Part 1 – Calculators Allowed  

8.AF.8

1) Graph both equations.

\[ y = x + 3 \quad y = -2x - 3 \]

Identify the solution for the system of equations.

Solution: ( _____ , _____ )

2) The graph of a system of linear equations is shown below.

How many solutions does the system of equations have?

a. 0 solutions  
b. 1 solution  
c. 2 solutions  
d. Infinitely many solutions

3) Graph both equations.

\[ y = -\frac{2}{3}x + 3 \quad y = -\frac{2}{3}x - 1 \]

How many solutions does the system of equations have?

a. 0 solutions  
b. 1 solution  
c. 2 solutions  
d. Infinitely many solutions

4) According to the graph, what is the solution for this system of equations?

Solution: ( _____ , _____ )
5) In the diagram below, at what height does the ladder reach the tree?

- a. 12 feet
- b. 12.2 feet
- c. 13.9 feet
- d. 14.2 feet

6) Quadrilateral $TPQR$ is shown.

What is the length of side $QR$? Round your answer to the nearest tenth, if necessary.

Answer: _________ units

7) The coordinate plane shows various places around Joe’s town.

What is the shortest distance from the school to the grocery? Round your answer to the nearest tenth of a mile, if necessary.

Answer: ____________ miles

8) Jaden is flying a kite. The kite is 50 feet directly above a fire hydrant. Jaden is standing 80 feet from the fire hydrant.

What is the best approximation for the length of kite string being used? Round the distance to the nearest whole foot.

- a. 37 feet
- b. 62 feet
- c. 94 feet
- d. 130 feet
9) What statement best describes the value of $\sqrt{8}$?
   a. The value of $\sqrt{8}$ is between 2 and 2.5
   b. The value of $\sqrt{8}$ is between 2.5 and 3
   c. The value of $\sqrt{8}$ is between 3 and 3.5
   d. The value of $\sqrt{8}$ is between 3.5 and 4

10) Write the decimal equivalent for $\frac{6}{11}$. Don’t round your answer, use bar notation if necessary.

   Answer: _______________

11) Select ALL of the following that represent a RATIONAL number.
   a. $-4.25$
   b. $\frac{2}{5}$
   c. $\pi$
   d. $\sqrt{15}$
   e. $0.\overline{2}$

12) On the number line below, plot and label the approximate position of $\sqrt{53}$.

13) What is the solution of the equation $x^2 = 90$?
   a. $x = \sqrt{90}$
   b. $x = 90$
   c. $x = 45$
   d. $x = \pm\sqrt{90}$

14) Find the approximate side length from the square below.

   \[
   A = 48\text{cm}^2
   \]

   a. 4 cm
   b. 6.2 cm
   c. 6.9 cm
   d. 12 cm

15) How many faces does a triangular pyramid have?

   Answer: ________ faces

16) A cone is sliced parallel to its base. What is the shape of the cross-section?

   a. Square
   b. Triangle
   c. Circle
   d. Sphere
17) Two 3-D objects have the following dimensions below.

**Cone:**
- Radius = 8 inches
- Height = 10 inches

**Square Pyramid:**
- Area of Base = 144 inches
- Height = 10 inches

Compare the volumes of the objects. Select the correct choice.

a. The cone has the larger volume
b. The square pyramid has the larger volume
c. Both objects have the same volume
d. It is impossible to determine the volumes

18) A beach ball has a diameter of 12 inches. How much air is needed to fill the beach ball to capacity?

   a. $2,304\pi \text{ in}^3$
   b. $86\pi \text{ in}^3$
   c. $288\pi \text{ in}^3$
   d. $904\pi \text{ in}^3$

19) A men’s basketball has a diameter of 9.55 inches. How much material is needed to cover the basketball? Use 3.14 for $\pi$. Round your answer to the nearest tenth, if necessary.

   Answer: _____________ in$^2$

20) The scatterplot below compares the number of hours that students spent studying with their test scores.

What equation would represent the line of best fit for the scatterplot?

   a. $y = -1.2x + 40$
   b. $y = 1.2x + 70$
   c. $y = 3.5x + 40$
   d. $y = 5x - 30$
21) What choice below represents the most accurate line of best fit?

A.  

B.  

C.  

D.  

22) What type of association is most clearly shown in the scatter plot?

A. Positive, linear
B. Negative, linear
C. Positive, non-linear
D. Negative, non-linear

23) The graph below compares the temperature with sales of bottled water.

Temperature vs Sales

Which one of the following statements below is TRUE?

a. As the temperature increases, the sales increase
b. As the sales increase, the temperature increases
c. As the temperature decreases, the sales increase
d. There is no correlation between the points
24) Like all marathons, the Indianapolis Marathon is 26.2 miles. Scott is training for the race. He ran 6.2 miles north, 8.4 miles east and then straight home.

DRAW AND LABEL A MAP OF HIS RUN

SHOW ALL WORK

Scott’s training goal is to run at least a marathon. Did he reach his goal? Use words, number and/or symbols to explain how you found your answer. Round your distance to the nearest tenth of a mile.

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

25) The graph compares the total cost of two taxicab companies.

PART A
The solution for the system of equations is (_______, _______).
Round to the nearest whole numbers.

PART B
Explain the real-world meaning of this solution.

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
26) Classify the following values as either rational or irrational:

\[ \sqrt{2}, \ 3.14, \ \frac{5}{13}, \ 4.4, \ \pi, \ \sqrt{49} \]

<table>
<thead>
<tr>
<th>Rational</th>
<th>Irrational</th>
</tr>
</thead>
</table>

27) The table shows the number of years of college education and hourly earnings (in dollars) for several people.

<table>
<thead>
<tr>
<th>Years of College Education</th>
<th>7</th>
<th>0</th>
<th>1</th>
<th>4</th>
<th>3</th>
<th>4</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hourly Earnings</td>
<td>33</td>
<td>6</td>
<td>9</td>
<td>24</td>
<td>16</td>
<td>19</td>
<td>28</td>
</tr>
</tbody>
</table>

**Part A**

Make a scatter plot of the data.

**Part B**

Draw a line of best fit on your scatter plot.

**Part C**

Circle the equation that BEST models the data.

\[ y = 10x + 5 \]
\[ y = 4x + 6 \]
\[ y = -6x + 6 \]
\[ y = 5x + 16 \]

**Part D**

In a complete sentence, describe the relationship between the years of college education and hourly earnings.

__________________________________________________________________________________________
__________________________________________________________________________________________

**Part E**

Use the equation you selected in Part C to predict the number of years of college education for a person that is making $30 per hour. Round to the nearest whole year.

SHOW ALL WORK

Answer: ____________ years