1. Write 2.5% as a simplified fraction.

2. Simplify the expression $2y^2 - 5y + 13 - 13y^2 + 4y - 3$

3. Evaluate the rational expression $\dfrac{2t^3 - 8}{t^2 + 5}$ for $t = -1$.

4. Write the number $127{,}000$ in scientific notation.

5. Translate the following into an algebraic expression:
The sum of a number and 16, divided by 4, yields the quotient of the number and 9.

6. Find the restricted value(s) for

$$\frac{x^2 - 9}{x^2 - 2x - 15}$$

7. 31.5 is what percent of 63?

8. Simplify and write your answer in **scientific notation**:

$$\left(8 \times 10^4\right) \cdot \left(2.5 \times 10^{-9}\right)$$

9. If -24 is added to a number, the sum will be 6 times the number. Find the number.

10. Write the slope-intercept form of the line passing through the points $(2, 3)$ and $(6, 4)$.

Solve the following equations:

11. $5x + 4 = 2(x + 8)$

12. $5.14x + 1.32 = 4.7x$

13. $x^2 - 13x + 40 = 0$

14. $(x - 2)(x + 1) = 28$

15. $\dfrac{3}{t + 2} = \dfrac{6}{t + 16}$

16. $\dfrac{7}{3x} - \dfrac{x + 2}{x} = \dfrac{3}{7}$

Solve each system of linear equations. If a system has no solution or infinitely many solutions, state so.

17. $x + 4y = 18$
$3x - y = -24$

18. $y = 3 - 2x$
$10x + 5y = 11$

Factor each of the following polynomials **completely**:

19. $3x^2 + 13x + 14$

20. $8x^2 - 3y + 8xy - 3x$

21. $4m^3 - 12m^2 - 40m$

22. $x^2 - \dfrac{4}{9}$

Perform the indicated operations and simplify. Express your answers using positive exponents only.

23. $(4 \cdot 5)^2 + 4 \cdot 5^2$

24. $\dfrac{18x^{24}(y^3)^2}{6x^3y^0z^2}$

25. $\dfrac{x^2 - 7x}{x^2 + 2x} \cdot \dfrac{x^2 + 7x + 12}{x^2 - 4x - 21}$

26. $(2x - 3)^2$

27. $\dfrac{a^2 + 5a - 14}{a + 3} \div \dfrac{a - 2}{a^2 + 2a - 3}$
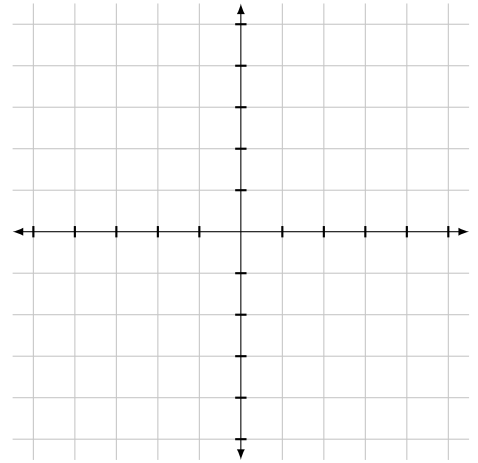
28. $4\sqrt{18} - \sqrt{72} + 3\sqrt{63}$

29. $-2y^2(4xy + 15y^3)$

30. $\dfrac{3(2x + 7)}{2x^2 + 9x - 18} + \dfrac{x + 5}{x + 6}$

31. $\dfrac{6a^3 - 10a^2 - 16a}{2a^2}$

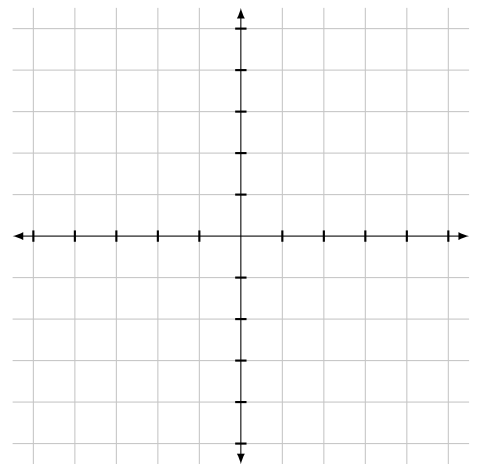**32.** $\dfrac{\left(\dfrac{k + 1}{28k}\right)}{\left(\dfrac{5k - 2}{21k}\right)}$

33. Graph $4x + 3y = 12$ by first finding the $x-$ and $y-$intercepts of the equation. Label points.

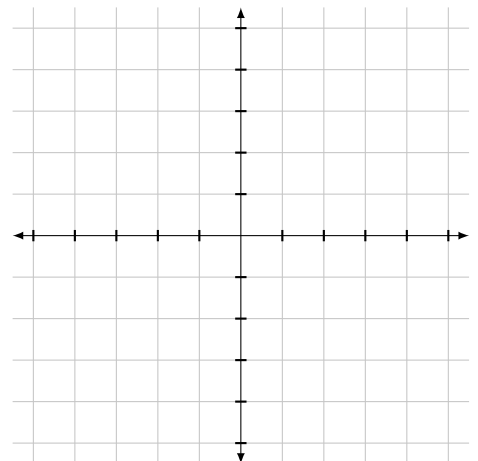x-intercept: (,   )

y-intercept: (,   )

34. Graph $x - 2y = 4$ by first writing the equation in slope-intercept form. Label points.

35. Find the solution to the system of linear equations by graphing. If there is no solution or infinitely many solutions state so.

$$\begin{cases} 2x - 14y = -14 \\ 2x + 7y = 28 \end{cases}$$

36. Nancy bought 7 pounds of oranges and 3 pounds of bananas for $17. Her husband later bought 3 pounds of oranges and 6 pounds of bananas for $12. What was the cost per pound of the oranges and the bananas?

37. One serving of trail mix has 67 grams of carbohydrates, which is 22% of the recommended daily amount. What is the total recommended daily amount of carbohydrates? Round to the nearest gram.

38. A 61-foot string of lights will be attached to the top of a 11-foot pole for a holiday display. How far from the base of the pole should the end of the string of lights be anchored?

39. An acorn falls straight down from the top of a tall oak tree and hits the ground without hitting any branches on the way down. Solve the equation $^-16t^2 + 64 = 0$ for t to find how long it takes to reach the ground.

40. At the end of spring break, Lucy left the beach and drove back towards home, driving at a rate of 40 mph. Lucy's friend left the beach for home 30 minutes (half an hour) later, and drove 50 mph. How long did it take Lucy's friend to catch up to Lucy?