

# Quadratics

1. Write each of the following in standard form.

a.  $y = (x+3)(x-4)$

c.  $y = -(x+1)(x-3)$

e.  $y = (3x-5)^2$

b.  $y = 3(x-2)(x-5)$

d.  $y = -(x-5)(x+5)$

f.  $f(x) = 2(x-5)^2 - 4$

2. Write each of the following in factored (intercept) form.

a.  $y = 2x^2 + 4x$

c.  $y = x^2 - 64$

e.  $y = 2x^2 + 2x - 40$

b.  $y = x^2 + 4x - 32$

d.  $y = 3x^2 + 2x - 5$

f.  $f(x) = 3x^2 + 13x - 10$

3. Write each of the following vertex form.

a.  $y = x^2 + 10x - 10$

c.  $y = -5x^2 - 10x - 30$

e.  $y = 2x^2 - 6x + 12$

b.  $y = 4x^2 - 32x + 17$

d.  $y = \frac{2}{3}x^2 - 12x - 20$

f.  $f(x) = -3x^2 + 8x - 15$

4. Determine the roots, axis of symmetry, optimum value (max/min value), y-intercept, direction of opening and the vertex for each of the following.

a.  $y = (x-3)(x+5)$

c.  $y = -3(x-2)(x+1)$

e.  $y = 2x^2 - 4x - 48$

b.  $y = -(x-2)^2$

d.  $y = x^2 - 9$

f.

$f(x) = -2x^2 - 7x - 40$

5. Graph the parabolas in question 4.

6. State the transformations for each of the parabolas below and graph each of the following using transformations.

a.  $y = 3(x-4)+5$

b.  $y = -(x+4)-2$

c.  $f(x) = x^2 - 25$

7. Find the value of the discriminant. What does it tell you about the graph?

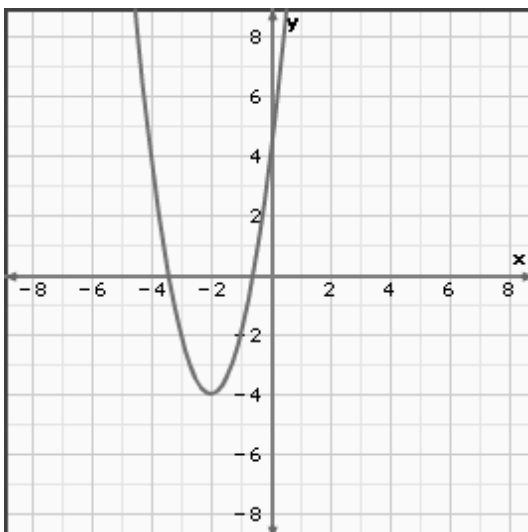
a.  $y = 2x^2 + 4x - 5$

b.  $y = -3x^2 - 4x - 10$

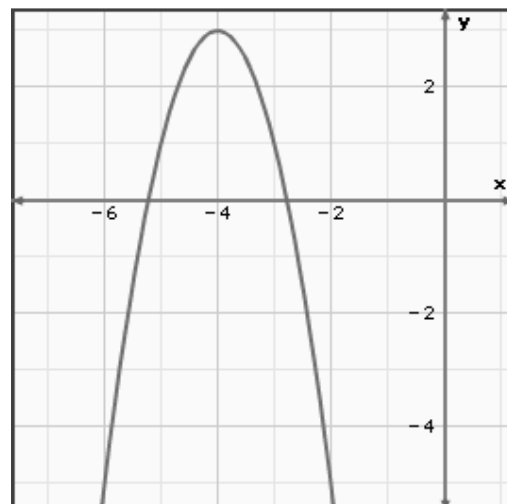
c.  $f(x) = -x^2 - 9x + 8$

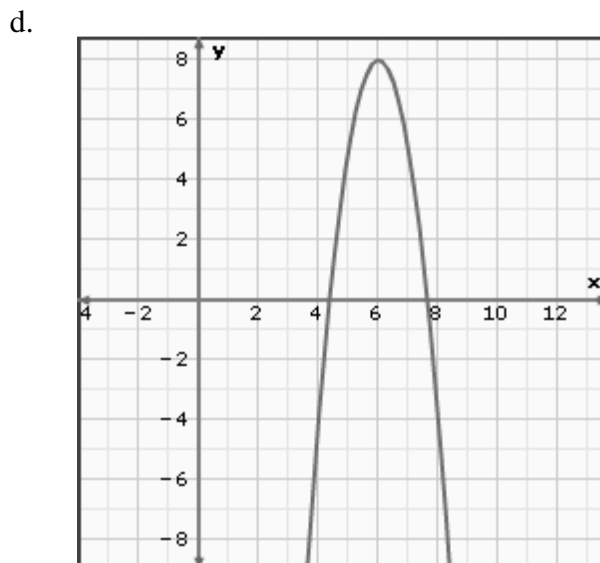
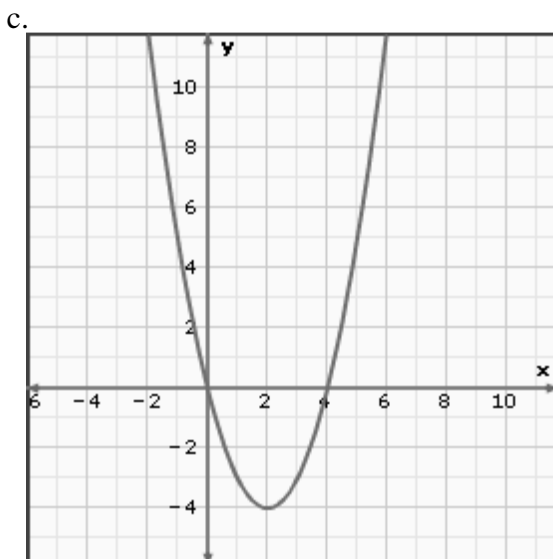
8. Find the equation of each of the parabolas.

a.



b.





8. Find the point of intersection of the line and the quadratic.
- a.  $y = 2x + 2$  and  $y = x^2 + x$                       c.  $y = x + 7$  and  $y = -x^2 - 5x + 2$
- b.  $y = x$  and  $y = -x^2 + 3x$                       d.  $y = 2x - 2$  and  $y = 2x^2 + 8x + 2$
9. A cannonball is shot out of a cannon buried 2 m in the ground. The height of the cannonball can be approximated by the equation  $h = -5t^2 + 35t - 2$ , where  $h$  is the height of the ball, in metres, and  $t$  is the time, in seconds.
- a. How long will it take the cannonball to reach ground level, to the nearest tenth of a second?
- b. Find the maximum height of the cannonball and the time it takes to reach this height.
- c. What is the height of the cannonball 2 seconds after it was fired.
- d. When will the cannonball reach a height of 4.5 m?
10. Ivanka is a professional jeweler. She designs and handcrafts one-of-a-kind god bracelets. A typical bracelet sells for \$200. At that price she usually sells 80 bracelets per craft show. She figures that for every \$10 decrease in price she can sell 5 more bracelets.
- a. Write an equation that represents the revenue of the bracelets.
- b. What price will generate the maximum revenue? What is the maximum revenue?
- c. What is the break even point?
11. The Northern Resources Department want to mark off an area as a conservation park. One side of the rectangular-shaped area will be a large lake. Not including this side, the lengths of the remaining 3 sides must not total more than 36 km. What must be the dimensions of the conservation park in order to obtain a maximum size?