

In each of the quadratic equations, $ax^2 + bx + c = 0$, identify the values of a , b , and c .

1. $x^2 + 3x + 2 = 0$

$a = 1$
 $b = 3$
 $c = 2$

2. $2x^2 + 3x + 1 = 0$

$a = 2$
 $b = 3$
 $c = 1$

3. $x^2 - 4x - 12 = 0$

$a = 1$
 $b = -4$
 $c = -12$

Use the quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to solve 1 - 3.

1. $x = \frac{-3 \pm \sqrt{(3)^2 - 4(1)(2)}}{2(1)}$

$x = \frac{-3 \pm \sqrt{9-8}}{2}$

$x = \frac{-3 \pm \sqrt{1}}{2}$

$x = \frac{-3 \pm 1}{2}$
 $\uparrow = \frac{-3+1}{2} = \frac{-2}{2} = -1$
 $\downarrow = \frac{-3-1}{2} = \frac{-4}{2} = -2$

2. $x = \frac{-3 \pm \sqrt{(-3)^2 - 4(2)(1)}}{2(2)}$

$x = \frac{-3 \pm \sqrt{9-8}}{4}$

$x = \frac{-3 \pm 1}{4}$
 $\uparrow = \frac{-3+1}{4} = \frac{-2}{4} = -\frac{1}{2}$
 $\downarrow = \frac{-3-1}{4} = \frac{-4}{4} = -1$

3. $x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-12)}}{2(1)}$

$x = \frac{4 \pm \sqrt{16+48}}{2}$

$x = \frac{4 \pm \sqrt{64}}{2}$

$x = \frac{4 \pm 8}{2}$
 $\uparrow = \frac{4+8}{2} = 6$
 $\downarrow = \frac{4-8}{2} = -2$

Write each of the quadratic expressions in factored form. QF or factoring

4. $x^2 + 3x + 2$

$(x+1)(x+2)$

5. $2x^2 + 3x + 1$

$(2x+1)(x+1)$

6. $x^2 - 4x - 12$

$(x-6)(x+2)$

7. $x^2 + 8x - 20$

$(x-10)(x+2)$

8. $x^2 + x - 12$

$(x+4)(x-3)$

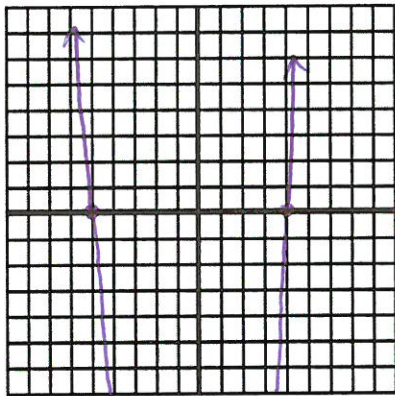
9. $x^2 - 7x + 12$

$(x-3)(x-4)$

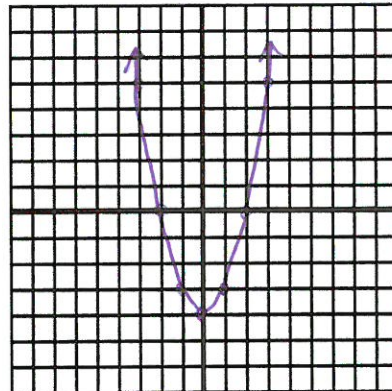
Graph:

10. $f(x) = (x + 5)(x - 4)$

11. $k(x) = x^2 - 4$



x	y
1	-18
0	-20
-0.5	-20.25
-1	-20
-2	-18



x	y
-2	0
-1	-3
0	-4
1	-3
2	0

x-intercept(s):

y-intercept:

$(-5, 0)$
 $(4, 0)$

$(0, -20)$

vertex:

$(-2.5, -20.25)$

x-intercept(s):

y-intercept:

$(2, 0)$
 $(-2, 0)$

$(0, -4)$

vertex:

$(0, -4)$

12. Complete parts a-e below.

a. Graph each of the quadratic functions:

$f(x) = x^2$

$g(x) = x^2 - 9$

$h(x) = (x + 2)^2 - 9$

b. How do the functions compare to each other?

Same shape all open up, different vertex values.

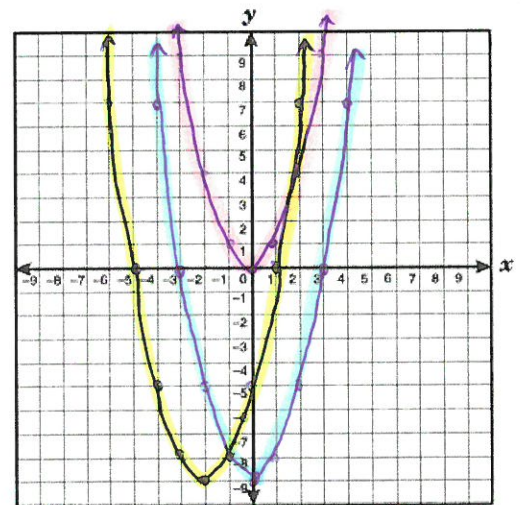
c. How do $g(x)$ and $h(x)$ compare to $f(x)$?

the vertex for both is lower (y-value $k = -9$).

d. Look back at the functions above and identify the x-intercepts of $g(x)$. What are they?

$(-3, 0)$ and $(+3, 0)$

e. What are the coordinates of the points corresponding to the x-intercepts in $g(x)$ in each of the other functions? How do these coordinates compare to one another?



For problems 16-17, use the given functions to find the missing values.

16. $f(x) = x^2 + 4x - 12$

a. $f(0) = \underline{-12}$

b. $f(2) = \underline{0}$

c. $f(x) = 0, x = \underline{2}$

d. $f(x) = 20, x = \underline{4, -8}$

$$\begin{aligned} f(x) &= 20 = x^2 + 4x - 12 \\ &\quad \underline{-20} \qquad \qquad \qquad \underline{-20} \\ 0 &= x^2 + 4x - 32 \\ 0 &= (x-4)(x+8) \\ x &= 4 \quad x = -8 \end{aligned}$$

-32	4
-1·32	
-2·16	
-4·8	4

17. $f(x) = x^2 - 6x + 9$

a. $f(0) = \underline{9}$

b. $f(-3) = \underline{36}$

c. $f(x) = 0, x = \underline{3}$

d. $f(x) = 16, x = \underline{-1, 7}$

$$\begin{aligned} 0 &= x^2 - 6x + 9 \\ 0 &= (x-3)(x-3) \\ x &= 3 \end{aligned}$$

$$\begin{aligned} 16 &= x^2 - 6x + 9 \\ &\quad \underline{-16} \qquad \qquad \qquad \underline{-16} \\ 0 &= x^2 - 6x - 7 \\ 0 &= (x-7)(x+1) \\ x &= 7 \quad x = -1 \end{aligned}$$

