

Solve by Factoring and Square Roots WS

Find the zeros of each function. Write your answers as ordered pairs.

$$1) f(x) = p^2 - 8p + 12$$

$\begin{matrix} a & b & c \\ \{2, 6\} \end{matrix}$

$$a \cdot c = 12$$

$$\begin{array}{r|l} 1 & 12 \\ -2 & 6 \\ 3 & 4 \end{array}$$

$$(p-2)(p-6) = 0$$

$$\text{zeros: } (2,0) (6,0)$$

$$2) g(x) = x^2 - 2x - 3$$

$\begin{matrix} a & b & c \\ \{3, -1\} \end{matrix}$

$$a \cdot c = -3$$

$$\begin{array}{r|l} 1 & -3 \end{array}$$

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

$$\text{zeros: } (3,0) (-1,0)$$

$$3) h(x) = x^2 - x - 12$$

$\begin{matrix} a & b & c \\ \{-3, 4\} \end{matrix}$

$$a \cdot c = -12$$

$$\begin{array}{r|l} 1 & 12 \\ 2 & 6 \\ 3 & 4 \end{array}$$

$$(x-4)(x+3) = 0$$

$$\text{zeros: } (4,0) (-3,0)$$

$$4) y = 7b^2 - 15b - 18$$

$\begin{matrix} a & b & c \\ \{-\frac{6}{7}, 3\} \end{matrix}$

$$a \cdot c = -126$$

$$\begin{array}{r|l} 1 & 126 \\ 2 & 63 \\ 3 & 42 \\ 6 & 21 \end{array}$$

$$(7b^2 + 6b)(-21b - 18)$$

$$b(7b+6) - 3(7b+6)$$

$$(b-3)(7b+6) = 0$$

$$\text{zeros: } (3,0) (-\frac{6}{7},0)$$

$$5) g(x) = 2r^2 - 11r - 21$$

$\begin{matrix} a & b & c \\ \{-\frac{3}{2}, 7\} \end{matrix}$

$$a \cdot c = -42$$

$$\begin{array}{r|l} 1 & 42 \\ 2 & 21 \\ 3 & 14 \end{array}$$

$$(2r^2 + 3r)(-14r - 21) = 0$$

$$r(2r+3) - 7(2r+3)$$

$$(r-7)(2r+3) = 0$$

$$\text{zeros: } (7,0) (-\frac{3}{2},0)$$

$$6) f(x) = 6a^2 + 5a - 25$$

$\begin{matrix} a & b & c \\ \{\frac{5}{3}, -\frac{5}{2}\} \end{matrix}$

$$a \cdot c = -150$$

$$\begin{array}{r|l} 1 & 150 \\ 2 & 75 \\ 3 & 50 \\ 5 & 30 \\ 6 & 25 \\ -10 & 15 \end{array}$$

$$(6a^2 - 10a) + (15a - 25) = 0$$

$$2a(3a-5) + 5(3a-5) = 0$$

$$(2a+5)(3a-5) = 0$$

$$\text{zeros: } (-\frac{5}{2},0) (\frac{5}{3},0)$$

$$7) g(x) = 3x^2 - 12$$

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

$$+12 \quad +12$$

$$\frac{3x^2}{3} = \frac{12}{3}$$

$$\sqrt{x^2} = \sqrt{4}$$

$$x = \pm 2$$

$$9) h(x) = 5x^2 - 125$$

$$5x^2 - 125 = 0$$

$$+125 \quad +125$$

$$\frac{5x^2}{5} = \frac{125}{5}$$

$$\sqrt{x^2} = \sqrt{25}$$

$$x = \pm 5$$

$$8) f(x) = -6x^2 + 96$$

$$-6x^2 + 96 = 0$$

$$-96 \quad -96$$

$$-6x^2 = -96$$

$$\sqrt{x^2} = \sqrt{16}$$

$$x = \pm 4$$

* Set Equal to zero
Get x^2 by itself
Square Rt. Both sides
Don't forget \pm

$$10) y = x^2 - 144$$

$$x^2 - 144 = 0$$

$$+144 \quad +144$$

$$\sqrt{x^2} = \sqrt{144}$$

$$x = \pm 12$$

- 11) A robber is on the 2nd floor of a building and is going to jump out of the window to get away from the police. The height, in feet, of the robber after x seconds is represented by the function $h(x) = -x^2 - 2x + 15$. How long is the robber in the air? * When does his height = 0?? *

$$-(x^2 + 2x - 15) = 0 \quad a \cdot c = \frac{-15}{1}$$

$$\begin{array}{r} 1 \\ -3 \\ \hline 15 \\ 5 \end{array}$$

$$-(x-3)(x+5) = 0$$

$$x = 3 \text{ or } x = -5$$

The robber is in the air for 3 seconds.

- 12) The height, in feet, of a swimmer diving off a diving board after x seconds is represented by $h(x) = -16x^2 + 48$. How many seconds does it take the swimmer to hit the water?

(When does his height = 0?)

$$-16x^2 + 48 = 0$$

$$-16x^2 = -48$$

$$\sqrt{x^2} = \sqrt{3}$$

$$x = \pm \sqrt{3}$$

$$x = 1.73 \text{ seconds}$$