

4/16 Algebra - Downing

Ex) A fish tank has a height of 3 ft. Its length is three times its width. The volume of the tank is 270 cubic feet. Find the length and width of the tank to the nearest tenth.

$$V = l \cdot w \cdot h$$

$$270 = (3w)(w)3$$

$$\frac{270}{9} = \frac{3w^2}{9}$$

No "b" value, you can use square roots

$$\sqrt{30} = \sqrt{w^2}$$

$$\pm 5.5 = w$$

use positive answer

width = 5.5 ft.

length = $3(5.5) = 16.5$ feet

Ex) A storage container has the shape of a rectangular prism. Its height is 6 feet. Its length is two times its width. The volume is 288 cubic feet. Find the length and width of the container to the nearest tenth.

$$V = l \cdot w \cdot h$$

$$288 = (2w)(w)(6)$$

$$\frac{288}{12} = \frac{2w^2}{12}$$

$$\sqrt{24} = \sqrt{w^2}$$

$$\pm 4.9 = w$$

width = 4.9 feet

length = $2(4.9) = 9.8$ feet

Ex) $2(x-5)^2 + 4 = 8$

$$\frac{2(x-5)^2}{2} = \frac{12}{2}$$

$$\sqrt{(x-5)^2} = \sqrt{6}$$

$$x-5 = \pm 2.45$$

$$\begin{array}{r} x-5 = 2.45 \\ +5 \quad +5 \\ \hline \end{array} \quad \begin{array}{r} x-5 = -2.45 \\ +5 \quad +5 \\ \hline \end{array}$$

$$x = 7.45 \quad x = 2.55$$

HW - Quiz

9.5 Quadratic Formula

Ex) $x^2 - 4x + 1$

$\frac{1}{11}$ ← factoring does not work → have to use quadratic formula

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

where $a \neq 0$ and $b^2 - 4ac \geq 0$

$(b^2 - 4ac)$ is called the discriminant

If $b^2 - 4ac$ is positive → 2 solutions

If $b^2 - 4ac$ is zero → 1 solution

If $b^2 - 4ac$ is negative → No Real Solutions

$\begin{matrix} a & b & c \\ x^2 - 4x + 1 = 0 \end{matrix}$

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

$$\begin{array}{cc} \frac{4 + \sqrt{12}}{2} & \frac{4 - \sqrt{12}}{2} \end{array}$$

Solutions = $\frac{4 + \sqrt{12}}{2} = 3.73$ $\frac{4 - \sqrt{12}}{2} = 0.27$

Ex) $\begin{matrix} a & b & c \\ 2x^2 - 5x + 3 = 0 \end{matrix}$ ← set = to 0

$$x = \frac{5 \pm \sqrt{(-5)^2 - 4(2)(3)}}{2(2)} \rightarrow \frac{5 \pm \sqrt{1}}{4}$$

$$\begin{array}{cc} \frac{5 + \sqrt{1}}{4} & \frac{5 - \sqrt{1}}{4} \\ x = 1.5 & = 1 \end{array}$$

HW - on-line