

Algebra Unit 2a Test Review

1. Solve the equation below. Justify each step.

$$3k - 3(3k - 2) = 10$$

| | |
|--|-------|
| | Given |
| | |

2. Solve the equation below. Justify each step.

$$-15x + 9 + 6x = 36$$

| | |
|--|-------|
| | Given |
| | |

3. Solve the equation below. Justify each step.

$$-3y + 4 = 9y - 6$$

| | |
|--|-------|
| | GIVEN |
| | |

4. Solve the equation below. Justify each step.

$$15w - 2(4w + 1) = w - 65$$

| | |
|--|-------|
| | Given |
| | |

5. Solve the inequality. Show all steps. Put your final answer in the boxes below.

$$3(2x - 3) \leq 5x - 27$$

| Solution | Interval Notation |
|----------|-------------------|
| | |

6. Solve the inequality. Show all steps. Put your final answer in the boxes below.

$$-3(x - 5) < 4$$

| Solution | Interval Notation |
|----------|-------------------|
| | |

7. Solve the equations.

$$7x - 6 = x + 6(x + 5)$$

$$7x + 30 = x + 6(x + 5)$$

8. In the problem below, explain the error.

$$6x - 2(x - 5) = 22$$

$$6x - 2x + 10 = 22$$

$$4x + 10 = 22$$

$$4x = 32$$

$$x = 8$$

9. Write the steps for each step of the equation.

$$3(5x - 6) = 4x + 10$$

$$15x - 18 = 4x + 10$$

$$11x - 18 = 10$$

$$11x = 28$$

$$x = \frac{28}{11}$$

10. Solve the equation below for h :

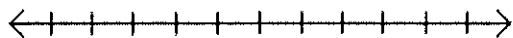
$$V = 4\pi r^2 h$$

11. Solve the equation for b :

$$\omega = 6a + 5b$$

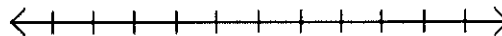
12. Solve and graph the inequality. Write your answer in interval notation.

$$2x + 6(3x - 3) \leq 7 - 5x$$



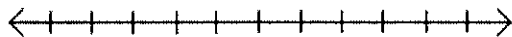
13. Solve and graph the inequality (your answer may be in interval or inequality form).

$$10x - 7 > 13 \text{ or } -4x - 2 > 10$$



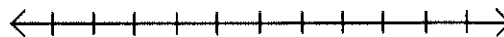
14. Solve and graph the inequality (your answer may be in interval or inequality form).

$$-10 \leq 2x - 8 < -6$$



15. Solve and graph the inequality (your answer may be in interval or inequality form).

$$-11 \leq 5x - 6 \leq 4$$



Name the properties below:

- If $a = b$, then $b = a$.
- $A = A$
- If $a = b$, and $b = c$, then $a = c$.

18. Emily is saving to buy a new dress for the prom. She already has some money saved. She adds to this fund with her allowance that she receives each week. The length of time it will take her to save for the dress is modeled by the inequality: $20 + 5x \geq 125$.

a. What does the constant represent? _____

b. How much is Emily's weekly allowance? _____

c. Describe the amount Emily will pay for the dress. _____

d. Solve the inequality. How many weeks will it take Emily to save enough to purchase the dress? _____

19. Bela is walking from home to school at a constant rate in feet per minute. Her distance to school is modeled by:

$$d = 3200 - 95m$$

Answer the following and include units.

How far does Bela live from school? _____

How fast does Bela walk? _____

20. A tub is filled with water. When the stopper is removed, the water drains at a constant rate of gallons per minute. This is modeled by $150 - 35x$. Interpret the following with units:

150: _____

35: _____

x: _____

Can the value of $x = 5$? Explain: _____

21. Find three consecutive integers such that the sum of three times the smallest number and twice the largest number is 119.

Equation: _____

Solution: _____

22. The length of a rectangle is 3 inches less than twice its width. If the rectangle has a perimeter of 84 inches, find the length and width. Let w = the width of the rectangle.

Equation: _____

Solution: _____

23. The sum of two consecutive odd integers is 104. Find the numbers.

Algebra Unit 2A Test Review

1. Solve the equation below. Justify each step.

$$3k - 3(3k - 2) = 10$$

| | |
|-----------------------|----------------------|
| $3k - 3(3k - 2) = 10$ | Given |
| $3k - 9k + 6 = 10$ | Distributive |
| $-6k + 6 = 10$ | Combining like terms |
| $-6k = 4$ | Subtraction prop. |
| $k = -\frac{4}{6}$ | Division prop. |
| $k = -\frac{2}{3}$ | Simplify. |

2. Solve the equation below. Justify each step.

$$-15x + 9 + 6x = 36$$

| | |
|----------------------|----------------------|
| $-15x + 9 + 6x = 36$ | Given |
| $-9x + 9 = 36$ | Combining like terms |
| $-9x = 27$ | Subtraction prop. |
| $x = -3$ | Division prop. |

3. Solve the equation below. Justify each step.

$$-3y + 4 = 9y - 6$$

| | |
|---------------------|----------------|
| $-3y + 4 = 9y - 6$ | GIVEN |
| $4 = 12y - 6$ | Addition prop. |
| $10 = 12y$ | Addition prop. |
| $\frac{10}{12} = y$ | Division prop. |
| $\frac{5}{6} = y$ | Simplify |
| $y = \frac{5}{6}$ | Symmetric |

4. Solve the equation below. Justify each step.

$$15w - 2(4w + 1) = w - 65$$

| | |
|----------------------------|----------------------|
| $15w - 2(4w + 1) = w - 65$ | Given |
| $15w - 8w - 2 = w - 65$ | Distributive |
| $7w - 2 = w - 65$ | Combining like terms |
| $6w - 2 = -65$ | Subtraction prop. |
| $6w = -63$ | Addition prop. |
| $w = -\frac{63}{6}$ | Division |
| $w = -\frac{21}{2}$ | Simplify |

5. Solve the inequality. Show all steps. Put your final answer in the boxes below.

$$3(2x - 3) \leq 5x - 27$$

$$6x - 9 \leq 5x - 27$$

$$x - 9 \leq -27$$

$$x \leq -18$$

| Solution | Interval Notation |
|--------------|-------------------|
| $x \leq -18$ | $(-\infty, -18]$ |

6. Solve the inequality. Show all steps. Put your final answer in the boxes below.

$$-3(x - 5) < 4$$

$$-3x + 15 < 4$$

$$-3x < -11$$

$$x > \frac{11}{3}$$

* Switch the sign.

| Solution | Interval Notation |
|--------------------|--------------------------|
| $x > \frac{11}{3}$ | $(\frac{11}{3}, \infty)$ |

7. Solve the equations.

$$7x - 6 = x + 6(x + 5)$$

$$7x - 6 = x + 6x + 30$$

$$7x - 6 = 7x + 30$$

$$\begin{array}{r} -7x \\ -7x \end{array} \quad \begin{array}{r} -6 = 30 \\ -6 = 30 \end{array} \rightarrow \text{NO solution!}$$

$$7x + 30 = x + 6(x + 5)$$

$$7x + 30 = x + 6x + 30$$

$$7x + 30 = 7x + 30$$

$$30 = 30 \rightarrow \text{All Real}$$

8. In the problem below, explain the error.

$$6x - 2(x - 5) = 22 \quad 6x - 2x + 10 = 22$$

$$6x - 2x + 10 = 22 \quad 4x + 10 = 22$$

$$4x + 10 = 22$$

$$4x = 32$$

$$x = 8$$

Added 10 instead
of subtracted.

9. Write the steps for each step of the equation.

$$3(5x - 6) = 4x + 10 \quad \text{given}$$

$$15x - 18 = 4x + 10 \quad \text{Distributive prop.}$$

$$11x - 18 = 10 \quad \text{Subtraction prop.}$$

$$11x = 28 \quad \text{Addition prop.}$$

$$x = \frac{28}{11} \quad \text{Division prop.}$$

10. Solve the equation below for h :

$$V = \frac{4\pi r^2 h}{3} \quad \text{Divide by } 4\pi r^2$$

$$\frac{V}{4\pi r^2} = \frac{4\pi r^2 h}{4\pi r^2}$$

$$h = \frac{V}{4\pi r^2}$$

11. Solve the equation for b :

$$w = 6a + 5b$$

$$-6a - 6a$$

$$w - 6a = 5b$$

$$\frac{w - 6a}{5} = \frac{5b}{5}$$

$$b = \frac{w - 6a}{5}$$

12. Solve and graph the inequality. Write your answer in interval notation.

$$2x + 6(3x - 3) \leq 7 - 5x$$

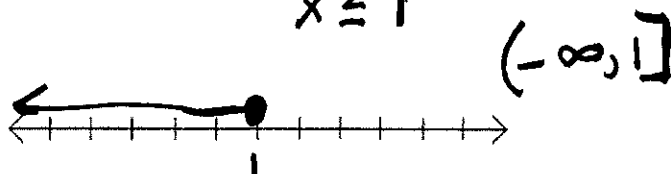
$$2x + 18x - 18 \leq 7 - 5x$$

$$20x - 18 \leq 7 - 5x$$

$$25x - 18 \leq 7$$

$$25x \leq 25$$

$$x \leq 1$$



14. Solve and graph the inequality (your answer may be in interval or inequality form).

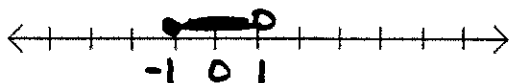
$$-10 \leq 2x - 8 < -6$$

$$\begin{array}{r} +8 \quad +8 \quad +8 \\ \hline -10 \leq 2x - 8 < -6 \end{array}$$

$$-2 \leq 2x < 2$$

$$-1 \leq x < 1$$

$$\boxed{-1 \leq x < 1 \quad / \quad [-1, 1)}$$



13. Solve and graph the inequality (your answer may be in interval or inequality form).

$$10x - 7 > 13 \text{ or } -4x - 2 > 10$$

$$10x > 20$$

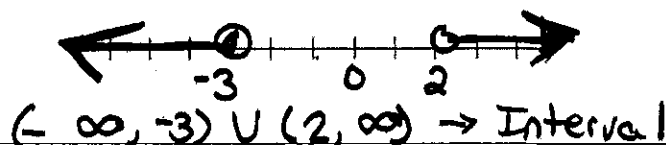
$$-4x > 12$$

$$x > 2$$

$$\text{or } x < -3$$

Flip sign!

$$\boxed{x > 2 \text{ or } x < -3} \text{ Inequality form}$$



15. Solve and graph the inequality (your answer may be in interval or inequality form).

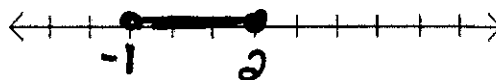
$$-11 \leq 5x - 6 \leq 4$$

$$\begin{array}{r} +6 \quad +6 \quad +6 \\ \hline -11 \leq 5x - 6 \leq 4 \end{array}$$

$$-5 \leq 5x \leq 10$$

$$-1 \leq x \leq 2$$

$$\boxed{-1 \leq x \leq 2 \quad / \quad [-1, 2]}$$



Name the properties below:

• If $a = b$, then $b = a$. Symmetric property

• $A = A$ Reflexive Property

• If $a = b$, and $b = c$, then $a = c$. Transitive property

18. Emily is saving to buy a new dress for the prom. She already has some money saved. She adds to this fund with her allowance that she receives each week. The length of time it will take her to save for the dress is modeled by the inequality: $20 + 5x \geq 125$.

a. What does the constant represent? 20 \$20 money already saved

b. How much is Emily's weekly allowance? \$5.00

c. Describe the amount Emily will pay for the dress. at least \$125

d. Solve the inequality. How many weeks will it take Emily to save enough to purchase the dress? 21 weeks

$$\begin{aligned} 20 + 5x &\geq 125 \\ 5x &\geq 105 \\ x &\geq 21 \end{aligned}$$

19. Bela is walking from home to school at a constant rate in feet per minute. Her distance to school is modeled by:

$$d = 3200 - 95m$$

Answer the following and include units.

How far does Bela live from school? 3200 feet

How fast does Bela walk? 95 feet/min.

20. A tub is filled with water. When the stopper is removed, the water drains at a constant rate of gallons per minute. This is modeled by $150 - 35x$. Interpret the following with units:

150: Number of gallons filling tub

35: Loses 35 gallons each minute

x: the number of minutes.

Can the value of $x = 5$? Explain: no.

There will be no water left at 5 minutes.

21. Find three consecutive integers such that the sum of three times the smallest number and twice the largest number is 119.

$$x, x+1, x+2$$

Equation: $3x + 2(x+2) = 119$

Solution: 23, 24, 25

$$\begin{aligned} 3x + 2x + 4 &= 119 \\ 5x + 4 &= 119 \\ 5x &= 115 \\ x &= 23 \end{aligned}$$

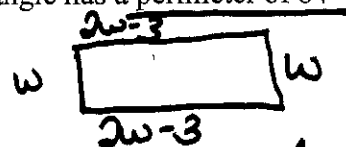
22. The length of a rectangle is 3 inches less than twice its width. If the rectangle has a perimeter of 84 inches, find the length and width. Let w = the width of the rectangle.

Equation: $(2w-3) + w + (2w-3) + w = 84$

$$6w - 6 = 84$$

$$\begin{aligned} 6w &= 90 \\ w &= 15 \end{aligned}$$

Solution: $w = 15$ in; $l = 27$ in



$$\begin{aligned} l &= 2w - 3 \\ l &= 2(15) - 3 \\ l &= 30 - 3 \\ l &= 27 \end{aligned}$$

23. The sum of two consecutive odd integers is 104. Find the numbers.

$$\begin{aligned} x \\ x+2 \end{aligned}$$

$$\begin{aligned} x + x+2 &= 104 \\ 2x + 2 &= 104 \\ 2x &= 102 \\ x &= 51 \end{aligned}$$

$$\boxed{51, 53}$$