1. The body of a 150 lb person contains 0.00023 lb of copper. Write the amount of copper in scientific notation.

   1. _______________ (2)

2. The distance from Venus to the sun is $1.08 \times 10^8$ kilometers. Write the distance in standard notation.

   2. _______________ (2)

3. Simplify the expression: $-2 + 8 \div 2 - 7$

   3. _______________ (2)

4. Find the value of: $\frac{3^2}{4} - \frac{5}{12}$

   4. _______________ (2)

   (reduced fraction)

5. Evaluate: $9 - (p - \sqrt{q})$ when $p = 5$, $q = 49$

   5. _______________ (3)

6. Simplify the following expressions and write your answer using positive exponents only.

   a. $m^{15} m^{-12}$

      6a. _______________ (2)

   b. $(x^0 y^7)^5$

      6b. _______________ (2)

   c. $\frac{w^2}{2w^3}$

      6c. _______________ (2)
7. The price of an art book in a book store in Seattle is $90. The sales tax rate in Seattle is 9.5%. How much do you have to pay to buy the book?

\[ \text{You have to pay } \frac{90 \times 0.095}{100} = \frac{8.55}{100} = 0.855 \text{ dollars.} \]

7. $\underline{8.55}$ (3)

8. There are 30 students in a Math 097 class. 18 of them are female. What percent of the students are male?

\[ \frac{30 - 18}{30} = \frac{12}{30} = 0.4 = 40\% \text{ of the students are male.} \]

8. $\underline{40\%}$ (2)

9. A number plus itself, plus twice itself, plus four times itself, is equal to 104.

a. If the number is represented by \( x \), write an equation that you need to solve for \( x \).

\[ x + x + 2x + 4x = 104 \]

9a. $\underline{x + x + 2x + 4x = 104}$ (2)

b. Solve your equation to find the number.

\[ 8x = 104 \]

\[ x = \frac{104}{8} = 13 \]

9b. $x = \underline{13}$ (3)

10. For each pair, fill in the blank with <, >, or = to correctly complete each comparison.

\[ \left( \frac{1}{3} \right)^2 \quad \left( -\frac{1}{3} \right)^2 \quad \frac{12}{33} \quad \frac{5}{11} \quad -| -3 | \quad 3 \]

11. Circle all the ordered pairs that are the solutions to the equation \( y = \frac{2}{3}x + 6 \).

\[ (0,6) \quad (3,8) \quad (9,0) \]

12. Simplify completely: \(-8x - 2 + 5(-9x + 4)\)

\[ -8x - 2 - 45x + 20 = -53x + 18 \]

12. $\underline{-53x + 18}$ (3)

13. Solve for \( r \): \( \frac{1}{3}r + \frac{1}{4} = \frac{5}{4} \)

\[ \frac{1}{3}r = \frac{5}{4} - \frac{1}{4} = \frac{4}{4} = 1 \]

\[ r = 3 \]

13. $r = \underline{3}$ (3)
14. Solve for \( m \): \( 12 + 0.5m = 0.3(60 + m) \)
   \( m = \) \underline{\hspace{2cm}} \hspace{1cm} (3)

15. Simplify the expression: \( \frac{35z^5 - 15z^2}{5z} \)
   \( = \) \underline{\hspace{2cm}} \hspace{1cm} (3)

16. Expand and combine the like terms: \( (2x - 5)(3x + 2) \)
   \( = \) \underline{\hspace{2cm}} \hspace{1cm} (3)

17. Factor completely: \( 22g^2h - 33gh^2 \)
   \( = \) \underline{\hspace{2cm}} \hspace{1cm} (3)

18. Factor completely: \( y^2 + 5y - 24 \)
   \( = \) \underline{\hspace{2cm}} \hspace{1cm} (3)

19. Factor completely: \( 144 - m^2 \)
   \( = \) \underline{\hspace{2cm}} \hspace{1cm} (3)

20. Solve for \( k \): \( 2E = kx^2 \)
   \( k = \) \underline{\hspace{2cm}} \hspace{1cm} (3)

21. Solve for \( x \): \( 9x(x - 8) = 0 \)
   \( x = \) \underline{\hspace{2cm}}, \underline{\hspace{2cm}} \hspace{1cm} (3)

22. Solve for \( p \): \( p^2 - 8p = 20 \)
   \( p = \) \underline{\hspace{2cm}}, \underline{\hspace{2cm}} \hspace{1cm} (3)
23. The graph of the line \( y = -\frac{1}{2}x + 3 \) given below. Use the graph to answer the following questions.

a. The \( x \)-intercept of the given line:

\[ (____,____) \] (2)

b. The \( y \)-intercept of the given line:

\[ (____,____) \] (2)

c. The slope of the given line:

\[ m = ____ \] (2)

d. On the same grid, graph the line \( 3x - y = 4 \).

\[ m = ____ \] (2)

e. Use the above graphs to solve the system:

\[ \begin{cases} y = -\frac{1}{2}x + 3 \\ 3x - y = 4 \end{cases} \]

\[ (____,____) \] (2)
24. A telephone pole is 45 feet tall. A wire is attached from the top of the pole to the ground at a point 20 feet from the base of the pole. Find the length $L$ of the wire.

\begin{center}
\begin{tikzpicture}
    \draw[thick] (0,0) -- (4,0) -- (4,4) -- (0,4) -- cycle;
    \draw[thick] (4,4) -- (0,0);
    \node at (2,2) {$L$};
    \node at (4,-0.5) {20 feet};
    \node at (0.5,4) {45 feet};
\end{tikzpicture}
\end{center}

24. $\text{______} \text{______}$ (3)

(round to two decimal places)

25. A math student kept a record of how much time she spent studying for each of her 100-point math exams and her score on each exam.

\begin{center}
\begin{tabular}{|c|c|}
\hline
\textbf{Exam Scores} & \textbf{Hours Spent Studying} \\
\hline
0 & 0 \\
5 & 0.5 \\
10 & 1 \\
15 & 1.5 \\
20 & 2 \\
25 & 2.5 \\
30 & 3 \\
\hline
\end{tabular}
\end{center}

a. How much time did she need to study to earn 85% on her math exam?

25a. $\text{______________}$ (2)

b. Find the slope of the line.

25b. slope = $\text{__________}$ (2)
26. A 27 inch board is cut into 2 pieces so that the longer piece is 3 inches longer than 3 times the shorter piece.

a. If the length of the shorter piece is \( x \), then write an expression to represent the length of the longer piece.

\[ \text{26a. The length of the longer piece: } \quad \text{___________} \quad (1) \]

b. Write an equation to represent the total length of the board.

\[ \text{26b. The total length of the board: } \quad \text{___________} \quad (2) \]

c. Solve the equation to find out the lengths of both pieces. (Show all work.)

\[ \text{26c. } \quad \text{(3)} \]

The length of the shorter piece: \( \text{___________} \)
(include units)

The length of the longer piece: \( \text{___________} \)
(include units)

27. My cousin spends $2.50 each day for her bus ride. The money \( A \) left in her bank account after \( d \) days of bus rides is given by: \( A = -2.50d + 180 \)

a. Use the formula to fill in the missing numbers in the table.

\[ \begin{array}{|c|c|} \hline d \text{, days} & A \text{, money left} \hline 0 & \hline 6 & \hline 150 & \hline \end{array} \]

\[ \text{b. How much money initially did my cousin have in her bank account?} \]

\[ \text{27b. } \quad \text{___________} \quad (2) \]

c. What is the slope of the line?

\[ \text{27c. slope = } \quad \text{___________} \quad (2) \]
(include units)

d. What does the slope mean in this context? Your sentence should include the number and the units of the slope.

\[ \text{27d. } \quad \text{___________} \quad (2) \]