

1. Perform the following operations. Show all steps.

$$(a) \frac{-2^4 + |(-2)^2 + (-3)^2| - (-6)^2 \div 4 \cdot 3}{|-2^2 + (-10) \div (-5)|} =$$

$$(b) \frac{\frac{1}{5} + \frac{1}{3}}{\frac{1}{5} - \frac{1}{3}} =$$

$$(c) \frac{3}{\frac{1}{2} - \frac{3}{8} \cdot 5\frac{1}{3}} =$$

2. Simplify each of the following expressions.

$$(a) \frac{4a^6b^5}{2a^5b^8} =$$

$$(b) \frac{x^3yx(y^3x^2)^5}{x^5(y^4x^3)^2y^5} =$$

$$(c) \frac{a^3(-2ab^5)^3a^7ba^3}{(2a^3b^5)^3} =$$

$$(d) (2x - 1)^2 =$$

$$(e) (3a^4 + 5)(3a^4 - 5) =$$

$$(f) (x + 3)^2 - (x - 3)^2 =$$

$$(g) (3a - 2)(6a + 9a^2 + 4) =$$

$$(h) (5x - 2)(3x + 7) =$$

3. Completely factor each of the following.

$$(a) 20pq^3t^2 - 45pq^3 =$$

$$(b) 32abx^5 - 162abx =$$

$$(c) 180k^6 - 245 =$$

$$(d) 3a^2b^3x^4 - 48a^2b^3 =$$

$$(e) -500t^2 + 45t^2x^6 =$$

4. Solve each of the following equations. Make sure to check your solutions.

$$(a) 15x^2 = 60x$$

$$(b) \frac{5x + 2}{3} - \frac{x - 1}{5} = 2x + 3$$

$$(c) 5x^3 = 45x^2$$

$$(d) 5x^3 = 45x$$

(e) $\frac{3}{4} - \frac{2}{7}x = -\frac{3}{28}$

(f) $(x + 4)(x - 1) - 5(2x - 3) = x(x + 9) + 27$

(g) $4x^3 = 196x$

5. Solve the formula $2a - 5b = 20$ for b .
6. Drinks cost \$ 2 each, sandwiches cost \$ 3 each. We bought 3 more drinks than sandwiches. All together, we paid \$ 56. How many drinks did we buy?
7. One side of a rectangle is 7 cm shorter than three times the other side. Find the length of the sides if the perimeter of the rectangle is 58 cm.
8. The sum of two consecutive even integers is 254. Find these numbers.
9. Consider the equations $3x - 4y = 12$ and $y = -x - 10$.
 - (a) Graph the straight lines determined by these equations in the same coordinate system. Use your graph to find the points where these lines intersect.
 - (b) Use algebraic methods to check your solution.