

To receive full credit, show all steps.

1. Simplify each of the following.

(a) $(5a - 1)^2 =$

(b) $(3x^5 + 4y)(3x^5 - 4y) =$

(c) $\frac{3a - 8}{8 - 3a} =$

(d) $\frac{2x + 1}{4x^2 - 1} =$

(e) $\frac{ab - a - b + 1}{b^2 - 1} =$

(f) $\frac{5x - 30}{x^2 - 36} \cdot \frac{3x + 18}{5} =$

(g) $\frac{3x}{x - 2} - \frac{x + 4}{x - 2} =$

(h) $2^0 + (-2)^0 =$

(i) $2^3 \cdot (2^{-2})^{-2} =$

(j) $(2^3 \cdot 2^{-2})^{-2} =$

(k) $2a^3 (-2ab^{-2})^{-2} ab^0 =$

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

(m) $(x - y)(x^5 + x^4y + x^3y^2 + x^2y^3 + xy^4 + y^5) =$

2. Factor completely each of the following:

(a) $4a^2mn - 15abm^2 - 6abmn + 10a^2m^2 =$

(b) $a^2x^3 - b^2x - a^2x + b^2x^3 =$

(c) $162a + 162b - 2ax^4 - 2bx^4 =$

3. Factor by grouping.

(a) $x^2 - 6x + 8 =$

(b) $3a^2 - 5a - 2 =$

(c) $4b^2 - b - 5 =$

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

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

(b) $-3(2x - 1) - (3 - 7x) = 2(x + 1) - (x - 1)$

(c) $8x^3 = 50x^2$

(d) $8p^3 = 50p$

(e) $2 - (3 - x)(2x + 5) = (x - 1)(2x - 1)$

(f) $8a + 2a^2 = 42$

5. Solve each of the following inequalities. Graph the solution set.

(a) $\frac{3 - 4x}{3} - \frac{2x - 3}{7} \leq -x + 7$

(b) $\frac{3 - 2a}{7} > -1$

(c) $3(2x - 3) - (5x + 4) > -14$

6. Solve each of the following formulas.

(a) $A = 2a - 3b$ for a

(b) $A = 2a - 3b$ for b

(c) $F = \frac{mMG}{d^2}$ for m .

(d) $3x - 5y = 60$ for y .

7. Graph the straight lines $5x - 3y = 11$ and $y = -x - 9$ in the same coordinate system.

(a) Use your graph to find the coordinates of the point where the lines intersect.

(b) Use algebraic methods to check your solution for part a).

8. Word Problems.

(a) A couch went on a 15% sale. The sale price is \$ 697. Find the original price.

(b) The difference between two numbers is 7, their sum is 37. Find these numbers.

(c) Ann and Betty are roommates. The monthly rent is \$ 950. The amount paid by Ann is \$ 310 less than twice the amount paid by Betty. How much do they each pay for rent?

(d) The population of a town has decreased from 90 000 to 82 800. What percent of a change does this represent?

(e) One side of a rectangle is 4 ft shorter than three times the other side. Find the sides if the perimeter is 64 ft.

(f) One side of a rectangle is 4 ft shorter than three times the other side. Find the sides if the area is 84 ft².