

1. Expand each of the following.

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

c) $(2x - 1)^2$

e) $(3x - 5)(9x^2 + 15x + 25)$

b) $(x - 3)^2$

d) $(2x - 1)^3$

f) $(x - 3)^2 - (x - 1)(3x + 5)$

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

a) $(2x - 1)^2 - 3x(x - 2) = 8 + (x - 3)^2$

c) $(x + 7)(2x - 1)(5x - 8) = 0$

b) $\frac{3x + 1}{4} - \frac{2x - 1}{3} = x - 4$

d) $(2x - 1)^5 = 0$

e) $6x^3 = 3x^2$

3. Completely factor each of the following over the real numbers.

a) $a^5 + a^4$

b) $3x^2 - 48$

c) $4a^5 - 4a$

4. Factor each of the following over the real numbers by completing the square.

a) $126x + 4x^2 - 2x^3$

c) $2x + x^2 + 26$

e) $2x^2 + x - 15$

b) $4x^2 - 24x - 64$

d) $12x - 2x^2 - 4$

5. Simplify each of the following expressions.

a) $\sqrt{50} - 3\sqrt{18} + \sqrt{200}$

c) Rationalize $\frac{3}{\sqrt{10} - 4}$

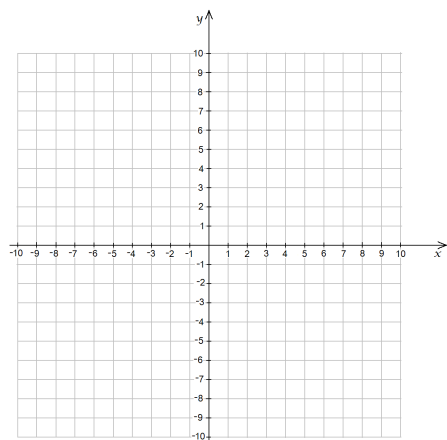
b) $(8 - \sqrt{5})^2$

d) Find the exact value of $x^2 - 4x + 7$ if $x = 5 - \sqrt{2}$

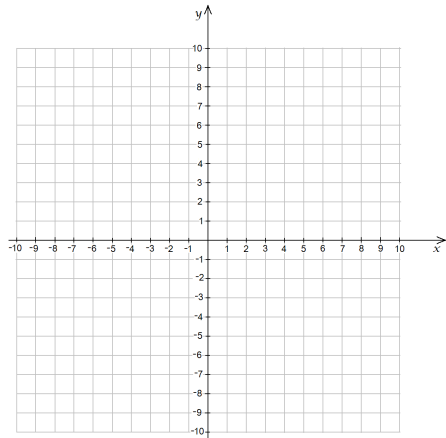
6. a) Solve the equation $x^2 + 7 = 6x$.

b) Use exact values to check your solutions.

7. Graph the straight lines $y = -\frac{2}{3}x + 1$ and $x + 2y = 0$ in the same coordinate system. Use your graph to find the coordinates of the point where the lines intersect.



8. Graph the parabola $y = 8x + x^2 + 12$. Clearly label the coordinates of five points on the parabola, including vertex and intercepts.



9. Find the distance between $(7, -2)$ and $(3, 3)$.
10. Compute the exact value of the area of the triangle with sides 10 cm, 10 cm, and 8 cm long.
11. Write an equation for the line that is
- parallel to $2x - 5y = 17$ and passes through $P(10, -2)$.
 - perpendicular to $2x - 5y = 17$ and passes through $P(10, -2)$.
 - passes through the points $(-2, 4)$ and $(6, 0)$.
12. We have 72 coins in a jar, all dimes and nickels. How many of each coin do we have if the total value of all coins is \$4.75?
13. We are standing on the top of a 912 feet tall tower and throw a small object upward. We measure and record the vertical location of the object. (Location is measured in feet, time in seconds.) t seconds after we threw it, the vertical position of the object is

$$h(t) = -16t^2 + 256t + 912$$

- Where is the object 6 seconds after we threw it?
- How long does it take for the object to be at a height of 1360 feet above the ground?
- How long does it take until the object hits the ground?