. What is the length of the wood beam?	Variable: __length of wood beam__ Equation: ___$\frac{x}{4} = 3.5$___	14 ft

Name _____

Date _____ Pd_____

MINI-QUIZ: MULTIPLYING & DIVIDING ONE-STEP EQUATIONS

Answer each question. Be sure to show all work.

1. $$8x = 63.2$$ $x = 7.9$	2. $$14 = \frac{x}{3}$$ $x = 42$	5. On her lunch break, Audrey purchases a meal for herself and her two coworkers. If each meal costs \$8.50, then how much was the total bill?
3. $$108 = 6x$$ $x = 18$	4. $$\frac{x}{7} = 14$$ $x = 98$	Equation: $\dfrac{x}{3} = 8.50$ Solution: $x = \$25.50$ total bill

---

1. $$8x = 63.2$$	2. $$14 = \frac{x}{3}$$	5. On her lunch break, Audrey purchases a meal for herself and her two coworkers. If each meal costs \$8.50, then how much was the total bill?
3. $$108 = 6x$$	4. $$\frac{x}{7} = 14$$	Equation: _____ Solution: _____

INDEPENDENT AND DEPENDENT VARIABLES

INDEPENDENT VARIABLES	• The independent variable is the _____fixed_____ variable, or the _____constant_____. • It can be represented by the _____x - coordinates_____ and is sometimes called the _____control_____. Ex: time, number of items
DEPENDENT VARIABLES	• The dependent variable is the _____responsive_____ variable. It is dependent on the independent variable. • It can be represented by the _____y - coordinates_____ and _____changes_____ based on the independent variable. Ex: total cost ($)

Read each situation below and determine which is the independent and dependent variable.

1. Jameson runs m miles and burns c number of calories. Independent: _____number of miles, m_____ Dependent: _____number of calories burned, c_____	2. The more hours, h, Brady practices, the better his test grade, g, will be. Independent: _____number of hours, h_____ Dependent: _____test grade, g_____
3. Michael pays $8.99 per month for his streaming subscription. Independent: _____number of months_____ Dependent: _____total cost_____	4. A car travels 60 mph. Independent: _____number of hours_____ Dependent: _____total miles_____
5. Each slice of pizza costs $6.00 at the football game. Independent: _____number of slices of pizza_____ Dependent: _____total cost_____	6. The later Jessie stays up at night, the sleepier she is at school. Independent: _____number of hours slept_____ Dependent: _____sleepiness_____

____Graphs____ and ____tables____ can also display independent and dependent quantities.

7. Use the graph below to determine the independent and dependent quantities.
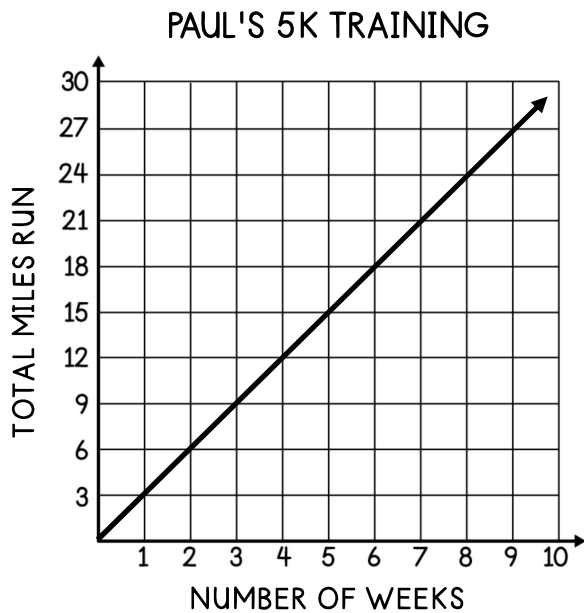
PAUL'S 5K TRAINING

a. What is the independent variable?

number of weeks

b. What is the dependent variable?

total miles run

c. List the independent quantities:

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

d. List the dependent quantities:

3, 6, 9, 12, 15, 18, 21, 24, 27, 30

e. Write an equation to represent Paul's 5K training.

y = 3x

For questions 8-9, record the independent and dependent variables from each table. Then, write an equation to represent the relationship between the variables.

8.

HOURS (H)	2	4	6	8
MILES (M)	130	260	390	520

Independent: _____# of hours_____

Dependent: _____# of miles_____

Equation: _____m = 65h_____

9.

MONTHS (M)	1	2	3	4
TOTAL COST (C)	3.99	7.98	11.97	15.96

Independent: _____# of months_____

Dependent: _____total cost_____

Equation: _____c = 3.99m_____

List the independent and dependent quantities from each table.

10.

# OF MINUTES (M)	TOTAL WORDS (W)
3	165
6	330
9	495
12	660

Independent: _____3, 6, 9, 12_____

Dependent: _____165, 330, 495, 660_____

11.

HOURS (H)	INCHES OF RAIN (R)
1	0.75
2	1.50
3	2.25
4	3.00

Independent: _____1, 2, 3, 4_____

Dependent: _____0.75, 1.5, 2.25, 3_____

12.

WEEKS (W)	TOTAL COST (C)
16	56
8	28
4	14
12	42

Independent: _____4, 8, 12, 16_____
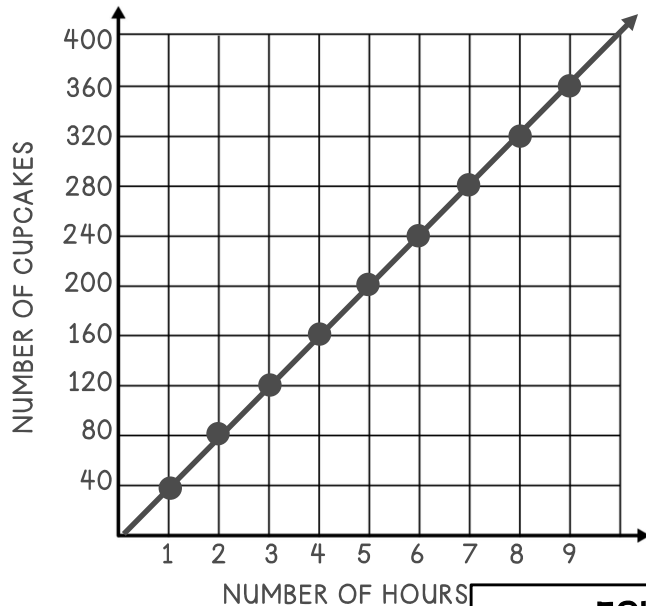
Dependent: _____14, 28, 42, 56_____

Summarize today's lesson:

INDEPENDENT AND DEPENDENT VARIABLES
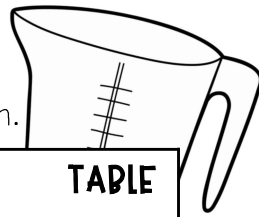
Complete the missing information in the chart below using the given verbal description.

GRAPH

NUMBER OF CUPCAKES (y-axis): 40, 80, 120, 160, 200, 240, 280, 320, 360, 400
NUMBER OF HOURS (x-axis): 1 2 3 4 5 6 7 8 9

TABLE

h	PROCESS	c
1	1 · 40	40
2	2 · 40	80
3	3 · 40	120
4	4 · 40	160
5	5 · 40	200
6	6 · 40	240
7	7 · 40	280
8	8 · 40	320
9	9 · 40	360

EQUATION

$$c = 40h$$

VERBAL DESCRIPTION

A baker can produce 40 cupcakes (c) every hour (h).

VARIABLES

Independent variable: number of hours

Dependent variable: total # of cupcakes

Use the information from the diagram above to answer the following questions about independent and dependent variables.

1. Write a sentence to explain the independent and dependent variables. The number of cupcakes made depends on how many hours the baker bakes.	2. How many hours does it take to bake 280 cupcakes? 7 hours
3. If the baker continued at the same rate, then how many cupcakes would she be able to make in 12.5 hours? 500 cupcakes	4. What does the ordered pair (5, 200) represent in this situation? It would take the baker 5 hours to produce 200 cupcakes

Name _____

Date _____ Pd _____

QUIZ: ONE-STEP EQUATIONS

Solve the equations below. Be sure to check your work.

1. $x + 18 = 63$

2. $x + 9.5 = 35$

3. $\frac{x}{15} = 8$

4. $45 = x - 20$

	Answers
1.	45
2.	25.5
3.	120
4.	65
5.	A
6.	D
7.	B
8.	C
9.	108
10.	64
11.	No
12.	B

5. Which solution satisfies the model below?
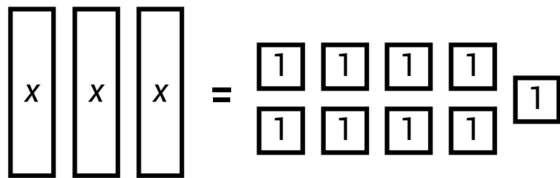
A. $x = 3$

B. $x = 6$

C. $x = 9$

D. $x = 27$

6. Which equation is true when $x = 3$?

A. $8x = 28$

B. $x - 19 = 16$

C. $28 + x = 25$

D. $\frac{x}{3} = 1$
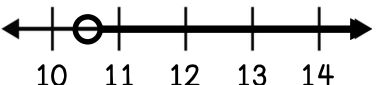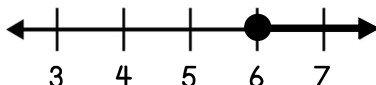
7. Which equation has a solution of $x = \frac{3}{4}$?

A. $6x = 15$

B. $x + \frac{3}{4} = 1\frac{1}{2}$

C. $x + 5.25 = 7$

D. $6x = 8$

8. Miles can type 35 words per minute. Let w represent the number of words and m represent the minutes. Which equation best represents this situation?

A. $35w = m$

B. $35 + w = m$

C. $35m = w$

D. $\frac{m}{35} = w$

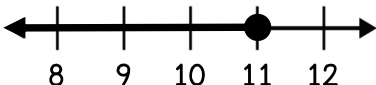9. In gym class, students were asked to form six equal groups. If there were 18 students in each group, then how many total students were there?

10. The high school dance team has 88 members, and 24 of them also hold a position in the student council. How many members are on the dance team but not in student council?

11. Taylor solves the equation $6x = 51$ and determines that $x = 7.5$. Justify whether or not he is correct in solving the equation.

_____

_____

_____

_____

12. The sum of the measures of two angles is 127.6°. One angle has a measure of 63°. What is the measure of the second angle?

A. 121.5°

B. 64.6°

C. 188.6°

D. 2.09°

Name _____

Date _____ Pd _____

INTRO TO INEQUALITIES

An equation uses an _____equal_____ sign to show that both sides are _____equal_____ .

An _____inequality_____ shows that both sides may ___not___ be equal.
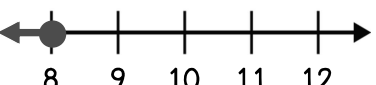
GREATER THAN	GREATER THAN OR EQUAL TO	LESS THAN	LESS THAN OR EQUAL TO
>	≥	<	≤

Use an inequality symbol to make each mathematical statement true.

4 $<$ 9	0.5 $>$ 0.45	3 $<$ 6	1.04 $<$ 1.4

INEQUALITIES	• Use the _____variable_____ as the starting point when reading an inequality statement.
	Ex: $6 \leq x$ can be rewritten as _____$x \geq 6$_____
	• A value can be substituted to determine if the inequality is correct.
	Ex: $x + 6 > 11$, if $x = 5$ $\qquad$ $7x < 45$, if $x = 6$
	$\quad 5 + 6 > 11 \rightarrow 11 > 11$ $\qquad$ $7(6) < 45 \rightarrow 42 < 45$
	false; x must be greater than 5 $\qquad\qquad$ true

Determine whether the given value makes a true statement.

1. $k + 8 \geq 19$, if $k = 11$	2. $12 > f$, if $f = 3$	3. $c - 12 > 30$, if $c = 13$
$11 + 8 \geq 19$ true	$12 > 3$ true	$13 - 12 > 30$ false
4. $16 < b - 8$, if $b = 22$	5. $\dfrac{x}{12} \leq 3$, if $x = 48$	6. $10 + p \leq 20$, if $p = 5$
$16 < 22 - 8$ false	$\dfrac{48}{12} \leq 3$ false	$10 + (5) \leq 20$ true

All the shaded numbers are true, or part of the _____solution set_____.

GREATER THAN	GREATER THAN OR EQUAL TO	LESS THAN	LESS THAN OR EQUAL TO
>	≥	<	≤

Practice graphing the following inequalities.

7.
k > 11

8   9   10   11   12

8.
12 ≥ f

10   11   12   13   14

9.
d < 6

3   4   5   6   7

10.
c < 25

15   20   25   30   35

11.
0 ≤ b

-1   0   1   2   3

12.
x ≥ 4.5

3   4   5   6   7

Using each verbal expression below, write and graph an inequality.

13. The McDonald family spends no more than $150 for groceries each week.

_x ≤ 150_

110   130   150

14. Jerod earns at least $10 when mowing lawns.

_x ≥ 10_

5   10   15   20   25

15. Jazlynn must score higher than a 92 on her science test to make an A on her report card.

_x > 92_

90   91   92   93   94

16. It takes Alex fewer than 15 minutes to walk to school.

_x < 15_

0   5   10   15   20

17. Callie says that the graph for the inequality 5 ≥ w will be the same as the graph for the inequality w ≥ 5. Do you agree or disagree? Justify your reasoning.

No. The graph for 5 ≥ w will have a closed circle with the arrow pointing to the left and the

graph for w ≥ 5 will have a closed circle with the arrow pointing to the right.

Summarize today's lesson:

INTRO TO INEQUALITIES

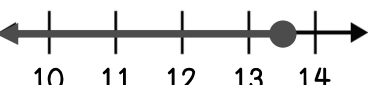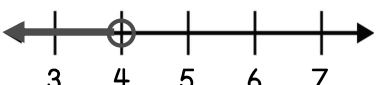Substitute each variable to determine whether the inequality statement is true or false.

1. $k + 12 \geq 20$, if $k = 15$	2. $16 > f$, if $f = 17$	3. $q > d$, if $d = 3$
$27 \geq 20$, true	$16 > 17$, false	$q > 3$, true

Write an inequality for each solution set graphed below.

4. $\underline{\quad x \leq 11 \quad}$	5. $\underline{\quad x > 10.5 \quad}$	6. $\underline{\quad x \geq 6 \quad}$
8 9 10 11 12	10 11 12 13 14	3 4 5 6 7

Practice graphing the following inequalities.

7. $k \leq 8$	8. $13.5 \geq f$	9. $d < 4$
8 9 10 11 12	10 11 12 13 14	3 4 5 6 7

Based on each verbal expression below, write and graph an inequality.

10. The Parkland Zoo has a maximum capacity of 350 visitors, v.	11. Trina must spend at least 45 minutes, m, studying for her test.
$\underline{\quad v \leq 350 \quad}$ 300 325 350 375 400	$\underline{\quad m \geq 45 \quad}$ 35 40 45 50 55

12. Mrs. Galloway asked her students to write an inequality statement and a value that makes the inequality true. Circle the name of the student who did this correctly.

JEB	ALIZA	ANGELO
$a - 12 > 10$, if $a = 22$	$35 > 4x$, if $x = 7$	$\dfrac{x}{5} \geq 10$, if $x = 15$

SOLVING INEQUALITIES

SOLVING ONE-STEP INEQUALITIES	• Inequalities can be solved by following the same steps as equations.

• The ___variable___ must be alone or ___isolated___ on one side of the inequality.

• Isolate the variable by using ___inverse___ or opposite operations.

• Whatever you do to one side, you must do to the ___other___.

Solve each inequality, check your answer, and then graph the solution.

1.

$n + 5 \leq 16$

___n ≤ 11___

CHECK & GRAPH:

$11 + 5 \leq 16$
$16 \leq 16$

11

2.

$c - 9 > 14$

___c > 23___

CHECK & GRAPH:

$24 - 9 > 14$
$15 > 14$

23

3.

$12g < 48$

___g < 4___

CHECK & GRAPH:

$12(3) < 48$
$36 < 48$

4

4.

$49 \geq 7g$

___7 ≥ g___

CHECK & GRAPH:

$49 \geq 7(6)$
$49 \geq 42$

7

5.

$\frac{p}{3} > 9$

___p > 27___

CHECK & GRAPH:

$\frac{28}{3} > 9$
$9.\overline{3} > 9$

27

6.

$33 \geq x + 19$

___14 ≥ x___

CHECK & GRAPH:

$33 \geq 13 + 19$
$33 \geq 32$

14

Solve the inequalities below for practice. Roll a pair of dice and find the sum of the two numbers showing. Solve that problem.

	SOLVE	SOLUTION
2	$7x \geq 35$	$x \geq 5$
3	$x + 6.8 < 11.2$	$x < 4.4$
4	$x - 5 > 16.7$	$x > 21.7$
5	$x + 14 \leq 16$	$x \leq 2$
6	$8 \geq x - 3$	$11 \geq x$ or $x \leq 11$
7	$7 \leq 2x$	$3.5 \leq x$ or $x \geq 3.5$
8	$\frac{x}{8} > 3$	$x > 24$
9	$\frac{x}{2} < 3.5$	$x < 7$
10	$18 < x + 11$	$7 < x$ or $x > 7$
11	$6x \geq 108$	$x \geq 18$
12	$x - 7 \leq 45$	$x \leq 52$

Use your understanding of solving inequalities to answer the questions below.

7. Kevin was asked to place a check mark next to any inequality in which x = 5 is a true statement. Check over his work and correct any mistakes.

QUESTION #1

✓ $25 < 5x$

QUESTION #2

✓ $x - 3 \leq 8$

QUESTION #3

✓ $30 \leq 6x$

Kevin should not have checked #1, since 25 is not less than 5(5).

8. Each of the students below made a statement about the inequality, $72 > 8x$. Which student(s) made a true statement?

CASSIE
You can rewrite the problem to be 8x > 72.
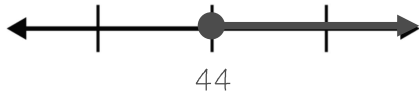
DON
The solution will be x > 9.

JOSIE
5 is part of the solution set.

Josie is correct.

Summarize today's lesson:

Name _____

Date _____ Pd _____

SOLVING INEQUALITIES

Solve the following one-step inequalities, check your work, and graph the solution.
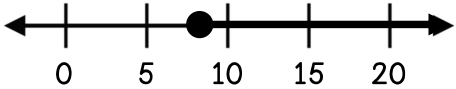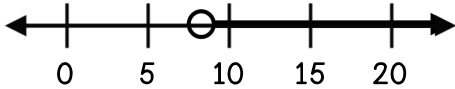
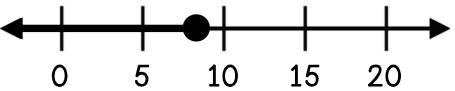| 1.	2.	3.
$3x < 54$	$\frac{x}{4} \geq 11$	$x - 7 > 29$
$\underline{x < 18}$	$\underline{x \geq 44}$	$\underline{x > 36}$
✓ CHECK:	✓ CHECK:	✓ CHECK:
$3(17) < 54$	$\frac{44}{4} \geq 11$	$37 - 7 > 29$
$51 < 54$	$11 \geq 11$	$30 > 29$
←——+——+——⊕——+——→ 18	←——+——+——●——+——→ 44	←——+——+——⊕——+——→ 36
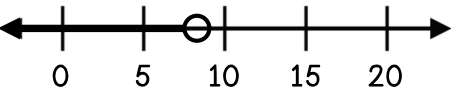
Use your understanding of inequalities to answer the questions below.

4. Which inequality is true when $x = 4$?
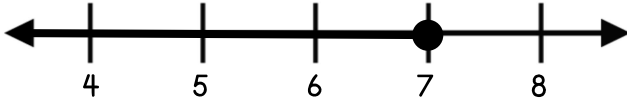
A. $x + 5 \leq 3$ B. $9x > 36$ (C.) $\frac{x}{2} < 3$ D. $18 \leq x - 8$

5. Jasmine solves the equation $15x > 120$. Which number line below represents the solution set?

A. ←——+——+——●——+——+——→
      0   5   10 15 20

(B.) ←——+——+——○——+——+——→
      0   5   10 15 20

C. ←——+——+——○——+——+——→
      0   5   10 15 20

D. ←——+——+——●——+——+——→
      0   5   10 15 20

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

←——+——+——+——●——+——→
    4   5   6   7   8

A. $16 + x < 23$ B. $5x \geq 35$

(C.) $x - 3 \leq 4$ D. $\frac{x}{2} > 3.5$

Name _____

Date _____Pd_____

APPLICATION OF INEQUALITIES

Remember the questions to ask yourself as you solve real-world problems.

What information are you given?

What are you solving for?

Does your solution make sense in the context of the problem?

Practice setting up an inequality for each of the situations below. Do not solve.

1. The school football team is selling raffle tickets for a fundraiser. It costs $155 to print the tickets, and they would like to make at least a $2,500 profit. How much money do they need to raise to cover the printing costs and meet their goal?

          a. What does the variable represent? _____ amount raised _____

          b. Write an inequality: _____ $x - 155 \geq 2500$ _____

2. Westfield Junior High is attending a field trip to the planetarium. Students must be placed into groups of 15 and the planetarium can only accept up to 18 groups per day. How many students can attend the planetarium field trip each day?

          a. What does the variable represent? _____ number of students _____

          b. Write an inequality: _____ $\frac{x}{15} \leq 18$ _____
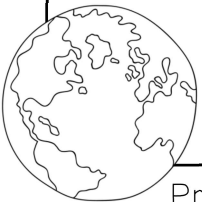
Practice setting up an equation and solving the real-world situations below.

3. Francis is saving money for a new tablet. She needs to save at least $200 and has decided to save $10 per week. How many weeks will it be before she can purchase the new tablet?

I KNOW:	I NEED TO KNOW:
save at least $200 $10 per week	How many weeks until she has enough money to purchase the tablet?

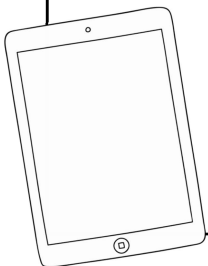| PLAN AND WORK:	SOLUTION:
$10x \geq 200$ $x \geq 20$	Francis will need to save for 20 or more weeks.

20

4. Farmer Fran would like to build a chicken coop. She determines that the area of the coop must be a minimum of 300 ft^2. If the length of the coop is 12 feet, then how wide does the chicken coop need to be? Use A=bh and sketch a diagram to help.

I KNOW:

A=bh, the area is a minimum of 300 ft^2
base is 12 feet

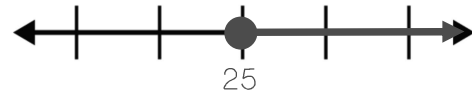**I NEED TO KNOW:**

The width of the chicken coop.

PLAN AND WORK:

$$12x \geq 300$$
$$x \geq 25$$

SOLUTION:

The chicken coop must be at least 25 feet wide.

25

---

5. Sam is purchasing flags for his flag football team and must spend less than $55.00. If each set costs $5.50, then how many flags can he purchase?

I KNOW:

flags total of less than $55.00
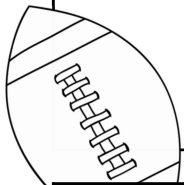$5.50 each

I NEED TO KNOW:

How many flags can Sam purchase?

PLAN AND WORK:

$$5.50x < 55$$
$$x < 10$$

SOLUTION:

Sam can purchase less than 10 flags.

10

---

6. It costs $0.30 per minute to make an international phone call. How many minutes could a caller talk if they could spend $21.00 at most on the call?

I KNOW:

$0.30 per minute
spend $21.00 or less

I NEED TO KNOW:

How many minutes can the caller talk?

PLAN AND WORK:

$$0.30x \leq 21$$
$$x \leq 70$$

SOLUTION:

The caller can talk for a maximum of 70 minutes.

70

Name _____

Date _____ Pd _____

APPLICATION OF INEQUALITIES

Gabby and her four sisters are going out to eat. Their parents gave each of them a $10.00 bill. Use the menu to help write and solve an inequality for each scenario.

CALIFORNIA CAFE

all prices shown include tax

Turkey Wrap	$6.50	Soft Drink	$1.55
Grilled Cheese	$5.49	Ice Cream	$2.80
Cobb Salad	$8.95	Chips	$1.29
Cheese Pizza	$7.25	French Fries	$1.79

1. Gabby and her four sisters combine the money their parents gave them. What is the maximum number of pizzas they can order to stay within their budget?

$7.25x \leq 50$

$x \leq 6.9$

6 pizzas

2. How many orders of french fries can the girls purchase if they want to spend less than $8.00 on french fries?

$1.79x < 8.00$

$x < 4.5$

4 orders of french fries (or less)

3. If Gabby knows she wants to order a soft drink, then what is the maximum amount of money she can spend on food to not exceed her $10.00 budget?

$1.55 + x \leq 10.00$

$x \leq \$8.45$

4. How many servings of ice cream can the girls buy if they want to spend no more than $10.00 on ice cream?

$2.80x \leq 10$

$x \leq 3.57$

3 servings (or less)

5. California Cafe has a goal of earning $130 on turkey wraps each day. How many turkey wraps do they need to sell in order to meet or exceed their goal?

$6.5x \geq 130$

$x \geq 20$

20 or more turkey wraps

6. California Cafe has a maximum capacity of 45 customers. If there are currently 27 customers in the cafe, how many more customers can they seat?

$x + 27 \leq 45$

$x \leq 18$

18 customers (or less)

Name _____

Date _____ Pd _____

EQUATIONS & INEQUALITIES UNIT STUDY GUIDE

Solve each of the problems below. These represent the types of questions on your test. Be sure to ask questions if you need more help with a topic.

I CAN DETERMINE IF A VALUE MAKES AN EQUATION OR AN INEQUALITY TRUE.

1. $6x = 108$, if $x = 18$	2. $x - 19 \leq 81$, if $x = 110$	3. $x + 6 > 24$, if $x = 18$
true	false	false

I CAN SOLVE EQUATIONS.

4. $2.1x = 23.1$	5. $x + 54 = 76$	6. $45 = 12 + x$
$x = 11$	$x = 22$	$x = 33$

7. $x - 10.6 = 16.9$	8. $\dfrac{x}{12} = 7.5$	9. $144 = 9x$
$x = 27.5$	$x = 90$	$x = 16$

10. $\dfrac{x}{8} = 14$	11. $28 = 3.5x$
$x = 112$	$x = 8$

I CAN WRITE REAL-WORLD EQUATIONS.

12. Xander collected four times as many stamps as his cousin. If Xander collected 60 stamps, then how many did his cousin collect?

Variable: _____ number of stamps collected _____

Equation: _____ 4x = 60 _____

13. Lucy has a coin collection of quarters from different states. The value of her coin collection is $9.50. How many quarters does she have in her collection?

Variable: _____ number of quarters _____

Equation: _____ 0.25x = 9.50 _____

I CAN SOLVE REAL-WORLD EQUATIONS.

14. Micah and his brother found some cash at a bus stop. They split the money evenly, each getting $16. How much money did they find?

$$\frac{x}{2} = 16$$
$$x = \$32$$

15. A large box of cereal costs $3.50. How many boxes can you purchase with $28.00?

$$3.50x = 28$$
$$x = 8 \text{ boxes}$$

16. Jada swam 200 meters more than Molly. Jada swam a total of 800 meters. How many meters did Molly swim?

$$m + 200 = 800$$
$$m = 600 \text{ meters}$$

17. A recipe calls for 2.5 cups of sugar. You have already added 0.75 cups. How many more cups of sugar do you need to add?

$$2.5 = x + 0.75$$
$$1.75 \text{ cups} = x$$

18. Jefferson High School has an enrollment of 1,864 students. In May, 564 students will graduate. How many students will be enrolled after graduation?

$$x + 564 = 1864$$
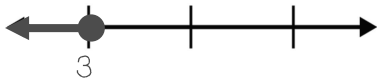$$x = 1300 \text{ students}$$

19. Mrs. Turner baked 120 cookies. She decided to give $\frac{1}{6}$ of them to her students. How many cookies did she take to her students?
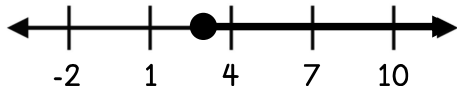
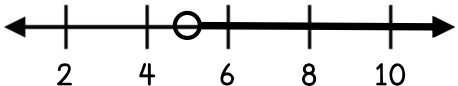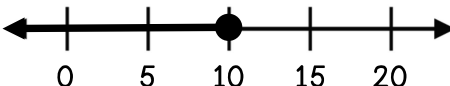$$x = \frac{1}{6}(120) \quad \text{or} \quad 120 = 6x$$
$$x = 20 \text{ cookies}$$

I CAN DETERMINE IF k=8 IS PART OF THE SOLUTION SET.

20.	21.	22.
$5k < 39$ $5(8) < 39$ $40 < 39$ No	$\dfrac{k}{2} \leq 4$ $\quad \dfrac{8}{2} \leq 4$ $\quad\quad\quad 4 \leq 4$ Yes	$k - 6 > 2$ $8 - 6 > 2$ $2 > 2$ No

I CAN GRAPH INEQUALITIES ON THE NUMBER LINE.

23.	24.	25.
$x \geq 6$ (closed dot at 6, arrow right) 6	$15.5 > x$ (open dot at 15.5, arrow left) 15.5	$x \leq 3$ (closed dot at 3, arrow left) 3
26. Write an inequality to describe the number line below. (closed dot at 4, arrow right) -2 1 4 7 10 $x \geq 3$	27. Write an inequality to describe the number line below. (open dot at 5, arrow right) 2 4 6 8 10 $x > 5$	28. Write an inequality to describe the number line below. (closed dot at 10, arrow left) 0 5 10 15 20 $x \leq 10$

I CAN IDENTIFY INDEPENDENT & DEPENDENT QUANTITIES FROM TABLES & GRAPHS.

29. Complete the statements below.

(graph: CHANGE IN VOLUME (ML) on y-axis from 10 to 100, NUMBER OF PENNIES on x-axis from 1 to 10, line rising from about 12 to 95)
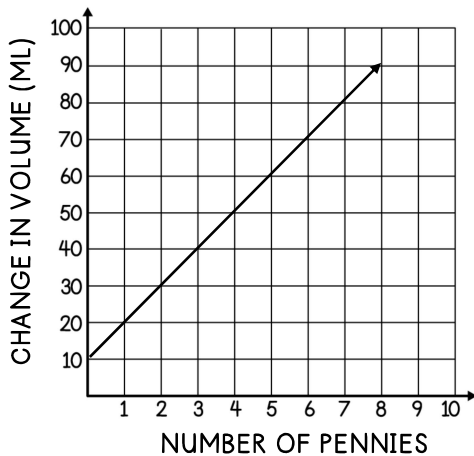
The _____ change in volume _____ depends

on the _____ number of pennies _____, which is

the independent variable.

30. Complete the statements below.

AMOUNT OF MONEY BEFORE PURCHASE (B)	AMOUNT OF MONEY AFTER $5.50 PURCHASE (A)
25	19.50
40	34.50
18	12.50
12	6.50
36	30.50

The _amount of money after the purchase_ depends

on the _amount of money before the purchase_, which

is the independent variable.

I CAN WRITE REAL-WORLD INEQUALITIES.

31. Missy is getting married and addressing invitations. She has at least 140 envelopes and has addressed 26 of them. Write an inequality that describes how many more invitations must be addressed. $26 + x \geq 140$ $x \geq 114$ invitation envelopes	32. In order to ride a roller coaster, a rider must be greater than 48 inches tall. Right now, Jeff is 45 inches tall. Write an inequality that describes how many more inches Jeff must grow in order to ride the roller coaster. $45 + x > 48$ $x > 3$ inches

I CAN SOLVE REAL-WORLD INEQUALITIES.

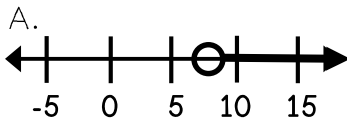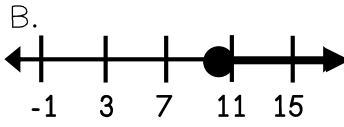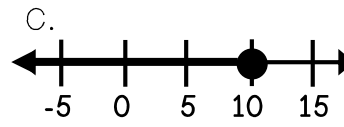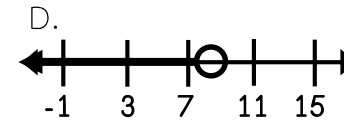|	
33. Sam can join a gym for $25.00 per month or for a flat rate of $500.00. What is the minimum number of months Sam would have to be a gym member to make the flat rate a better choice? $25x > 500$ $x > 20$ months	34. Max is creating a playlist and can have at most 180 minutes of music. He currently has 45 minutes. How many more minutes of music could Max include in the playlist? $x + 45 \leq 180$ $x \leq 135$ minutes
35. A lake is rising at a rate of 4 inches per hour. If the lake rises more than 36 inches, then it will cause flood damage. How long can the lake rise at this rate without causing flood damage? $4x \leq 36$ $x \leq 9$ hours	36. Belinda's Bakery profits $8.00 on each box of a dozen cookies. Belinda would like to profit at least $304 per day. How many boxes will Belinda need to sell each day? $8x \geq 304$ $x \geq 38$ boxes
37. The area of a rectangular dog run can be no more than 120 square feet. The length is 15 feet. What is the width of the dog run? $15x \leq 120$ $x \leq 8$ feet	38. Hunter has basketball practice five days a week. He practices a minimum of 450 minutes per week. On average how many minutes is each practice? $5x \geq 450$ $x \geq 90$ minutes

Name _____

Date _____ Pd _____

EQUATIONS & INEQUALITIES UNIT TEST

Solve the problems below. Be sure to show your thinking.

1. Which inequality is true when x = 7? A. x + 6 ≥ 18 B. x − 6 > 18 C. 11 + x < 18 (D) 11 + x ≤ 18	2. Which of the following makes the equation true? $$\frac{b}{4} = 16$$ (A) 64 B. 4 C. 16 D. 8
3. Solve for m. $$m + 7 \geq 20$$ m ≥ 13 _____	4. Solve for r. $$r - 4.5 < 11$$ r < 15.5 _____
5. A case of 12 boxes of macaroni and cheese can be purchased for $18.00. How much is each box of macaroni and cheese? x = $1.50 _____	6. Solve for j. $$j - 18 = 43$$ j = 61 _____

Match the inequalities to the correct graph.

_A_ 7. 7.5 < x

_C_ 8. x ≤ 10

A.
```
<———+——+——+——O+——+——>
   -5   0   5  10  15
```

B.
```
<———+——+——+——●——+——>
   -1   3   7  11  15
```

C.
```
<———+——+——+——●——+——>
   -5   0   5  10  15
```

D.
```
<———+——+——+—O——+——>
   -1   3   7  11  15
```

9. Which description below describes the equation: $$\frac{x}{4} = 55$$ (A) Ali divided x mugs into 55 boxes, with 4 mugs in each box. B. Ali divided 55 mugs into 4 boxes, with x mugs in each box. C. Ali divided x mugs into 55 boxes, with 4 mugs broken. D. Ali divided 4 mugs into x boxes, with 55 mugs in each box.	10. Madeline must earn at least 80 points for her science fair project. So far on the rubric she has 64 points. Write and solve an inequality to show how many points Madeline needs. x ≥ 16 _____

Solve the problems below. Be sure to show your thinking.

11. Jaxon must sell at least 49 rolls of wrapping paper to support the robotics club fundraiser. He has already sold 24 rolls of wrapping paper. Which inequality best represents the number of rolls of wrapping paper Jaxon still needs to sell? A. $x + 24 > 49$ B. $x + 24 \leq 49$ C. $x + 24 < 49$ (D) $x + 24 \geq 49$	12. In the table below, which best represents the independent variable? <table><tr><td># OF DAYS</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>TOTAL SALES</td><td>8</td><td>16</td><td>24</td><td>32</td><td>40</td></tr></table> A. the number of sales (B) the number of days C. the total cost D. the amount of time it takes to make a sale
13. Each soda costs $4.50 at a baseball game. Which of the following represents the dependent variable? A. $4.50 B. the number of sodas (C) the total cost D. the total number of sodas sold at the game	14. The summer sports training camp has a maximum capacity of 250 students. If 85 have preregistered, then how many students can still participate? Write and solve an inequality. $\underline{\hspace{2cm} x \leq 165 \hspace{1cm}}$
15. The sum of the measures of two angles is 107.3°. One angle has a measure of 51°. What is the measure of the second angle? $\underline{\hspace{2cm} x = 56.3° \hspace{1cm}}$	16. In gym class students were asked to form nine equal groups. If there were 16 students in each group, then how many total students were there? $\underline{\hspace{2cm} x = 144 \text{ students} \hspace{0.5cm}}$
17. Solve for g. $$\frac{g}{4} > 12$$ $\underline{\hspace{2cm} g > 48 \hspace{1cm}}$	18. Miles can type 60 words per minute. Let w represent the total number of words Miles can type and m represent the number of minutes he types. Which equation best represents this? A. $60 + w = m$ B. $60w = m$ C. $\frac{m}{60} = w$ (D) $60m = w$
19. If x = 9, then which inequality is true? (A) $2x > 16$ B. $x + 5 \leq 2$ C. $2x < 5$ D. $x - 2 \geq 16$	20. The Weston family spends a maximum of $50.00 per month on entertainment. Write and graph an inequality to represent this. $x \leq 50$![number line with closed circle at 50] 50