Algebra
Unit 2 : Solving Equations Test

Name: Key
Date: _____ Algebra: ____

READ ALL OF THE DIRECTIONS

In order to earn full credit on this test you must use a pencil and show ALL of your work and circle your answers. Leave your answers in reduced, improper fractions!

(11)

1. Match each property with the equation that illustrates it by *writing the letter* of your choice on the line provided.

E	Associative property of Addition	a. $500 + 0 = 500$
I	Commutative property of Multiplication	b. $2(a + 7) = 2a + 14$
B	Distributive property	c. $1 = \frac{1}{w} * w$
A	Additive Identity	d. $t + (-t) = 0$
J	Associative Property of multiplication	e. $(q + r) + s = q + (r + s)$
G	Multiplicative Identity	f. $0 = 99*0$
D	Additive Inverse	g. $p*1 = p$
C	Multiplicative Inverse	h. $a = b,\ b = c,\ a = c$
H	Transitive Property	i. $7 * 5 = 5 * 7$
K	Commutative Property of Addition	j. $3 * (5 * 2) = (3 * 5) * 2$
F	Zero Property	k. $m + n = n + m$

(3)

2. There are a few mistakes in the work in the box below. Circle ONE mistake. Describe the mistake made and how it can be corrected in the space to the right. You should not redo the problem.

$3f - 2 + f = -3 + 5f$

$-f \quad -f$

$2f - 2 = -3 - 5f$

$-2 \quad -2$

$2f = -5 - 5f$

$+5f \quad +5f$

$\frac{7f}{7} = \frac{-5}{7}$

$f = \frac{5}{7}$

subtracted f twice from one side of eq.

did not use inverse operations

dropped negative sign.

For each of the following multiple choice questions choose only ONE answer choice. Clearly circle your choice.

3. Anna is thinking of a number. Four times the quantity of twice the number minus five is equal to the number plus one. Which choice represents an equation to find the number Anna is thinking of?

   a. $4 \cdot 2x - 5 = x + 1$

   b. $4(2x - 5) = x + 1$

   c. $\frac{2x-5}{4} = x + 1$

   d. $2x - 5 \cdot 4 = x + 1$

4. The formula to find the area of a triangle is $A = \frac{1}{2}bh$ Which of the following is the same formula, solved for b?

   a. $b = \frac{1}{2}Ah$

   b. $2A - h = b$

   c. $\frac{2A}{h} = b$

   d. $b = 2Ah$

5. Which of the following would result in an answer of *no solution*?

   a. $X = 5$

   b. $3 = 3$

   c. $X = 0$

   d. $3 = 5$

6. Which of the following represents an algebraic expression?

   a. $3x + 1 = 2x + 5(x + 1)$

   b. $2a^2 + 5a - a^2 + 8 + a$

   c. $2p + 10 = 100$

   d. $2xy + 3x = -z$

7. Which of the following CAN you cross multiply?

   a. $\frac{1}{2} + \frac{x}{3}$

   b. $3 = \frac{x}{3} = \frac{-6}{y}$

   c. $\frac{1}{2} = \frac{x}{3} + \frac{5}{2}$

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

8. **Solve the following equations. SHOW ALL WORK AND CIRCLE YOUR ANSWERS!**

(8)

a. $0 = \frac{2p}{3} + 4$

$-4 \quad -4$

$3. \quad -4 = \frac{2p}{3} \cdot 3$

$\frac{-12}{2} = \frac{2p}{2}$

$-6 = p$

b. $-7 - 2(-1 + 8k) = -5 + 5k$

$-7 + 2 - 16k = -5 + 5k$

$-5 \quad -5$

$-16k = 5k$

$+16k \quad +16k$

$\frac{0}{21} = \frac{21k}{21}$

$0 = k$

(16)

9. At an amusement park, Teddy can spend $10 on snacks and $5 on games and only go on five rides, OR he can go on ten rides, spend $4 on snacks and have $1 left over. If each ride costs the same amount, how much is each ride?

a. Write an equation that models this situation; be sure you define your variable!

x = cost of each Ride. $\quad 10+5+5x = 10x+4+1$

b. Solve your equation to determine how much each ride costs. Be sure to answer in a full sentence.

$15+5x = 10x+5$

$-5 \quad -5$

$10 + 5x = 10x$

$-5x \quad -5x$

$\frac{10}{5} = \frac{5x}{5}$

$2 = x$

each Ride costs $2

c. Use your answer to figure out how much money Teddy brought to the park with him.

$15+5x$

$15+5(2)$

$15+10$

25

Teddy brought $25

(10) **10. Solve the following equations. SHOW ALL WORK AND CIRCLE YOUR ANSWERS!**

a. $\frac{6}{6}p - \frac{3}{2}\frac{3}{3} + \frac{4}{3}\frac{2}{2}p = 2$

CD = 6

$\frac{6p}{6} - \frac{9}{6} + \frac{8p}{6}$

$\frac{6p-9+8p}{6}$

$\frac{14p-9}{6} = 2 \cdot 6$

$14p - 9 = 12$

$+9 \quad +9$

$\frac{14p}{14} = \frac{21}{14}$

$p = \frac{21}{14}$

$p = \frac{3}{2}$

b. $\frac{3m+10}{4} = \frac{m}{2} - 3\frac{2}{2}$

$\frac{3m+10}{4} = \frac{m-6}{2}$

$2(3m+10) = 4(m-6)$

$6m + 20 = 4m - 24$

$-4m \quad -4m$

$2m + 20 = -24$

$-20 \quad -20$

$\frac{2m}{2} = \frac{-44}{2}$

$m = -22$

(4) 11. The sum of three consecutive numbers is 18. What is the **middle** number?

a. Let x = the first number. Write an equation that describes this situation. $x + (x+1) + (x+2) = 18$

b. Solve your equation and answer the question in a full sentence.

$3x + 3 = 18$

$-3 \quad -3$

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

$x = 5$ → #s: 5, 6, 7

The middle # is 6

(2) **12.** Anna finished a modeling problem for math class and came up with the answer: $2s + 45 = 99$. Which of the following could be the situation that Anna wrote her model for? **(Choose only one answer choice)**

a. Steve spent 99 in total at the mall, he bought 2 shirts and a pair of jeans that cost $45. How much do the shirts cost?

b. Steve bought two shirts for $22 each and a pair of jeans, if he spent $99 in total, how much were the jeans?

c. Steve bought some shirts and pants at the mall and spent $99, how much were the shirts?

d. Steve spent $99 at the mall, he bought 2 pairs of jeans and 1 shirt for $22. How much are the jeans?

(6)

13. Literal Equations – solve each of the equations/formulas for the stated variable. Show all of your work and box in your answer.

a. $V = \pi r^2 h$ for h

$\frac{V}{\pi r^2} = \frac{\pi r^2 h}{\pi r^2}$

$\boxed{\frac{V}{\pi r^2} = h}$

b. $y = mx + b$, solve for x.

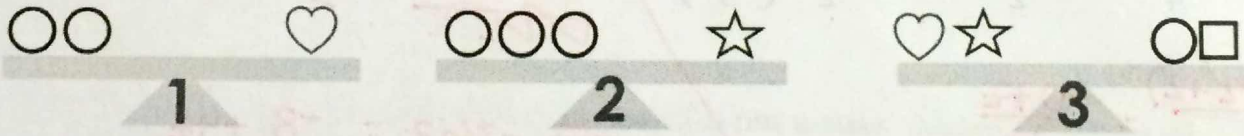
$-b \quad -b$

$\frac{y-b}{m} = \frac{mx}{m}$

$\boxed{\frac{y-b}{m} = x}$

(4)

14. Consider the scales below and complete the following questions.



a. Determine how many circles are equal to one square.

1□ = 4○

b. Describe how you came to your answer in part a.

c. If the square is equal to twelve units, determine the value of the other shapes: Show or describe your work.

Circle = 3

Heart = 6

Star = 9

15. Jason says that the two formulas below are the same. Is he correct or not? Explain your answer mathematically.

$K = \frac{1}{2}mv^2$	$m = \frac{2k}{v^2}$

yes...

EXTRA Credit:

1. Solve the following equation.

$$\frac{-1}{4} - \frac{3z+1}{2} = \frac{-1}{2}\left(\frac{2-z}{3}\right)$$

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

$\frac{-1-6z-2}{4}$

$\frac{-3-6z}{4} = \frac{-2+z}{6}$

$6(-3-6z) = 4(-2+z)$

$-18-36z = -8+4z$

$+18 \quad -4z \quad +18 \quad -4z$

$\frac{-40z}{-40} = \frac{10}{-40}$

$z = \frac{-1}{4}$

2. Look at the circle to the right , what letter does not belong with the others? Circle it. Explain why it doesn't belong below:

Q