Folder Check Algebra Unit #2

Name: ____________ Score: ____ out of 70

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Worksheet Policy
-0 All Questions Done
-1 More than Half Done
-2 Only Groupwork Q’s
-3 Less than Half Done
-4 Blank/Absent

Notes Policy
-0 All boxes filled
-1 One Empty Box
-2 Two Empty Boxes
-3 Less than Half Done
-4 Blank/Absent

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## Solving One Step Equations

**Solve each equation.**

<table>
<thead>
<tr>
<th>Equation</th>
<th>Solution</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x + 5 = 9$</td>
<td>$x = 4$</td>
<td>Subtraction $-5$</td>
</tr>
<tr>
<td>$a + 12 = 16$</td>
<td>$a = 4$</td>
<td>Addition $-12$</td>
</tr>
<tr>
<td>$c + 8 = 17$</td>
<td>$c = 9$</td>
<td>Addition $-8$</td>
</tr>
<tr>
<td>$y - 4 = 3$</td>
<td>$y = 7$</td>
<td>Addition $+4$</td>
</tr>
<tr>
<td>$x - 7 = 5$</td>
<td>$x = 12$</td>
<td>Addition $+7$</td>
</tr>
<tr>
<td>$b - 1 = 21$</td>
<td>$b = 22$</td>
<td>Addition $+1$</td>
</tr>
<tr>
<td>$f + 7 = 12$</td>
<td>$f = 5$</td>
<td>Subtraction $-7$</td>
</tr>
<tr>
<td>$g + 2 = 19$</td>
<td>$g = 17$</td>
<td>Subtraction $-2$</td>
</tr>
<tr>
<td>$t + 11 = 15$</td>
<td>$t = 4$</td>
<td>Subtraction $-11$</td>
</tr>
<tr>
<td>$s - 12 = 10$</td>
<td>$s = 22$</td>
<td>Subtraction $+12$</td>
</tr>
<tr>
<td>$c - 16 = 8$</td>
<td>$c = 24$</td>
<td>Addition $+16$</td>
</tr>
<tr>
<td>$a + 15 = 16$</td>
<td>$a = 1$</td>
<td>Subtraction $-15$</td>
</tr>
<tr>
<td>$x + 4 = -5$</td>
<td>$x = -9$</td>
<td>Subtraction $-4$</td>
</tr>
<tr>
<td>$y + 3 = -12$</td>
<td>$y = -15$</td>
<td>Subtraction $-3$</td>
</tr>
<tr>
<td>$m + 4 = -10$</td>
<td>$m = -14$</td>
<td>Subtraction $-4$</td>
</tr>
</tbody>
</table>
Solve the one-step equations:

<table>
<thead>
<tr>
<th>16.</th>
<th>17.</th>
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</thead>
<tbody>
<tr>
<td>[ 7 = \frac{b}{11} ] (ii) (ii) multiplication</td>
<td>[ -105 = -5g ] division [ \div -5 \div -5 ]</td>
</tr>
<tr>
<td>[ 77 = 1b ] [ 77 = b ]</td>
<td>[ +21 = 1g ] [ +21 = 9 ]</td>
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</tbody>
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<table>
<thead>
<tr>
<th>18.</th>
<th>19.</th>
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<tbody>
<tr>
<td>[ 72 = -18h ]</td>
<td>[ -16 = \frac{k}{7} ]</td>
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</table>

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<tr>
<th>20.</th>
<th>21.</th>
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<tbody>
<tr>
<td>[ -9 = \frac{n}{-19} ]</td>
<td>[ -900 = 10a ]</td>
</tr>
</tbody>
</table>

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<tr>
<th>22.</th>
<th>23.</th>
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<tbody>
<tr>
<td>[ 126 = 7t ]</td>
<td>[ 35 = \frac{v}{-6} ]</td>
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<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1. ( 3x + 5 = 35 )</td>
<td>2. ( 5a + 17 = 47 )</td>
</tr>
<tr>
<td>Subtract: ( 5 )</td>
<td>Divide: ( \div 3 )</td>
</tr>
<tr>
<td>( 3x = 30 )</td>
<td>( x = 10 )</td>
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<tbody>
<tr>
<td>4. ( 3y - 5 = 16 )</td>
<td>5. ( 55 = 6a + 7 )</td>
<td>6. ( 17 = 8c - 7 )</td>
</tr>
</tbody>
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<tbody>
<tr>
<td>7. ( 15x + 49 = 19 )</td>
<td>8. ( 75 = 11 + 16x )</td>
<td>9. ( 14 = 12b + 8 )</td>
</tr>
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<tbody>
<tr>
<td>10. ( 8 = 18c - 10 )</td>
<td>11. ( 11 = 15m - 19 )</td>
<td>12. ( 11 = 16d - 5 )</td>
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</tbody>
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<tbody>
<tr>
<td>13. ( \frac{3a}{8} = 12 )</td>
<td>14. ( \frac{4c}{9} = 20 )</td>
<td>15. ( 42 = \frac{7d}{8} )</td>
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<tbody>
<tr>
<td>16. ( \frac{2}{3}x = 18 )</td>
<td>17. ( 12 = \frac{3}{4}y )</td>
<td>18. ( \frac{3}{5}m = 30 )</td>
</tr>
<tr>
<td>Multiply: ( \times 4 ) Divide: ( \div 3 )</td>
<td>Multiply: ( \times 4 ) Divide: ( \div 3 )</td>
<td>( 16 = y ) -5 -</td>
</tr>
</tbody>
</table>

* only do half of the questions.
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<tbody>
<tr>
<td>22. ( \frac{x}{3} + 4 = 13 )</td>
<td>23. ( \frac{w}{4} - 9 = 51 )</td>
<td>24. ( \frac{b}{7} - 8 = 15 )</td>
</tr>
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</tr>
<tr>
<td>25. ( 12 = \frac{y}{5} + 3 )</td>
<td>26. ( 6m + 12 = 18 )</td>
<td>27. ( 9d - 1 = 17 )</td>
</tr>
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<tr>
<td>28. ( 4a + 1 = 5 )</td>
<td>29. ( 4 = 3t - 2 )</td>
<td>30. ( \frac{1}{3}x - 5 = 11 )</td>
</tr>
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<tr>
<td>31. ( \frac{x}{9} + 4 = 13 )</td>
<td>32. ( 13 = \frac{y}{3} - 5 )</td>
<td>33. ( 47 = \frac{w}{5} + 7 )</td>
</tr>
</tbody>
</table>

*Only do half of the questions.*
Solving Multi-Step Equations
Variables on Both Sides - Negative Coefficients

Name: ___________________ Date: Alg Unit 2 Lesson #3

Solve the equations for x.

(1) \( -34 - 6x = 12 - 4x \)

\[
\begin{align*}
-34 &+ 4x = 12 + 34 \\
-2x &+ 4x = 46
\end{align*}
\]

\[
\begin{align*}
x &= -23
\end{align*}
\]

(2) \( -9x - 66 = 86 - x \)

Add \( x \) on both sides.

(5) \( -113 - 8x = -14x + 37 \)

Add 8x.

(6) \( -106 + 15x = 11x + 34 \)

Subtract 11x.

(9) \( -13x - 34 = 14 - 15x \)

Add 13x.

(10) \( 7x - 43 = 12x + 42 \)

Subtract 7x.
Solve for \( x \):

3. \[ 8x + 4 = 2x + 52 \]
   Subtract \( x \)

4. \[ 5x - 6 = 8x + 30 \]
   Subtract \( x \)

7. Eight times a number is 36 more than twice the same number. Find the number.
   \[ 8x = 36 + 2x \]
   Subtract \( x \)

8. If three times a number is increased by 22, the result is 14 less than seven times the same number. Find the number.
   \[ 3x + 22 = 7x - 14 \]
   Subtract \( x \)

9. Zhoe is comparing two local yoga programs. Hey-Yoga charges $90 a month and a $35 one-time registration fee. Yoga-Bear charges $80 a month with a $75 one-time registration fee. After how many months will the two schools charge the same amount? What conclusion can you come to about long and short term memberships?

   Let \( m \) = \# of months

   \[ 90m + 35 = 80m + 75 \]
   Subtract \( x \)

   \[ m = \quad \]
Lesson #4

Solving One-Step Inequalities

Solve each inequality.

1) \( x + 5 < 6 \)
   \[ \begin{array}{c}
   -5 \\
   \hline
   \hline
   x < 1
   \end{array} \]
   \[ \begin{array}{c}
   0 \quad 1 \quad 2 \\
   \hline
   \hline
   \text{答} \\
   \end{array} \]

2) \( 3 \leq 9 \)
   \[ \begin{array}{c}
   \div 3 \\
   \hline
   x \geq 3
   \end{array} \]
   \[ \begin{array}{c}
   1 \quad 2 \quad 3 \quad 4 \\
   \hline
   \hline
   \text{答} \\
   \end{array} \]

3) \( x - 2 > 4 \)

4) \( \frac{x}{9} \leq 1 \)

5) \( 10 + x > 17 \)

6) \( 6x < 12 \)

7) \( -x \geq 2 \)
   \[ \begin{array}{c}
   \div -1 \\
   \hline
   x \leq -2
   \end{array} \]
   \[ \begin{array}{c}
   -3 \quad -2 \quad -1 \\
   \hline
   \hline
   \text{答} \\
   \end{array} \]

8) \( -x < 5 \)

9) \( -x \leq 16 \)

10) \( \frac{x}{(-1)} > 12 \)
    \[ \begin{array}{c}
    \times (-1) \\
    \hline
    x < -12
    \end{array} \]
    \[ \begin{array}{c}
    -13 \quad -12 \quad -11 \\
    \hline
    \hline
    \text{答} \\
    \end{array} \]

11) \( \frac{x}{-1} \leq 1 \)

12) \( x \geq 7 \)

-13-
Choose the correct inequality that best describes each graph.

1) \( \geq -2 \) is right

2) \( \leq 18 \) is left

3) 

4) 

5) 

6) 

7) 

8)
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<th>Name:</th>
<th>Unit #: 2</th>
<th>Lesson #: 4</th>
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**Activator**

**New Vocabulary (1 of 4)**

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**New Vocabulary (2 of 4)**

**New Vocabulary (3 of 4)**

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-15-
Although word problems can often be some of the most challenging for students, they give us great opportunities to refine our understanding of the relationships between quantities and how to manipulate expressions to solve equations. When you solve any real world problem in mathematics you are **modeling** a physical situation with **mathematical tools**, such as **equations**, **diagrams**, **tables**, as well as many others.

As we work through these problems, try to make sure to always do the following:

**MODELING AND SOLVING LINEAR WORD PROBLEMS**

1. Clearly define the quantities involved with common sense variables and **let statements**.
2. Use your **let statements** to write out expressions for **quantities that you are interested in**.
3. Carefully translate the information you are told into an equation.
4. Solve the equation – remember to mentally note the justification for each step.
5. Check the reasonableness of your answer! This could be the most important, and neglected, step in the modeling/problem solving method.

Let’s start off with a reasonably easy example.

**Exercise #1**: The sum of a number and five more than the number is 17. What is the number?

(a) First experiment with some numbers. This will help you when going to the abstract with variables.

\[
\_ + 5 + \_ = 17
\]

(b) Now, let’s carefully set up **let statements** and an **equation** that relates the quantities of interest. Solve the equation for the number.

\[
\text{Let } x = \text{ a Number}
\]

**Exercise #2**: The difference between twice a number and a number that is 5 more than it is 3. **Write** an **equations** could be used to find the value of the number, \(x\). Explain how you arrived at your choice.

\[
\_ \times - (x + 5) = 3
\]
3. The sum of three times a number and 2 less than 4 times that same number is 15.

\[ \_ (x + 2) - \_ x = \_ \]

4. The sum of 3 less than 5 times a number and the number increased by 9 is 24. What is the number?

\[ 5x - 3 + x + \_ = \_ \]

What is the number?

\[ x = \_ \]

5. Tom is 4 more than twice Andrews age. Sara is 8 less than 5 times Andrews age. If Tom and Sara are twins, how old is Andrew?

Tom:

\[ T = 4 + 2A \quad \text{Set equal} \]

Sara:

\[ S = 5A - 8 \]

\[ _A - _ = _ + _ A \]

How old is Andrew? \( A = \_ \)

How old is Tom? \( T = \_ \)

How old is Sara? \( S = \_ \)
<table>
<thead>
<tr>
<th>Name:</th>
<th>Unit # 2 Lesson # 5</th>
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<tr>
<td>Activator</td>
<td>New Vocabulary (1 of 4)</td>
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<td>New Vocabulary (2 of 4)</td>
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<td>New Vocabulary (3 of 4)</td>
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</tbody>
</table>
Solving Literal Equations

Example: Solve for $x$ in terms of $b$ and $c$.

\[ 2x + b = c \]
\[ -b \quad -b \quad \text{Subtraction} \]
\[ 2x = c - b \]
\[ \div 2 \quad \div 2 \quad \text{Division} \]
\[ x = \frac{c - b}{2} \quad \text{Answer} \]

\[ \frac{x}{2} - b = c \]
\[ +b \quad +b \quad \text{Addition} \]
\[ \frac{x}{2} = c + b \]
\[ (2) \quad (2) \quad \text{Multiplication} \]
\[ x = 2(c + b) \]

1) Solve for $x$ in terms of $B$

\[ x - 5 = B \quad \text{Addition} \]

2) Solve for $x$ in terms of $M$.

\[ M = 2x \quad \text{Division} \]

3) Solve for $x$ in terms of $C$.

\[ x + c = 3 \quad \text{Subtraction} \]

4) Solve for $x$ in terms of $A$.

\[ A = \frac{x}{2} \quad \text{Multiplication} \]

\[ -21 \quad \boxed{1} \quad = x \]
Multistep equations.

5) If \( A + 2x = 3 \), then \( x \) is equal to:

Subtraction

Division

7) Solve for \( x \) in terms of \( a, b, \) and \( c \):

\[ ax - b = c \]

Addition

Division

9) Solve for \( x \) in terms of \( a, b, \) and \( c \):

\[ \frac{x}{2} + A = y \]

Subtraction

Multiplication

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Name: _____________________________  Unit # 2  Lesson # 6

Activator

New Vocabulary (1 of 4)

New Vocabulary (2 of 4)  New Vocabulary (3 of 4)

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UNIT #2  Study Guide  Algebra I

PART I QUESTIONS: Answer all questions in this part by writing the choice of the appropriate answer in the blank beside the problem. Please show all of your work.

1. Which of the following values of \(x\) is a solution to the equation \(4(x-3) + 8 = 68\)

2. Solve the two step equation \(\frac{x}{-4} + 5 = -7\)

3. Write a true inequalities when \(x = -2\)

   \[X < \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\]

   \[X \leq \_\_\_\_\_\_\_\_\_\_\_\_\]

   \[X > \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\]

   \[X \geq \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\]

4. Two times the sum of a number, \(n\), and 4 is at most 10. Which of the following inequalities properly models this statement?

   Write this statement.

   \(-25-\)
5. Max correctly starts solving the linear equation \[ 3(x+7) = -9 \] writing \[ x+7 = -3 \] Which of the following properties justifies what Max wrote?

\[ x+7 = -3 \]

6. Which of the following graphs shows the solution set to \[ 3x - 7 > 8 \]

Graph the solution

\[ 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \]

Circles: greater than or less than

open circle

Closed circle

why?

7. The value \( x = 8 \) is a solution to each of the following, except which?

\[ x - 4 > 3x \quad \text{or} \quad 2(x + 3) = 4x: -10 \]

8. Plato was saving $10 each week in order to have enough money for a phone that costs $150. If his father started him off with $20, which of the following is the minimum number of whole weeks Plato will need to save?

Write an equation and solve.
9. The volume of a cone is given by the formula \( V = \frac{1}{3} \pi r^2 h \). Solve this equation for the height, \( h \), in terms of \( V \) and \( r \).

10. When a number, \( x \), is increased by 4, and then the result is multiplied by 6, the result is equal to 18. Write an equation and solve it to find the value of \( x \).

11. Justify your response, is the value \( x = -4 \) a solution to the inequality \( 5x - 3 > 6x \)?

12. Solve the following equation for \( x \). Show the manipulations that lead to your final answer.

\[
7(x + 2) - 3x + 4 = (x - 5) + (x - 3)
\]
13. Algebraically solve the inequality \[ 5x - 146 \leq -9/3x + 2 \]

14. Graph the inequality from #13 on the number line.

15. Give a property of real numbers or a property of equality to justify each step in the solution of the equation shown below.

\[
\begin{align*}
4x + 8 + 2x & = -37 \\
4x + 2x + 8 + 1 & = -37 \\
6x - 7 & = -37 \\
6x & = -30 \\
x & = -5
\end{align*}
\]

16. Solve the following multistep equation. \[-3x - 4 = -22\]