**10.4: Use Square Roots to Solve Quadratic Equations**

**Goals:** \*Solve a quadratic equation by using square roots

 \*Identify the number of solutions a quadratic equation

To be able to use square roots the quadratic must be in the form: *y* = *x*² + *c*

Which means *b* = 0

\*Want to isolate *x*², which when it is isolate is a new equation called: *x*² = *d*

**\*\*THINGS TO NOTICE\*\***

· If *x*² = *d* and *d* > 0, then there are 2 solutions, the positive and negative square roots of *d*

· If *x*² = *d* and *d* = 0, then there is one solution, *x* = 0

· If *x*² = *d* and *d* < 0, then there are no solutions because you cannot take the square root of a negative number

**Solve:**

**Ex:** 2*x*² = 8 **Ex:** *m*² – 18 = –18 **Ex:** *b*² + 12 = 5

 *x*² = 4 *m*² = 0 *b*² = –7

 *x* = ±2 *m* = 0 No Solution

**Ex:** 3*x*² = 27 **Ex:** *p*² + 12 = 12 **Ex:** *a*² – 3 = –4

 *x* = ±3 *p* = 0 No Solution

**Ex:** *c*² – 25 = 0 **Ex:** 5*w*² + 12 = 8 **Ex:** 2*x*² + 11 = 11

 *c* = ±5 No solution *x* = 0

**Ex:** 4*z*² = 9 **Ex:** 25*s*² = 49 **Ex:** 9*m*² = 100

 $z=\pm \frac{3}{2}$ $s=\pm \frac{7}{5}$ $m=\pm \frac{10}{3}$

**Ex:** 25*x*² = 16 **Ex:** 49*b*² + 64 = 0

$x=\pm \frac{4}{5}$ No solution

**Approximate the solutions using a calculator. (Round to the nearest hundredth)**

**Ex:** 3*x*² – 11 = 7 **Ex:** 2*x*² – 10 = 6 **Ex:** *x*² + 4 = 14

 *x* = ±2.45 *x* = ±2.83 *x* = ±3.16

**Ex:** 3*k*² – 1 = 0 **Ex:** 2*p*² – 7 = 2

 *k* = ±0.58 *p* = ±2.12

**Solve:**

**Ex:** 6(*x* – 4)² = 42 **Ex:** 4(*x* + 6)² = 32 **Ex:** 2(*x* – 2)² = 18

 (*x* – 4)² = 7 (*x* + 6)² = 8 (*x* – 2)² = 9

 *x* – 4 = ±2.65 *x* + 6 = ±2.83 *x* – 2 = ±3

 *x* = –2.65 + 4 = 1.35 *x* = –3.17 and –8.83 *x* = 5 and –1

 *x* = 2.65 + 4 = 6.65

**Ex:** 4(*q* – 3)² = 28 **Ex:** 3(*t* + 5)² = 24

*q* = 0.35 and 5.65 *t* = –7.83 and –2.17

**Ex:** During a hockey game a remote-controlled blimp flies above the crowd and drops a numbered tennis ball. The number corresponds to a prize. Use the diagram to find the amount of time the ball is in the air.



*h* = –16*t*² + 45

17 = –16*t*² + 45

–28 = –16*t*²

$$\frac{7}{4}=t^{2}$$

*t* = 1.32 seconds