

1. Simplify each of the following expressions

$$(a) \frac{x^3 (2x^2y)^3 x^4y}{(2xy^2)^2} =$$

$$(b) \frac{(2x^2y)^3}{(-2xy^3)^2} =$$

$$(c) (a - b)(a^3 + a^2b + ab^2 + b^3) =$$

$$(d) (3x - 2a)^2 =$$

$$(e) (x^4 - 2x^3 + x^2 - 5x + 2) - (-x^4 + x^3 - 5x + 7) =$$

2. Conjugates are nice because they add, subtract, and multiply to useful expressions. Perform the operations on the conjugates.

$$(a) (2x + 5) + (2x - 5) =$$

$$(b) (2x + 5) - (2x - 5) =$$

$$(c) (2x - 5)(2x + 5) =$$

3. Factor out the greatest common factor.

$$(a) 6a^3bx - 18a^2by - 6a^2b =$$

$$(b) 20x^2 - 12x^4 + 4x^7 =$$

$$(c) 20x^3 + 2x^4y - 2x^3y^2 =$$

$$(d) 3a(x - 5) + 7(x - 5) =$$

4. Factor completely each of the following polynomials.

$$(a) 12x^2 - 432 =$$

$$(b) 81a^2c - 25b^2c =$$

$$(c) 4x^{10} - 1 =$$

$$(d) -2 + 18k^2 =$$

$$(e) 9x^2(5a + 1) - 49(5a + 1) =$$

5. Solve each of the following formulas

$$(a) X = 2Y - 3Z \text{ for } Z.$$

$$(b) F = \frac{9}{5}C + 32 \text{ for } C.$$

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

(a)  $(2x - 5)(2 - x) - 13 = (x - 3)(5 - 2x)$

(b)  $2x^3 = 50x$

(c)  $(x - 2)^2 + x^2 = (x - 3)(x + 7) + 25$

(d)  $3x(x + 1)(x - 7) = 0$

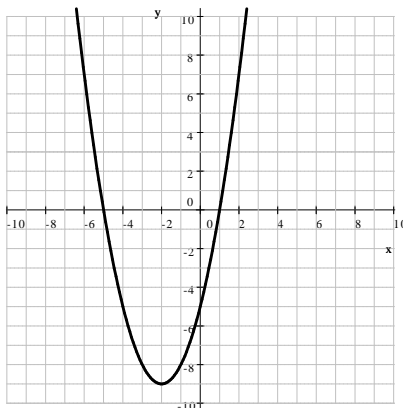
7. Solve the following inequalities. Graph the solution set.

(a)  $\frac{4x - 3}{5} - \frac{3 - x}{2} \geq 2x - 7$

(b)  $-2(3x + 5) < 4x$

(c)  $2(3 - 4(5x + 6)) + 2 \geq 0$

8. Consider the graph shown on the picture below. Note that the points  $A(1, 0)$ ,  $B(2, 7)$  and  $C(-1, -8)$  are on the graph.



(a) Use the points given above to decide: is it possible that this graph has equation  $y = 4x - 4$ ?

(b) Use the points given above to decide: is it possible that this graph has equation  $y = 4x + x^2 - 5$ ?

(c) Use points  $A$  and  $B$  given above to decide: is it possible that this graph has equation  $(x - 1)^2 + (y + 4)^2 = 25$ ?

9. Consider the equations  $y = -x + 5$  and  $2x - 3y = -5$ .

(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.

10. Ann is asked how old she is. Her answer: "The age of my dad is five less than five times my age. If you add our ages, you get 61". How old is Ann's father?

11. The price of a book has increased from \$ 60 to \$ 72. What percent of a change does this represent?