

1. Simplify each of the following expressions.

$$(a) \frac{-5^2 - 60 \div (-4) \cdot 3}{|-21 \div (-7)| - (-1)^6} = 10$$

$$(b) \frac{\frac{1}{5} + \left(-\frac{1}{2}\right)^2 \cdot \left(3\frac{2}{5}\right)}{\frac{1}{5} + \frac{1}{2}} - 2^{-1} = 1$$

$$(c) 5\sqrt{18a^5} - 7\sqrt{32a^5} + 4\sqrt{50a^5} = 7a^2\sqrt{2a}$$

$$(d) \frac{x^3 (-2x^3y^{-2})^4 2yx^{-1} (-12xy^{-3}x^{-2})^{-1}}{x^{-3}yx^3y^0 (-3x^{-5}y)^{-2}y^{-3}} = -24x^5$$

$$(e) \frac{x^2 - 4x - 21}{x^2 - 49} \div \frac{8x + x^2 + 15}{2x + x^2 - 35} = \frac{x - 5}{x + 5}$$

$$(f) \frac{2a - \frac{1}{8a}}{4 + \frac{1}{a}} = \frac{4a - 1}{8}$$

$$(g) \frac{x - 5}{x + 2} - \frac{3}{2 - x} - \frac{14 - x}{x^2 - 4} = \frac{x - 1}{x + 2}$$

$$(h) (3x - 1)(3x + 9x^2 + 1) = 27x^3 - 1$$

$$(i) \text{Rationalize the denominator in } \frac{2}{\sqrt{17} + 4} = 2\sqrt{17} - 8$$

$$(j) \text{Rationalize the denominator in } \frac{2}{\sqrt{x} + 4} = \frac{2\sqrt{x} - 8}{x - 16}$$

2. Solve each of the following equations. Make sure to check your solution(s).

$$(a) \frac{3x - 1}{4} + \frac{8 - 4x}{3} = 2x + 5 \quad -1$$

$$(b) \sqrt{5x - 4} - 3 = 8 \quad 25$$

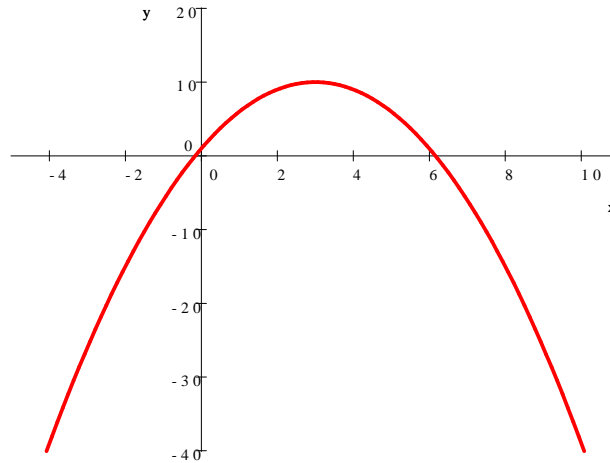
$$(c) 2x^2 + x^3 = 2x \quad 0, -\sqrt{3} - 1, \sqrt{3} - 1$$

$$(d) \sqrt{2x - 1} + 4 = 1 \quad \text{no solution}$$

$$(e) 4 - (2x - 5)(x + 1) = 18 - 2x^2 \quad 3$$

3. Graph the parabola $y = 6x - x^2 + 1$. Clearly indicate the coordinates of at least five points, including vertex and intercepts.

y -intercept: $(0, 1)$ vertex: $(3, 10)$ x -intercepts: $(3 - \sqrt{10}, 0)$ and $(3 + \sqrt{10}, 0)$



4. One side of a rectangle is 8 in longer than three times the other side. The area of the rectangle is 315 in². Find the sides. **9 in by 35 in**
5. The hypotenuse of a right triangle is 74 ft. The difference between the other two sides is 46 ft. Find the sides of the triangle. **24 ft, 70 ft, 74 ft**
6. One side of a rectangle is 7 cm shorter than five times the other side. Find the length of the sides if the area of the rectangle is 528 cm². **11 cm by 48 cm**
7. How many gallons of a 9% acid solution must be mixed with 15 gallons of a 30% acid solution to obtain an acid solution that is 24%? **6 gallons of the 9% solution with 15 gallons of the 30% solution.**