Algebra 1 Mastery Test #1 Review

1. Evaluate the expression for the given value of the variable.
   \[ 3n + 3 \text{ for } n = 9 \]

2. Evaluate the expression for the given value of the variable.
   \[ 6(x + 3) - 5 \text{ for } x = 9 \]

3. Evaluate \(8y + 7\) for \(y = 8\).

4. Find the value of \(5^4\).

5. Order the numbers \(3^3, 9, 2^7, 7^2, 8^1\) from least to greatest.

\textbf{Simplify:}

6. \(3 + 2(3 + 4)^3\)

7. Evaluate \(\frac{jk}{j + k}\) when \(j = 7\) and \(k = 13\).

8. Simplify \(9 \times 11 + 4 - 8 + 4\).
9. Evaluate the expression $27 \cdot 3^2 - 3 \cdot 3^2$.

10. Simplify $\left(7 \cdot 6^2 - 7 \cdot 2^2\right) + (4 + 3)$.

11. Janice baked 27 cookies with 9 ounces of chocolate chips. How many cookies could she bake with one ounce of chocolate chips?

12. You ran for 20 minutes and burned 155 calories. How many calories did you burn per minute?

13. It is known that a cyclist can travel 41.4 miles in 3 hours. At that rate, how far can the same cyclist travel in 7 hours?

14. Write a variable expression for "7 times the sum of $x$ and 5."

15. Write an expression for "three less than five times a number $x$.

16. Is 7 a solution of $2u + 3 \geq 13$?

17. Is $x = 7$ a solution of the inequality $5 + 2x \leq 15$?
18. Is \( x = 2 \) a solution of the inequality \( 5x - 2 \geq 7 \)?

**Solve the equation using mental math.**

19. \( z + 18 = 30 \)

20. \( 3x = 33 \)

21. A jumbo jet carries 340 passengers, 38 in first class, and the remainder in coach. If the average first class ticket is $950 and the average coach ticket is $493, how much will the airline gross if the plane is full?
   a. $245,310   b. $188,006   c. $184,986   d. $305,634

22. At 57 km/h, how far can you travel in 7 h?
   a. 399 km   b. 513 km   c. 434 km   d. 285 km

23. Make an input-output table for the function \( y = x + 2 \). Use \( x \)-values of 1, 2, 3, 4, and 5.
   a.  
   | Input, \( x \) | 1 | 2 | 3 | 4 | 5 |
   | Output, \( y \) | 1 | 2 | 3 | 4 | 5 |
   b.  
   | Input, \( x \) | 1 | 2 | 3 | 4 | 5 |
   | Output, \( y \) | 3 | 5 | 7 | 9 | 11 |
   c.  
   | Input, \( x \) | 1 | 2 | 3 | 4 | 5 |
   | Output, \( y \) | 3 | 4 | 5 | 6 | 7 |
   d.  
   | Input, \( x \) | 1 | 2 | 3 | 4 | 5 |
   | Output, \( y \) | 2 | 3 | 4 | 5 | 6 |
24. Which of the functions represents the input-output table?

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4</td>
<td>( y = 4x - 4 )</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>( y = 4x + 4 )</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>( y = 4x - 5 )</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>( y = 5x + 4 )</td>
</tr>
</tbody>
</table>

Write a function rule for the input-output table.

25. 

<table>
<thead>
<tr>
<th>Input ( x )</th>
<th>Output ( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>

26. Find the range of the function.

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

27. Make an input-output table to represent the function. Use 1, 2, 3, 4, and 5 as the domain.

\( y = 3x + 9 \)

28. Determine whether the relation is a function.

<table>
<thead>
<tr>
<th>Kumiko’s age (years)</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kumiko’s height (inches)</td>
<td>57</td>
<td>58</td>
<td>59</td>
<td>64</td>
<td>66</td>
<td>66</td>
</tr>
</tbody>
</table>

a. No, the relation is not a function.  

b. Yes, the relation is a function.
29. **EXTENDED RESPONSE**  Write your answer on a separate piece of paper.

Kim's earnings from her part-time job can be expressed by a linear equation of the form $y = ax$, where $x$ represents how many hours she works in a pay period, $a$ is her hourly wage, and $y$ is her earnings, in dollars. She prepared the table below so she could make a graph of her income versus the number of hours she works in a pay period.

<table>
<thead>
<tr>
<th>Hours of Work</th>
<th>Earnings ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>20.25</td>
</tr>
<tr>
<td>5</td>
<td>33.75</td>
</tr>
<tr>
<td>6</td>
<td>40.50</td>
</tr>
<tr>
<td>9</td>
<td>67.50</td>
</tr>
<tr>
<td>15</td>
<td>101.25</td>
</tr>
<tr>
<td>20</td>
<td>135.00</td>
</tr>
</tbody>
</table>

**Part A** Sketch a graph of the ordered pairs shown in the table above.

**Part B** One of the rows in Kim's original table has an incorrect earnings value. Which ordered pair on the graph has an incorrect $y$-value for the time given? Explain how you can identify that point.

**Part C** What should the $y$-value be for the number of hours of work in the ordered pair identified in Part B? Explain your reasoning.
30. The table shows the study times and test scores for a number of students. Draw a scatter plot of the data. Put study time on the horizontal axis and test score on the vertical axis.

<table>
<thead>
<tr>
<th>Study Time (min)</th>
<th>8</th>
<th>14</th>
<th>19</th>
<th>26</th>
<th>30</th>
<th>33</th>
<th>35</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Score</td>
<td>60</td>
<td>65</td>
<td>61</td>
<td>70</td>
<td>69</td>
<td>70</td>
<td>75</td>
<td>76</td>
</tr>
</tbody>
</table>
Algebra 1 Mastery Test #1 Review  
Answer Section  

1. ANS: 30  
   DIF: Level A  
   REF: 0802f1b0-1a76-11df-b9de-001e33aa91d2  
   TOP: Lesson 1.1 Evaluate Expressions  
   KEY: algebraic expression | variable  

2. ANS: 67  
   DIF: Level B  
   REF: 0807b470-1a76-11df-b9de-001e33aa91d2  
   TOP: Lesson 1.1 Evaluate Expressions  
   KEY: algebraic expression | variable  

3. ANS: 71  
   DIF: Level A  
   REF: 07efe6b0-1a76-11df-b9de-001e33aa91d2  
   TOP: Lesson 1.1 Evaluate Expressions  
   KEY: algebraic expression | evaluate | order of operations | substitute  

4. ANS: 625  
   DIF: Level A  
   REF: 080ed890-1a76-11df-b9de-001e33aa91d2  
   TOP: Lesson 1.1 Evaluate Expressions  
   KEY: evaluate | exponents | power  

5. ANS: $8^1, 9, 3^3, 7^2, 2^7$  
   DIF: Level C  
   REF: 07e19e70-1a76-11df-b9de-001e33aa91d2  
   TOP: Lesson 1.1 Evaluate Expressions  
   KEY: exponent | order  

6. ANS: 101  
   DIF: Level B  
   REF: MALG0078  
   TOP: Lesson 1.2 Apply Order of Operations  
   KEY: order of operations  

7. ANS: 91  
   20  
   DIF: Level B  
   REF: MALG0086  
   TOP: Lesson 1.2 Apply Order of Operations  
   KEY: whole | variable | evaluate | substitute | rational expression  

8. ANS: 101  
   DIF: Level B  
   REF: MALG0087  
   TOP: Lesson 1.2 Apply Order of Operations  
   KEY: order of operations | whole | decimal
9. ANS: 216  
   DIF: Level B   REF: MALG0091   TOP: Lesson 1.2 Apply Order of Operations  
   KEY: order of operations | evaluate | exponent | power

10. ANS: 32  
   DIF: Level C   REF: MALG0092   TOP: Lesson 1.2 Apply Order of Operations  
   KEY: evaluate | exponent | power | rational | order of operations | simplify | expression

11. ANS: 3 cookies  
   DIF: Level B   REF: MALG0103   TOP: Lesson 1.3 Write Expressions  
   KEY: rate | time | total | divide

12. ANS: 7.75 calories per minute  
   DIF: Level B   REF: MALG0104   TOP: Lesson 1.3 Write Expressions  
   KEY: unit | rate

13. ANS: 96.6 miles  
   DIF: Level B   REF: MALG0167   TOP: Lesson 1.3 Write Expressions  
   KEY: ratio | word | rate | time | distance

14. ANS: 7(x + 5)  
   DIF: Level B   REF: MALG0096   TOP: Lesson 1.3 Write Expressions  
   KEY: word | expression | translate

15. ANS: 5x - 3  
   DIF: Level B   REF: MALG0098   TOP: Lesson 1.3 Write Expressions  
   KEY: variable | translate | word | symbol

16. ANS: yes  
   DIF: Level B   REF: MALG0132   TOP: Lesson 1.4 Write Equations and Inequalities  
   KEY: inequality | linear

17. ANS: No  
   DIF: Level B   REF: MALG0133   TOP: Lesson 1.4 Write Equations and Inequalities  
   KEY: inequality | solve | solution | determine
18. ANS: Yes
   DIF: Level B  REF: MALG0134  TOP: Lesson 1.4 Write Equations and Inequalities
   KEY: inequality | solve | solution | determine

19. ANS: z = 12
   DIF: Level A  REF: 7ee20f22-cdbb-11db-b502-0011258082f7
   TOP: Lesson 1.4 Write Equations and Inequalities  KEY: Equation | mental math

20. ANS: x = 11
   DIF: Level A  REF: 7ee23632-cdbb-11db-b502-0011258082f7
   TOP: Lesson 1.4 Write Equations and Inequalities  KEY: Equation | mental math

21. ANS: C
   DIF: Level B  REF: MALG0150
   TOP: Lesson 1.5 Use a Problem Solving Plan
   KEY: subtract | multiply | linear combination | word | add

22. ANS: A
   DIF: Level A  REF: MALG0109
   TOP: Lesson 1.5 Use a Problem Solving Plan  KEY: unit rate

23. ANS: C
   DIF: Level B  REF: MALG0203
   TOP: Lesson 1.7 Represent Functions as Rules and Tables
   KEY: graph | output | function | table | input

24. ANS: 
   $y = 4x + 4$
   DIF: Level B  REF: MALG0204  TOP: Lesson 1.7 Represent Functions as Rules and Tables
   KEY: function | table | linear

25. ANS: 
   $y = 4x$
   DIF: Level B  REF: MALG0206  TOP: Lesson 1.7 Represent Functions as Rules and Tables
   KEY: equation | function | table | write

26. ANS: 
   The range is the collection of the output values: 10, 13, and 12.
   DIF: Level B  REF: MALG0193  TOP: Lesson 1.7 Represent Functions as Rules and Tables
   KEY: domain | range | relation

27. ANS:

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>12</td>
<td>15</td>
<td>18</td>
<td>21</td>
<td>24</td>
</tr>
</tbody>
</table>

   DIF: Level B  REF: MALG0201  TOP: Lesson 1.7 Represent Functions as Rules and Tables
   KEY: output | function | table | rule | input

28. ANS: B
   DIF: Level A  REF: 08139b50-1a76-11df-b9de-001e33aa91d2
   TOP: Lesson 1.8 EXT Determine Whether a Relation is a Function
   KEY: relations | functions | table
29. **ANS:**

*Part A*

![Graph of earnings vs. hours of work]

*Part B* The ordered pair $(9, 67.50)$ has an incorrect $y$-value. That point does not lie on the line that passes through all of the other points in the graph. Solutions to a linear equation should all lie on the same line.

*Part C* The $y$-value in $(9, 67.50)$ should be 60.75. If you divide the $y$-value by its corresponding $x$-value for any point on the line, you find that Kim earns $6.75 per hour. So, if Kim works 9 hours, she should earn $9(6.75) = $60.75.

**DIF:** Level B  **REF:** MCT80504  **TOP:** Lesson 1.8 Represent Functions as Graphs  **KEY:** graph | table | interpret

30. **ANS:**

![Graph of effect of study on test score]

**DIF:** Level A  **REF:** MMT30354  **TOP:** Lesson 1.8 Represent Functions as Graphs  **KEY:** scatter plot