

1. Find the coordinates of the max/min points, x -intercepts, and y -intercepts on graphs of $f(x) = (x+2)^2 - 9$.

 x -int

$$0 = (x+2)^2 - 9$$

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

$$\pm\sqrt{9} = (x+2)$$

$$\pm 3 = x+2$$

$$1 = 3-2 = x$$

$$-5 = -3-2 = x$$

$$(1, 0)$$

$$(-5, 0)$$

Factor completely.

2. $3x^2 - 7x - 6$

$$\begin{array}{r|rr} x & | & (x-3)(3x+2) \\ \hline 3 & | & 0 \end{array}$$

4. $x^2 + 36$

Not factorable

6. $3x^2 - 15x + 18$

$$3(x^2 - 5x + 6)$$

$$3(x-3)(x-2)$$

8. $2x^2 + 13x - 7$

$$\begin{array}{r|rr} x & | & (x+7)(2x-1) \\ \hline -7 & | & 0 \end{array}$$

 y -int

$$f(0) = (0+2)^2 - 9$$

$$f(0) = 2^2 - 9$$

$$f(0) = -5$$

$$(0, -5)$$

Max/min $\leftarrow a > 0$

$$(-2, -9)$$

$$(h, k)$$

3. $x^3 - x^2 - 8x + 8$

$$x^2(x-1) - 8(x-1)$$

$$(x^2 - 8)(x-1)$$

5. $25x^2 - 81$

$$(5x-9)(5x+9)$$

7. $x^2 + 10x$

$$x(x+10)$$

9. $3x^2 - 48$

$$3(x^2 - 16)$$

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

10. Given the function, $f(x) = x^2 + 12x + 11$

a. Write the rule in vertex form and find the coordinates of the max/min point on its graph.

$$(x+6)^2 - 25$$

minimum $(-6, -25)$

b. Use the results of part a to solve the equation $x^2 + 12x + 11 = 0$.

$$(x+6)^2 - 25 = 0$$

$$(x+6)^2 = 25$$

$$x+6 = \pm 5$$

$$x = -6 \pm 5$$

$$x = -1$$

$$x = -11$$

11. Given the function, $f(x) = x^2 - 18x + 74$

a. Write the rule in vertex form and find the coordinates of the max/min point on its graph.

$$(x-9)^2 - 7$$

minimum $(9, -7)$

b. Use the results of part a to solve the equation $x^2 - 18x + 74 = 13$.

$$(x-9)^2 - 7 = 13$$

$$(x-9)^2 = 20$$

$$x-9 = \pm \sqrt{20}$$

$$x = 9 \pm \sqrt{20}$$

Solve by factoring.

$$12. \ 2x^2 + x - 3 = 0$$

$$(x-1)(2x+3) = 0$$

$$x-1=0 \quad 2x+3=0$$

$$x=1 \quad 2x=-3$$

$$x=-1.5$$

$$13. \ x^3 + x^2 - 81x - 81 = 0$$

$$x^2(x+1) - 81(x+1) = 0$$

$$(x+1)(x^2-81) = 0$$

$$(x+1)(x+9)(x-9) = 0$$

$$x+1=0 \quad x+9=0 \quad x-9=0$$

$$x=-1 \quad x=-9 \quad x=9$$

Solve with quadratic formula and leave answers in simplest radical form or a+bi form.

$$14. \ x^2 + 4x + 9 = 0$$

$$\frac{-4}{2} \pm \frac{\sqrt{4^2 - 4(1)(9)}}{2}$$

$$\frac{-4}{2} \pm \frac{\sqrt{-20}}{2} \quad \begin{matrix} \sqrt{-20} \\ \sqrt{-4} \sqrt{5} \\ 2i \sqrt{5} \end{matrix}$$

$$\frac{-4}{2} \pm \frac{2i\sqrt{5}}{2}$$

$$-2 \pm i\sqrt{5}$$

$$15. \ x^2 - 6x - 11 = 0$$

$$\frac{6}{2} \pm \frac{\sqrt{(-6)^2 - 4(1)(-11)}}{2}$$

$$3 \pm \frac{\sqrt{80}}{2}$$

$$3 \pm \frac{\sqrt{16}\sqrt{5}}{2}$$

$$3 \pm \frac{4\sqrt{5}}{2}$$

$$3 \pm 2\sqrt{5}$$

ANSWERS:

1. Minimum: (-2, -9)
x-intercepts: (-5, 0) and (1, 0)
y-intercept: (0, -5)

2. $(3x + 2)(x - 3)$

3. $(x^2 - 8)(x - 1)$

4. Not factorable

5. $(5x + 9)(5x - 9)$

6. $3(x - 2)(x - 3)$

7. $x(x + 10)$

8. $(2x - 1)(x + 7)$

9. $3(x + 4)(x - 4)$

10. a. $f(x) = (x+6)^2 - 25$
Minimum: (-6, -25)

b. $x = -1$ or $x = -11$

11. a. $f(x) = (x-9)^2 - 7$
Minimum: (9, -7)

b. $x = 9 \pm \sqrt{20}$

12. $x = \frac{-3}{2}$ or $x = 1$

13. $x = -9$ or $x = -1$ or $x = 9$

14. $x = -2 \pm i\sqrt{5}$

15. $x = 3 \pm 2\sqrt{5}$