Using $\sqrt{\ }$'s to Solve Quadratic Equations

$c^2-16=0$

$(c-4)(c+4)=0$

$c=4,-4$

10.4 NOTES

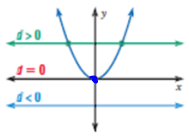
Use Square Roots to Solve Quadratic Equations

To use square roots to solve a quadratic equation of the form $ax^2 + c = 0$, first isolate x^2 on one side to obtain $x^2 = d$. Then use the following information about the solutions of $x^2 = d$ to solve the equation.

KEY CONCEPT *For Your Notebook*

Solving $x^2 = d$ by Taking Square Roots

- If $d > 0$, then $x^2 = d$ has two solutions: $x = \pm\sqrt{d}$.
- If $d = 0$, then $x^2 = d$ has one solution: $x = 0$.
- If $d < 0$, then $x^2 = d$ has no solution.



Example 1 – Solve Quadratic Equations

Solve the equation.

a. $c^2 - 25 = 0$

$+25 \quad +25$

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

$c = \pm 5$

2 Solutions

b. $2x^2 + 11 = 11$

$-11 \quad -11$

$\frac{2x^2}{2} = \frac{0}{2}$

$\sqrt{x^2} = \sqrt{0}$

$x = 0$

1 Solution

Example 1 Cont. Solve Quadratic Equations

Solve the equation.

c. $5w^2 + 12 = -8$

$-12 \quad -12$

$\frac{5w^2}{5} = \frac{-20}{5}$

$w^2 = -4$

No Solution

d. $25m^2 = 16$

$\frac{25m^2}{25} = \frac{16}{25}$

$\sqrt{m^2} = \sqrt{\frac{16}{25}}$

$m = \pm \frac{4}{5}$

2 Solutions

Example 2- Approximate solutions of a quadratic equation

Solve the equation. Round the solutions to the nearest hundredth.

a. $x^2 + 4 = 14$

$-4 \quad -4$

$\sqrt{x^2} = \sqrt{10}$

$x = \pm 3.16$

b. $3k^2 - 15 = 0$

$+15 \quad +15$

$\frac{3k^2}{3} = \frac{15}{3}$

$\sqrt{k^2} = \sqrt{5}$

$k = \pm 2.24$

Example 2 Cont. - Approximate solutions of a quadratic equation

Solve the equation. Round the solutions to the nearest hundredth.

c. $2p^2 - 7 = 2$

$+7 \quad +7$

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

$\sqrt{p^2} = \sqrt{4.5}$

$p = \pm 2.12$

d. $4b^2 = 22$

$\frac{4b^2}{4} = \frac{22}{4}$

$\sqrt{b^2} = \sqrt{5.5}$

$b = \pm 2.35$

Example 3- Solve a Quadratic Equation (binomial squared in the equation)

Solve the equation. Round the solutions to the nearest hundredth, if necessary.

a. $2(x-2)^2 = 18$

$\frac{2}{2}$ $\frac{}{2}$

$\sqrt{(x-2)^2} = \sqrt{9}$

$x-2 = \pm 3$

$+2$ $+2$

$x = 2 \pm 3$

$x = 5, -1$

b. $4(n-3)^2 = 28$

$\frac{4}{4}$ $\frac{}{4}$

$\sqrt{(n-3)^2} = \sqrt{7}$

$n-3 = \pm 2.65$

$+3$ $+3$

$n = 3 \pm 2.65$

$n = 5.65, .35$

Example 3- Solve a Quadratic Equation (binomial squared in the equation)

Solve the equation. Round the solutions to the nearest hundredth, if necessary.

c. $3(t+5)^2 = 24$

$\frac{3}{3}$ $\frac{}{3}$

$\sqrt{(t+5)^2} = \sqrt{8}$

$t+5 = \pm 2.83$

-5 -5

$t = -5 \pm 2.83$

$t = -7.83, -2.17$

d. $5(y+1)^2 = 25$

$y = 1.24, -3.24$

Example 4- word problems

Use the given area A of the circle to find the radius r or the diameter to the nearest hundredth.

$A = \pi r^2$

a. $A = 144\pi$ in^2

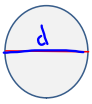
$A = \pi r^2$

$\frac{144\pi}{\pi} = \frac{\pi r^2}{\pi}$

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

$12\text{in} = r$

b. $A = 34\pi$ ft^2



$\frac{34\pi}{\pi} = \frac{\pi r^2}{\pi}$

$\sqrt{34} = \sqrt{r^2}$

$5.83 = r$

$d = 2r$

$d = 2(5.83)$

$d = 11.66$ ft

Homework

10.4 Practice B worksheet