

1. Use order of operations to simplify: $5^2 - 16 \div 2^2 \cdot 4 - 1$
2. Let $A = \{a, b, c\}$, $B = \{a, c, d, e\}$, and $C = \{a, d, f, g\}$. Find the indicated sets:
 - (a) $A \cap B$
 - (b) $C \cup A$
3. Simplify the exponential expression: $\left(\frac{1x^{-2}y^3}{2x^5y^2}\right)^{-5}$
4. Write in scientific notation: 0.0000002345
5. Rationalize the denominator: $\frac{5}{6 + \sqrt{2}}$
6. Perform the indicated operation: $(10x^4 - 8x^3 + 2x^2) - (5x^4 - 3x^3 + 2x^2 - 1)$
7. Multiply: $(x - 3)(x^2 - 4x + 3)$
8. Factor: $x^3 - 3x^2 - 9x + 27$
9. Divide: $\frac{x^2 - 5x - 24}{x^2 - x - 12} \div \frac{x^2 - 10x + 16}{x^2 + x - 6}$
10. Add: $\frac{x}{x^2 - 9} + \frac{x - 1}{x^2 - 5x + 6}$

11. Graph the equation $y = |x| - 1$ and create a table for $x = -3, -2, -1, 0, 1, 2,$ and 3 .

12. Is the following equation an identity, a conditional, or an inconsistent equation?

$$7x + 1 = 5(x + 5) + 2x$$

13. Solve by factoring: $x^2 - x - 6 = 0$

14. Solve by square roots: $4x^2 = 16$

15. Solve by completing the square: $x^2 - 10x + 1 = 0$

16. Solve by quadratic formula: $2x^2 - 1x - 3 = 0$

17. Use graphs to find the set: $(-2, 2] \cap [-1, 3)$

18. Solve the equation: $|x + 1| = 9$

19. Solve the inequality: $9 < 2x + 3 \leq 12$

20. Solve the inequality: $|2x + 3| \geq 15$

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21. Given $f(x) = x^2 + 3x - 1$, find $f(x + 1)$.
22. Determine if $f(x) = x^3 + x^2$ is even, odd or neither.
23. Find the slope of $(-1, 5)$ and $(2, -4)$
24. Find the equation of a line in slope intercept form through the line $(1, 4)$ and is perpendicular to $3x + 6y = 12$
25. Find the average rate of change of $f(x) = x^2$ as changes from $x_1 = -2$ to $x_2 = 3$
26. Find the domain of $f(x) = \sqrt{x - 5}$
27. Given $f(x) = x^2 + 3$ and $g(x) = x - 1$
- (a) Find $(f - g)(x)$
 - (b) Find $(f \circ g)(x)$
 - (c) Find $(f \circ g)(1)$
28. Find the midpoint of $(-3, 3)$ and $(-5, 7)$
29. Find the distance between $(1, -2)$ and $(-2, 1)$
30. Find the center and radius of: $(x - 12)^2 + (x + 9)^2 = 25$

31. Given $f(x) = 2(x + 3)^2 - 5$

- (a) Find the vertex.
- (b) Does the graph open upward or downward?
- (c) Does the graph have a maximum or minimum?
- (d) Find the domain.
- (e) Find the range.

32. Find the vertex of $f(x) = x^2 - 2x + 8$

33. Given $f(x) = x(x - 9)^3(x + 2)^2$,

- (a) Find the behavior.
- (b) Find the zeros.
- (c) Find the multiplicity of each zero.
- (d) Find if it crosses or touches each x-intercept.
- (e) Find the y-intercept.

34. Divide. You may use the method of your choice. $(3x^4 - 2x^3 - 1) \div (x + 1)$

35. List all the POSSIBLE zeros of: $f(x) = 2x^4 - 5x^2 - 4x - 16$

36. Given $f(x) = \frac{2x^2 + 6x + 4}{x^2 - 3x - 10}$

- (a) Find the domain
- (b) Find the vertical asymptotes
- (c) Find the horizontal asymptotes

37. Solve: $\frac{1}{x-5} \geq 1$

38. Graph $f(x) = \left(\frac{1}{2}\right)^x$

39. Write in exponential form: $x = \log_4 97$

40. Write in logarithmic form: $2^x = 5$

41. Evaluate: $\log_{16} 4$

42. Expand: $\log_2 \frac{xy^2}{64}$

43. Condense: $\ln(x) + 3\ln(x - 2) - 5\ln(x + 6) - \frac{1}{2}\ln(x - 3)$

44. Solve: $\log_3(x - 1) - \log_3(x + 2) = 2$

45. Solve: $3^{x+2} = 7^{4x-5}$