PART I QUESTIONS: Show all of your work.

1. Which of the following is the slope of the line that passes through the points \((-4, -6)\) and \((1, 9)\):

\[
\frac{y_1 - y_2}{x_1 - x_2} = \frac{-6 - 9}{-4 - 1} = \frac{-15}{-5} = 3
\]

2. Which equation could correspond to the graph of the linear function shown below?

\[y = \frac{1}{2}x - 1\]

3. A wheel with a specific circumference will move 540 inches when rolled 20 times. How far will the same wheel move, to the nearest inch, in 9 rolls?

\[M = \frac{540}{20} = 27\text{ inches per roll}\]

\[243\text{ inches after 9 rolls.}\]

4. A line with a slope of -3 passes through the point \((4, -5)\). Which of the following is the equation of the line?

\[y = -3x + 7\]
5. A rental car company charges a base fee of $25 plus $0.29 per mile driven. Which of the following equations models the charge \( y \) for renting a car based on the number of miles, \( x \), driven?

\[
y = m x + B \\
y = 0.29 x + 25
\]

6. Which of the following is the equation of the graph shown?

\[
y = mx + B \\
y = -1x + 2 \\
\frac{\text{down-1}}{\text{right+1}} = m
\]

7. Charles is making a recipe that calls for 5 quarts of milk. Unfortunately, Charles only has a single cup measuring device. If there are two cups in a pint and two pints in a quart, then how many cups will Charles need for 5 quarts of milk?

4 cups = 1 quart

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
</tr>
</tbody>
</table>

\[4+4+4+4+4=20\]

8. Which of the following equations describes all points on a vertical line that passes through the point \((-4, 8)\)?

9. A sequence is defined by the rule. If \( f(x) = 4x + 2 \). If \( f(1) = 6 \) then what does \( f(7) = \) ?

\[
f(1) = 4(1) + 2 \\
f(7) = 4(7) + 2 \\
f(1) = 6 \\
f(7) = 30
\]
PART II QUESTIONS: Show all of your work.

10. If graphed in the coordinate plane, would the line \( y = 3x + 6 \) pass through the point \((-5, -9)\)? Explain how you arrived at your answer.

\[
(-9) = 3(-5) + 6 \\
-9 = -15 + 6 \\
-9 = -9 \quad \text{True,} \\
\text{(-5, -9) is a solution and is on the line and table}
\]

11. An arithmetic sequence has a first term of 6 and a common term of 8. What is its third term? Show how you arrived at your answer.

\begin{align*}
\text{The 3rd number is 30.}
\end{align*}

\begin{align*}
B &= 6 \\
M &= 8 \\
0 &\quad 6 \\
1 &\quad 14 \\
2 &\quad 22 \\
3 &\quad 30
\end{align*}

\[
f(3) = 30\]

PART III QUESTIONS: Show all of your work

12. As a large truck fills its gas tank, the volume of gas, in gallons, can be modeled with the linear function \( y = 7.1x + 5 \), where \( y \) is the volume of gas and \( x \) is the number of minutes it has been filling. Give a physical interpretation for both the 7.1 and 5 parameters in the linear model. Use appropriate units in your explanation.

\[
\text{The truck started with 5 gallons of gas.} \\
7.1 \text{ gallons of gas are being pumped per minute.}
\]

13. Write the equation of the line that passes through the points \((5, 6)\) and \((3, 8)\). Express your answer in simplest form.

\[
y = -1x + B \\
(6) = -1(5) + B \\
6 = -5 + B \\
+5 \\
11 = B
\]
14. Graph the line \( y = -4x - 3 \) on the axes provided.

15. Use the graph from #14. At what value of \( y \) does the line have when \( x = 2 \)? Show how you determined your answer.

\[
\begin{align*}
y &= 4x - 3 \\
y &= 4(2) - 3 \\
y &= 8 - 3 \\
y &= 5
\end{align*}
\]

**PART IV QUESTION:** Show all of your work.

16. A company produces boxes of DVD's at a rate of 80 boxes per hour. They begin to produce boxes when they first open for the day and after 4 hours have 573 boxes in stock. How many boxes were in stock when they opened?

\[
\begin{align*}
y &= mx + B \\
y &= 80x + B \\
(4, 573) &= 80(4) + B \\
573 &= 320 + B \\
253 &= B
\end{align*}
\]

17. Use the same company from problem #16. Write a linear model for the amount of boxes, \( y \), as a function of the number of hours since they opened, \( x \). Use your model to predict the number of boxes in stock at the end of 9 hours of work.

\[
\begin{align*}
y &= mx + B \\
y &= 80x + 253 \\
y &= 80(9) + 253 \\
y &= 720 + 253 \\
y &= 973
\end{align*}
\]

973 boxes will be at the company at the end of this day.