

9.3 Solving Quadratic Equations

* Quadratic equation is an equation that can be written as $ax^2+bx+c=0$, where $a \neq 0$ (standard form of a quadratic equation)

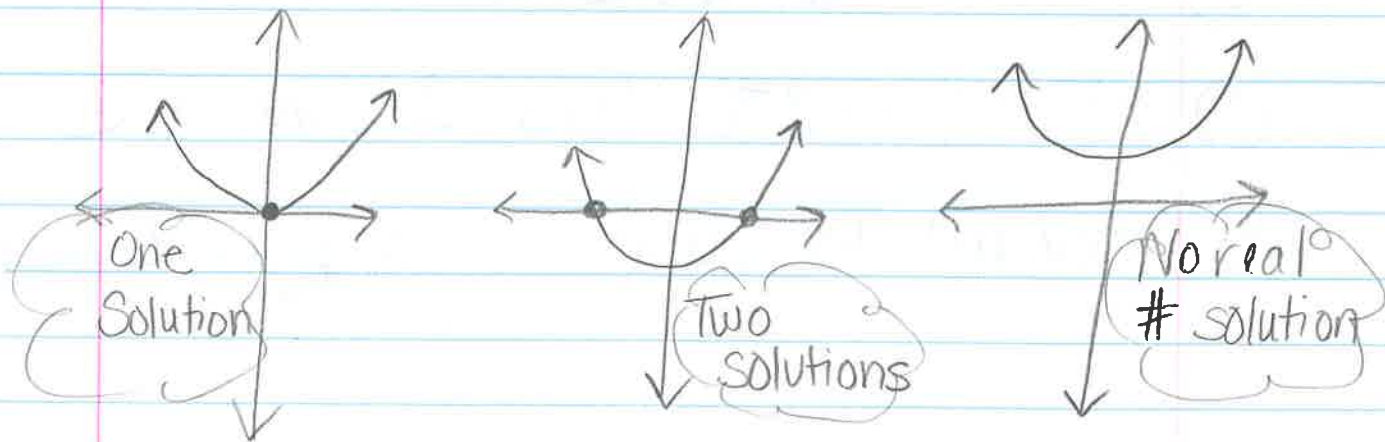
* To solve a quadratic equation:

- graph ($y=ax^2+bx+c$)
OR

- use square roots ($ax^2+bx+c=0$)

* The solutions to a quadratic equation are the x-intercepts (also called roots of the equation or zeros of the functions)

* There can be two solutions, one solution OR no real #s for the solutions.



* Review solving by graphing with Problem 1 (A-C) on pg. 562

* Got it #1)

A) Think it out. How would this equation be graphed. $y = x^2 - 16$

→ No bx , therefore, the line of sym. is $x=0$

→ Vertex would be $(0, -16)$

→ If $(0, -16)$ is the min. (b/c "a" is positive) then the parabola must extend upward, crossing the x -axis @ 2 points (meaning 2 solutions)

→ graph to find those solutions

or what else can you do?

(factor, solve for "x", etc.)

Answer: 2 solutions @ ± 4

B) $y = 3x^2 + 6$ has No solution

C) $x^2 - 25 = -25$ has 1 solution @ 0

* Review Problem 2 on pg. 562

Got it #2) Solve by using Square Roots

A) $m^2 - 36 = 0$
 $m = \pm 6$

B) $3x^2 + 15 = 0$
 $-15 -15$
 $3x^2 = -15$

$\sqrt[3]{x^2 = -5}$
 $x = \text{No Solution}$

C) $4d^2 + 16 = 16$
 $-16 -16$
 $4d^2 = 0$
4

$d^2 = 0$
 $d = 0$

One solution @ 0

* Review Problem 3 on pg. 563

* In many real world situations, the negative square root may not be a reasonable solution.

* Got it #3

A) $V = lwh$
 $500 = (2w)(w)(4)$
 $500 = 8w^2$

$62.5 = w^2$
 $w = \pm 7.9$

7.9 ft

B) The solutions of the equation are irrational #s, which are difficult to approximate on a graph.

The first part of the paper discusses the importance of maintaining accurate records of all transactions. This is essential for the proper management of the company's finances and for ensuring compliance with tax laws.

In order to achieve this, it is necessary to establish a system of double-entry bookkeeping. This system ensures that every transaction is recorded in two different accounts, one as a debit and one as a credit, which helps to maintain the balance of the books.

Another key aspect of financial management is the regular review of financial statements. This allows the company to monitor its performance over time and to identify any areas where it may be overspending or where it can cut costs.

Finally, it is important to ensure that all financial records are kept secure and are accessible to the appropriate personnel. This is particularly important in the event of an audit or a dispute with a creditor.

9.3 pg. 563 #6, 7, 8 - 48 even (Solve by any method)

6) It is easier to solve using square roots when the equation has noninteger solutions. It is almost always easier to solve using square roots to find its solutions.

7) if a & c have opposite signs, there will be two solutions (ex $x^2 - 1 = 0$ & $m^2 - 36 = 0$)

if $c = 0$, there will be one solution (vertex is $(0, 0)$)

if a & c have the same sign, there will be no solution (ex: $x^2 + 1 = 0$ & $4d^2 + 16 = 16$)

$$8) \begin{aligned} x^2 - 9 &= 0 \\ x^2 &= 9 \end{aligned}$$

$$\begin{aligned} x &= \pm 3 \\ \text{two solutions} \end{aligned}$$

$$12) \begin{aligned} x^2 + 4 &= 0 \\ x^2 &= -4 \end{aligned}$$

$$\text{no solution}$$

$$10) \begin{aligned} 3x^2 &= 0 \\ 3 & \\ x^2 &= 0 \end{aligned}$$

$$\begin{aligned} x &= 0 \\ \text{one solution} \end{aligned}$$

$$14) \begin{aligned} \frac{1}{2}x^2 + 1 &= 0 \\ \frac{1}{2}x^2 &= -1 \\ \frac{1}{2}x &= -1 \end{aligned}$$

$$\begin{aligned} x &= -2 \\ \text{no solution} \end{aligned}$$

$$16) \frac{1}{4}x^2 - 1 = 0$$

$$+1 +1$$

$$4\left(\frac{1}{4}x^2 = 1\right)$$

$$x^2 = 4$$

$$x = \pm 2$$

two solutions

$$26) \frac{64b^2}{64} = \frac{16}{64}$$

$$b^2 = 16/64$$

$$b^2 = \frac{1}{4}$$

$$b = \pm \frac{1}{2}$$

two solutions

$$18) x^2 - 10 = -10$$

$$+10 +10$$

$$x^2 = 0$$

$$x = 0$$

one solution

$$30) 3a^2 + 12 = 0$$

$$-12 -12$$

$$3a^2 = -12$$

$$3$$

$$a^2 = -4$$

no solution

$$20) n^2 = 81$$

$$n = \pm 9$$

two solutions

$$28) 144 - p^2 = 0$$

$$-p^2 = -144$$

$$p^2 = 144$$

$$p = \pm 12$$
 two solutions

$$22) k^2 - 196 = 0$$

$$k^2 = 196$$

$$k = \pm 14$$

two solutions

$$32) A = s^2$$

$$13m$$

$$34) A = \pi r^2$$

$$90 = \pi r^2$$

$$\pi$$

$$\frac{90}{\pi} = r^2$$

$$r = \sqrt{\frac{90}{\pi}}$$

$$28.65 = r^2$$

$$r \approx 5.35$$

$$\text{cm}$$

$$24) w^2 - 36 = -64$$

$$w^2 = -28$$

no solution

$$31b) 100 = \pi r^2$$

$$\frac{100}{\pi} = r^2$$

$$31.8 = r^2$$

$$r = 5.6 \text{ ft}$$

$$38) c^2 - 18 = 9$$
$$+18 +18$$
$$c^2 = 27$$

two solutions

$$40) V = \pi r^2 h$$
$$1100 = \pi r^2 \left(\frac{52}{12}\right) \text{ * inches to ft.}$$
$$1100 = 4.3(\pi)(r^2)$$
$$1100 = 13.5(r^2)$$
$$13.5$$

$$81.48 = r^2$$

$$r = 9.027$$

$$r = 9 \text{ ft}$$

$$42) \text{ larger square } 36 \text{ ft}^2$$

$$36 \cdot (.50) = 18$$

$$A = s^2$$
$$\sqrt{18} = s^2$$

$$s = 4.2 \text{ ft}$$

$$44) 49p^2 - 16 = -7$$
$$+16 +16$$
$$49p^2 = 9$$
$$49$$

$$p^2 = \frac{9}{49}$$

$$p = \frac{\pm 3}{7}$$

two solutions

$$46) \frac{1}{2}t^2 - 4 = 0$$
$$2\left(\frac{1}{2}t^2 = 4\right)$$

$$t^2 = 8$$

$$t = \pm 2.8$$

two solutions

* see attached 2

$$48) \quad -\frac{1}{4}x^2 + 3 = 0$$

$$-3 \quad -3$$

$$-1 \left(-\frac{1}{4}x^2 = -3 \right)$$

$$x^2 = 12$$

$$x = \pm 3.5$$

two solutions

* Use Labels with Formula

* Keep answer
in feet

$$V = \pi r^2 h$$

$$1,100 \text{ ft}^3 = \pi(r^2)(52 \text{ in})$$

$$1,100 \text{ ft}^3 = \pi(r^2) \left(\frac{52 \text{ in}}{12} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \right)$$

$$1,100 \text{ ft}^3 = \pi(r^2) \left(\frac{52}{12} \text{ ft} \right)$$

$$1,100 \text{ ft}^3 = \pi(r^2)(4.3 \text{ ft})$$

$$1,100 \text{ ft}^3 = (\pi \cdot 4.3 \text{ ft})(r^2)$$

$$1,100 \text{ ft}^3 = 13.5 \text{ ft}(r^2)$$

$$13.5 \text{ ft}$$

$$\frac{1,100 \text{ ft}^3}{13.5 \text{ ft}} = r^2$$

$$81.48 \text{ ft}^2 = r^2$$

$$81 \text{ ft}^2 = r^2$$

$$\sqrt{81 \text{ ft}^2} = \sqrt{r^2}$$

$$9 \text{ ft} = r$$



$$V = \pi r^2 h$$

* Keep answer
in inches $\left(\frac{1100 \text{ft}^3}{1} \cdot \frac{1728 \text{in}^3}{1 \text{ft}^3} \right) = \pi r^2 (52 \text{in})$

$$1900800 \text{in}^3 = (3.14)(r^2)(52 \text{in.})$$

$$1900800 \text{in}^3 = 163.28 r^2$$

$$163.28 \text{in}$$

$$\frac{1900800 \text{in}^3}{163.28 \text{in}} = r^2$$

$$11641.4 \text{in}$$

$$11641.4 \text{in}^2 = r^2$$

$$\sqrt{11641.4 \text{in}^2} = \sqrt{r^2}$$

$$r \approx 107.9 \text{in}$$

* Problem asks for
the answer in ft.

$$\frac{107.9 \text{in}}{1} \cdot \frac{1 \text{ft.}}{12 \text{in}} = 9 \text{ft.}$$