

Roots of Quadratic Equations
Oct. 24, 2017

Roots of quadratic equations have 3 names:

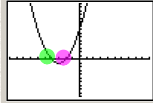
1. Roots
2. Zeros
3. X-Intercepts

We are looking for the 2 values of 'x' that make the quadratic true when $y = 0$
We can find the roots three ways:

1. Use the **graphing calculator** (graph and find the points where the graph crosses the x-axis)
2. **Factor** the equation
3. **Quadratic formula**

Method 1: Graphing

$y = x^2 + 6x + 8$



x-intercepts? $x = -2$ and $x = -4$
-2 & -4 are the roots (or zeros) of $y = x^2 + 6x + 8$

Method 2: Factoring

$y = x^2 + 6x + 8$

What 2 #'s multiply to give 8 and add to give 6?
 $4 \times 2 = 8$
 $4 + 2 = 6$

$y = (x+4)(x+2)$
 $0 = (x+4)(x+2)$
 $x+4=0 \rightarrow x=-4$
 $x+2=0 \rightarrow x=-2$

Once you have the 2 factors, set the y to zero and solve both factors for 'x'.

Example: Find the zeros of $y = x^2 - 11x + 10$

$y = (x-1)(x-10)$
 $0 = (x-1)(x-10)$
 $x-1=0 \rightarrow x=1$
 $x-10=0 \rightarrow x=10$

Find the zeros of the following functions:

a) $y = 2x^2 - 32x - 72$
 $y = 2(x^2 - 16x - 36)$
 $y = 2(x-18)(x+2)$
 $0 = 2(x-18)(x+2)$
 $0 = (x-18)(x+2)$
 $x-18=0 \rightarrow x=18$
 $x+2=0 \rightarrow x=-2$

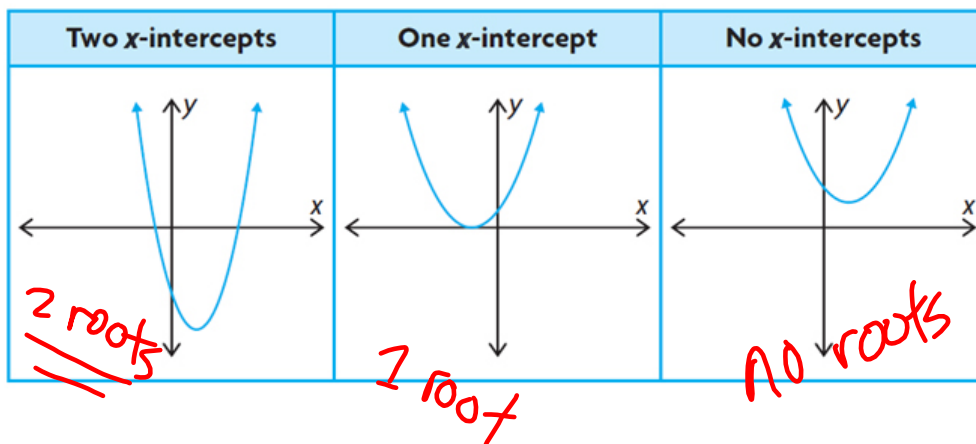
b) $y = x^2 - 8x + 16$
 Factored form: $(x-4)(x-4)$
 $y = (x-4)(x-4)$
 $0 = (x-4)(x-4)$
 $x-4=0 \rightarrow x=4$
 $x-4=0 \rightarrow x=4$
 1 x-int!

Communication Tip
A quadratic function is in factored form when it is written in the form $y = a(x-h)(x-k)$

Mar 1-11:14 AM

The X-Intercepts of Zeroes of the Function

The x-intercepts are the points at which a parabola intersects the x-axis. These points are also known as zeroes, roots, solutions, and solution sets. Each quadratic function will have two, one, or no x-intercepts, depending on the location of the vertex and the direction of opening. By examining the location of the vertex, it is possible to determine the number of zeros, and therefore the number of x-intercepts.



Oct 4-8:14 PM

Attachments

7s4e1 final.mp4

7s4e2 final.mp4

7s4e3 final.mp4

7s4e4 final.mp4

fm7s4-p11.tns

FM11-7s4.gsp