

Name \_\_\_\_\_

## Unit 6 Study Guide: Expressions, Equations &amp; Inequalities

1. Beth got a \$75 gift card to an online music store. She uses the gift card to buy an album for \$14.95. She also wants to use the gift card to buy some singles. Each song costs \$1.99. Write an inequality that describes this situation, where  $s$  is the number of songs Beth wants to buy?

$$14.95 + 1.99s \leq 75$$

2. Select all expressions that are equivalent to  $7x + 2 - (4x - 2)$ .

a.  $7x + 2 - 4x - 2$

b.  $7x + -4x + 2 + 2$

c.  $3x + 4$

d.  $7x - 4x + 2 - 2$

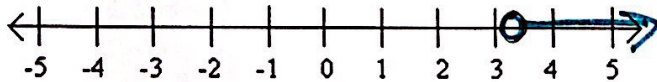
e.  $7x + 2 + -4x - -2$

3. At midnight, the temperature in a city was 5 degrees Celsius. The temperature was dropping at a rate of 3 degrees Celsius per hour.

a. Write an inequality that represent  $n$ , the number of hours past midnight, when the temperature was colder than -5 degrees Celsius. Explain your reasoning.

$$5 - 3n < -5$$

b. On the number line, show all the values of  $n$  that make your inequality true.



\*MULT/÷  
by neg #  
flip sign.

$$\begin{array}{r} \cancel{5} - 3n < \cancel{-5} \\ \hline -3n < -10 \\ \hline -3 \phantom{0} \\ \hline n > 3\frac{1}{3} \end{array}$$

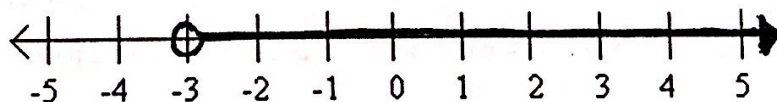
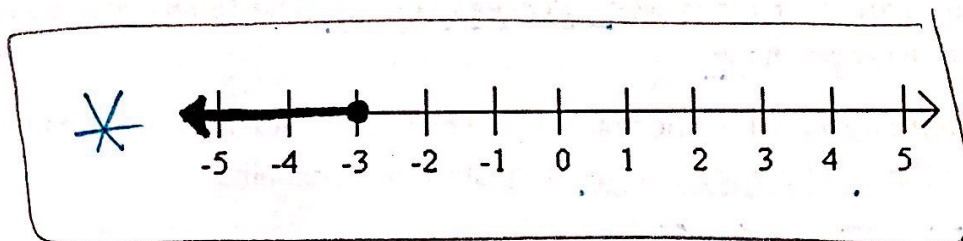
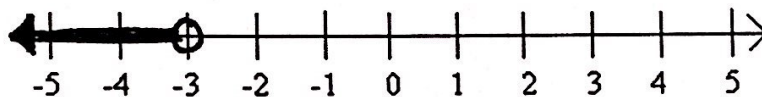
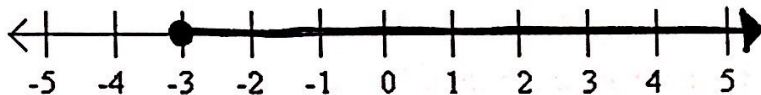
Name \_\_\_\_\_

## Unit 6 Study Guide: Expressions, Equations &amp; Inequalities

4. Which number line shows all the values of  $x$  that make the inequality

$$-5x + 3 \geq 18 \text{ true?}$$

$$\begin{array}{r} -3 - 3 \\ \hline -5x \geq 15 \\ \hline -5 \quad -5 \\ \hline x \leq -3 \end{array}$$



5. Expand to write an equivalent expression:  $-\frac{1}{4}(-12x + 20y)$   
Distribute

$$\frac{3x + (-5y)}{4} = 3x - 5y$$

6. Factor to write an equivalent expression:  $81m - 108$

$$9(9m - 12) \text{ or } 27(3m - 4)$$

Name \_\_\_\_\_

## Unit 6 Study Guide: Expressions, Equations &amp; Inequalities

7. Skyler is simplifying the expression  $8 - 4x + 7 + 6x$ . Here is her work:

$$\begin{array}{l}
 8 - 4x + 7 + 6x \\
 (8 - 4)x + (7 + 6)x \\
 4x + 13x \\
 17x
 \end{array}$$

factored out an 'x'!

a. Skyler's work is <sup>15</sup> incorrect. Explain the error she made.b. Simplify the expression  $8 - 4x + 7 + 6x$ .

$$15 + 2x \text{ or } 2x + 15$$

Solve for each variable (#8-13)

8.  $3(x + 6) = 86 + x$

$$\begin{array}{r}
 3x + 18 = 86 + x \\
 + x - 18 \quad | \quad -18 + x \\
 \hline
 4x = 68 \\
 \frac{4x}{4} = \frac{68}{4} \\
 x = 17
 \end{array}$$

$x = 17$

9.  $\frac{r}{-5} = -18$  (-5)

$$r = 90$$

10.  $-2.3x - 8.7 = -0.8x - 4.2$

$$\begin{array}{r}
 -2.3x - 8.7 = -0.8x - 4.2 \\
 +2.3x \quad | \quad +2.3x \\
 \hline
 -8.7 = 1.5x - 4.2 \\
 +4.2 \quad | \quad +4.2 \\
 \hline
 -4.5 = 1.5x \\
 \frac{-4.5}{1.5} = \frac{1.5x}{1.5}
 \end{array}$$

Name \_\_\_\_\_

## Unit 6 Study Guide: Expressions, Equations &amp; Inequalities

11.  $-12 \geq -8 + 6m$

$$m \leq -\frac{2}{3}$$

$$\begin{array}{r} -12 \geq -8 + 6m \\ +8 \quad +8 \\ \hline -4 \geq 6m \\ 3 \cancel{6} \quad 6 \\ \hline -\frac{2}{3} \geq m \end{array}$$

12.  $3(5x+2) - 11x < 38$

$$x < 8$$

$$\begin{array}{r} 3(5x+2) - 11x < 38 \\ (15x) + 6 - 11x < 38 \\ 4x + 6 < 38 \\ -6 \quad -6 \\ \hline 4x < 32 \\ \frac{4x}{4} < \frac{32}{4} \\ \boxed{x < 8} \end{array}$$

13.  $-3.8 \leq g + (-4.7)$

$$g \geq 0.9$$

$$\begin{array}{r} -3.8 \leq g + (-4.7) \\ +4.7 \quad +4.7 \\ \hline 0.9 \leq g \end{array}$$

14. A fish tank holds 20 liters of water. Each day the tank drains 0.7 liters of water. A sensor will buzz when the remaining water is 3.5 liters or less.

a. Starting from a full tank, can the fish tank last 15 days without the sensor going off? Explain or show your reasoning.

$$15(.7) = 10.5$$

$$20 - 10.5 = 9.5$$

$$9.5 > 3.5$$

Yes

b. Write and solve an equation to determine the number of days the fish tank can last without the sensor buzzing.

$$20 - 0.7x = 3.5$$

c. Write and solve an inequality that represents this situation. Explain what the solution means in the context of the situation. (Before buzzer goes off)

$$20 - 0.7x > 3.5$$