Simplify each expression as much as possible.

1. \((4b^2 - 5b + 11) - (2b^2 + 7b - 10)\)
   \hspace{1cm} 1.__________________ (4)

2. \((x^3)^3 (xy^{-4})^2\)
   \hspace{1cm} 2.__________________ (3)
   \hspace{1cm} (answer with only positive exponents)

3. \(6^{-1} + 11^{-1}\)
   \hspace{1cm} 3.__________________ (4)
   \hspace{1cm} (give answer as a fraction)

4. \((7s^4t^0)^2\)
   \hspace{1cm} 4.__________________ (3)

5. \(\sqrt{28} + \sqrt{252}\)
   \hspace{1cm} 5.__________________ (4)
   \hspace{1cm} (give answer as a radical)

6. \(\frac{3k + 6}{5} \div \frac{15}{10k + 20}\)
   \hspace{1cm} 6.__________________ (4)

7. \((d - \sqrt{3})(d + \sqrt{3})\)
   \hspace{1cm} 7.__________________ (4)
8. Write \( \sqrt[6]{7^5} \) using an exponent, without a radical.

\[ \text{__________________} \quad (2) \]

Factor Completely.

9. \( 18x^2 - 24xy \)

\[ \text{__________________} \quad (3) \]

10. \( 10v^2 - 19v - 2 \)

\[ \text{__________________} \quad (4) \]

Solve the following equations. Show all your work to receive full credit.

11. Solve the system of linear equations algebraically.

\[
\begin{align*}
5x + 5y &= 20 \\
y - 3x &= -8
\end{align*}
\]

\[ \text{__________________} \quad (5) \]

12. \( z^2 - 21 = -4z \)

\[ \text{__________________} \quad (4) \]

13. \( \sqrt{3t - 5} = 5 \)

\[ \text{__________________} \quad (4) \]
Combine the two terms into a single term.
14. \( \frac{6}{7x} + \frac{5}{14} \)  

Solve the following equation. Show all your work to receive full credit.
15. \( \frac{2x}{3} + \frac{x}{2} = \frac{5}{6} \)

Solve for x.
16. \( 3^{2x+11} = 27 \)

17. Solve \( 3x^2 - 11x + 5 = 0 \) using the quadratic formula. For part a, write your answers in simplified radical form. For part b, round your answers to the nearest hundredth (two decimal places).

\[
x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

17. a) \( \underline{\phantom{0000000000000000}} \) \( \underline{\phantom{0000000000000000}} \) (3)

17. b) \( \underline{\phantom{0000000000000000}} \) \( \underline{\phantom{0000000000000000}} \) (1)

18. Solve the inequality below and use the number line to graph your solutions.

\(-3x - 2 < 10\)  

\[\boxed{0}\]

18. \( \underline{\phantom{0000000000000000}} \) (3)

19. Solve the equation for p.

\( t = \frac{k}{3p} \)

19. \( \underline{\phantom{0000000000000000}} \) (2)
20. Find the slope of the line that contains the two points \((3, -6)\) and \((8, 1)\). Write your answer as a fraction, not a decimal.

20. ________________ (2)

21. At a premier showing of a new blockbuster movie The Last Fraction, 579 tickets were sold.

The price of an adult ticket is $10 and the price of a child ticket is $7. In total, the movie theater made $4755 from the premier showing of the film.

Write a system of equations to model the situation. Use \(A\) to represent the number of adult movie tickets sold at the premier, and use \(C\) to represent the number of child tickets sold. **YOU DO NOT NEED TO FIND A SOLUTION TO THIS SYSTEM.**

First equation: ________________________________ (2)

Second equation: ________________________________ (2)

22. When a hole is punched in a barrel full of water, the barrel contains \(W\) gallons of water \(T\) minutes after the hole was created.

\[
W = -\frac{15}{8}T + 32
\]

How many gallons did the barrel initially hold? (Include units) ________________ (1)

What is the slope in this situation? (Include units) ________________ (3)

Write a sentence explaining the meaning of the slope in this problem. Sentences that do not include **numbers and units** will not receive full credit.
23. Student attendance in a certain math class is inversely proportional to the number of days since the start of class.

On day 2, attendance was 40 students. How many students will attend class on day 10?

23. __________________________ (4)

24. For the parabola with equation \( y = x^2 - 2x - 8 \), find;

   a) The y-intercept has coordinates (________, ________)  (1)

   b) The x-intercepts have coordinates (________, ________) and (________, ________)  (2)

   c) The vertex has coordinates (________, ________)  (2)

25. Draw a graph of the line with the following equation.

\[ y = -\frac{2}{3}x + 2 \]  (3)
26. You and your friend are riding bicycles towards the same library. Your friend texts you saying that she is 23 miles west of the library. At that moment you note that you are 5 miles south of the library. What is the distance between you and your friend at this time? Round your answer to the nearest hundredth (two decimals) of a mile.

27. Jasmine is two times the age of Gina, but eight years less than Lee. Lee’s age is the sum of the first five even integers. What are the ages of Lee, Jasmine, and Gina?

Lee’s age is ______________

Jasmine’s age is ___________  

Gina’s age is ______________