Show all work to receive full credit. Point-values for each problem are shown at the right in parenthesis.

For problems 1-6 perform the indicated operation and simplify your answer as much as possible.

1. $(5x^2 + 11x - 10) - (9x^2 - 6)$

2. $(2w - 5z)(w - 5z)$

3. $(\sqrt{P} - \sqrt{Q})(\sqrt{P} + \sqrt{Q})$

4. $\frac{15-10C}{25C}$

5. $\frac{9x^6y^3}{27xy^7}$

6. $\frac{-A}{6B} + \frac{5B}{12AB}$

7. Simplify the radical below. No decimal answers.
$\sqrt{18x^3y^6}$
8. Simplify the expression below and write using positive exponents only.
   \((4^3 r^2)(4^{-2} r^{-2})\)

9. Factor completely. \(2z^2 + 6z - 20\)

10. Factor completely. \(9y^2 - 49\)

11. Solve for \(Y\).
    \((13Y - 75) + 2(5 - 9Y) = -17Y\)

12. Solve for \(m\) by factoring. \(6m^2 - 9m = 0\)

13. Solve for \(x\).
    \(\sqrt{5x} = 10\)

14. Solve for \(t\).
    \(\frac{2t+4}{4t+8} = \frac{1}{5}\)
15. Solve the compound inequality below for \( x \) and graph the solution set on the number line.

\[-3 < -(3x - 6) \leq 21\]

15.____________________(2)

![Number Line Diagram]

(2)

16. Solve the equation \( 2t^2 - 10 = 0 \) for \( t \) using the square root property. **Give Exact Answer(s).**

16.____________________(2)

17. Answer the questions below concerning the linear equation, \(-8x + 6y = -24\).
   a. Find the \( x \)-intercept of this line

   a.(_______, ________) (2)

   b. Find the \( y \)-intercept of this line

   b.(_______, ________) (2)

   c. Write the equation of the line in slope-intercept form

   c.____________________(2)

   d. Graph the line on the axes provided.

![Coordinate Plane Diagram]
18. The amount, $A$, of medicine that a physician prescribes for a patient varies directly as the weight, $W$, of the patient. A physician prescribes 3 g of a medicine for a 150 pound person. How much medicine should be prescribed for a 120 pound person? (Include units)

18. ______________ (3)

19. The formula $C = \frac{5}{9}(F - 32)$ is used to find the temperature, $C$, in degrees Celsius for a given temperature expressed in degrees Fahrenheit, $F$. Solve the formula for $F$ in terms of $C$.

19. ______________ (3)

20. The cost, $y$, to rent a car, for one day is $20 plus $0.25 for every mile that the car is driven.
   a. Write a linear equation to compute the cost, $y$, of driving a car $x$ miles for one day.

   a. ______________ (2)

   b. What does the slope represent in the context of this problem? (Use a complete sentence and include units)

      ____________________________________________________________________________
      ____________________________________________________________________________
      ____________________________________________________________________________

   2. ____________________________________________________________________________

   c. How much will it cost to rent a car for one day and drive for 100 miles?

   c. ___________ dollars (2)

   d. Malissa’s final bill was $70. How many miles did she drive?

   d. ___________ miles (2)

21. Compute the product $\sqrt[3]{y} \cdot \sqrt[3]{y}$ and state the answer using exponential notation. (no radicals)

21. ______________ (3)
22. Find the equation of the line containing the point $P(-2,5)$ and the point $Q(5, -9)$. Answer must be in slope-intercept form.

23. Solve the following system of linear equations. Write your solution as an ordered pair.

\[
\begin{align*}
4x - 3y &= -19 \\
3x + 2y &= 24
\end{align*}
\]

24. It takes a boat 2 hours to go 16 miles downstream with the current and 4 hours to return against the current. Set up the system of linear equations that would be used to find the speed of the boat in still water and the speed of the current. You do not need to solve the problem, just give the equations!

25. Solve for $x$ using the quadratic formula, $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Round your answers to the nearest hundredth.

\[20x^2 - 28x + 5 = 0\]
26. Sarah and her dog Chewy are playing ball at the dog park. Sarah throws the ball 20 feet south and then walks towards the east. She’s gone 7 feet by the time Chewy gets to the ball. How far must Chewy run to bring the ball back to Sarah? Round to 2 decimal places.

27. Given the equation, \( y = -x^2 - 2x + 3 = -(x - 1)(x + 3) \).
   Find the vertex, \( y \)-intercept, \( x \)-intercepts, and draw the graph.
   
   a. \( y \)-intercept: \((______, ______)\) (1)
   
   b. \( x \)-intercept: \((______, ______)\) (1)
   
   x-intercept: \((______, ______)\) (1)
   
   c. Vertex: \((______, ______)\) (1)
   
   d. Draw the graph (1)