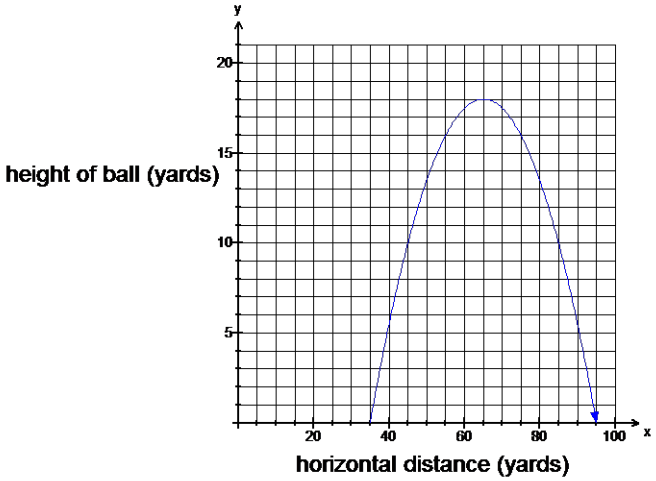
Sect. 7.1 Solving Quadratic Equations by Graphing

Example 1:

The path of a football at one particular kick-off can be modelled by the function $h(d) = -0.02d^2 + 2.6d - 66.5$ where h is the height of the ball above ground (yards) and d is the horizontal distance from the kicking team's goal line (yards).



a) What are the x-intercepts? What do they mean in this context?

b) Why are there 2 x-intercepts?

c) Why is there no y-intercept labelled on this graph?

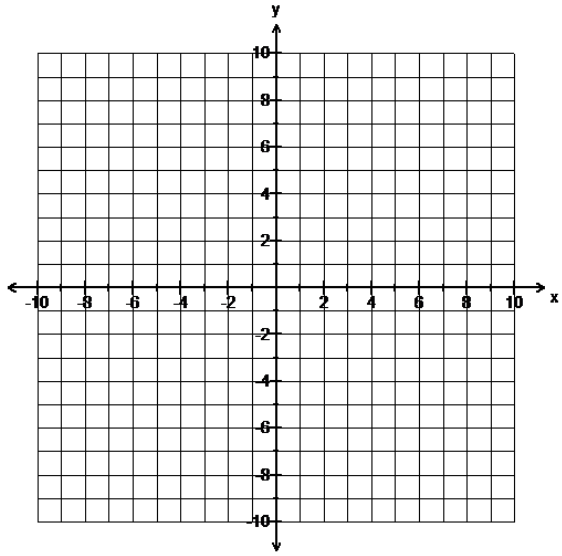
d) What horizontal distance does the ball travel before it hits the ground?

Example 2:
Solve $x^2 - 7x + 12 = 0$ graphically.

To solve a quadratic equation graphically, construct a table of values and sketch the graph:

$y = x^2 - 7x + 12$

x	y
1	
2	
3	
4	
5	



x-intercepts:_____

The x-intercepts are **solutions** to the equation $0 = x^2 - 7x + 12$

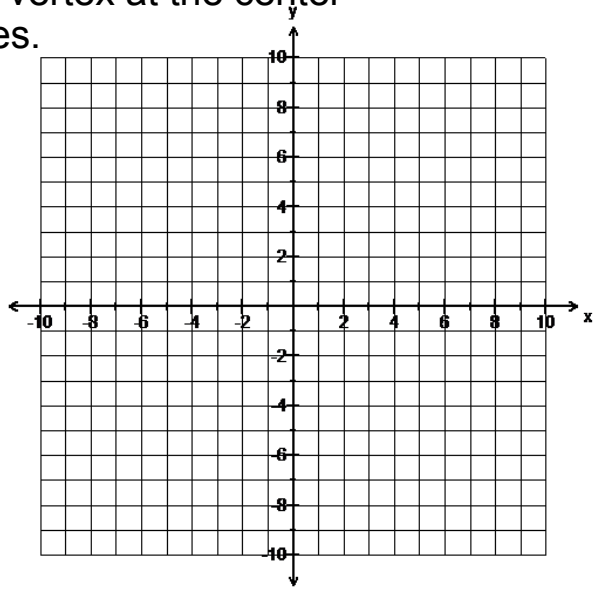
Verify the 2 solutions:

Example 3:
Given the equation $y = x^2 + 6x + 8$,create a table of values and sketch the graph.

Step 1: Find the coordinates of the vertex:

Step 2: The parabola will be symmetrical at the vertex so place the vertex at the center of the table of values.

x	y



Step 3: Find two points on one side of the vertex.

Use SYMMETRY to get two other points!!

Review:

a) What is the y-intercept?

b) What are the x-intercepts?

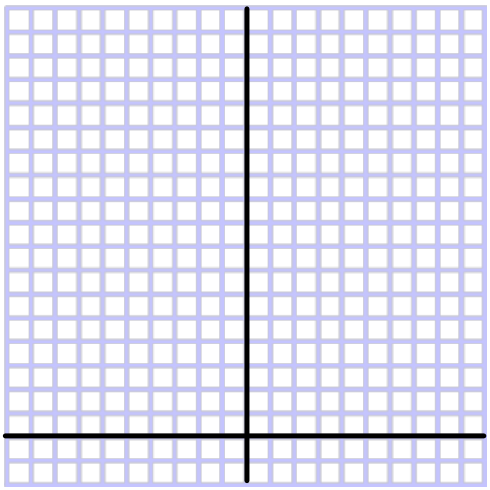
c) What is the y value when x is -1?

d) What are the x values when y is 8?

Example 4:
Given the equation $y = x^2 + 5$, graph the equation and state the x-intercepts.

$y = x^2 + 5$

x	y
-2	
-1	
0	
1	
2	



x-intercepts:_____

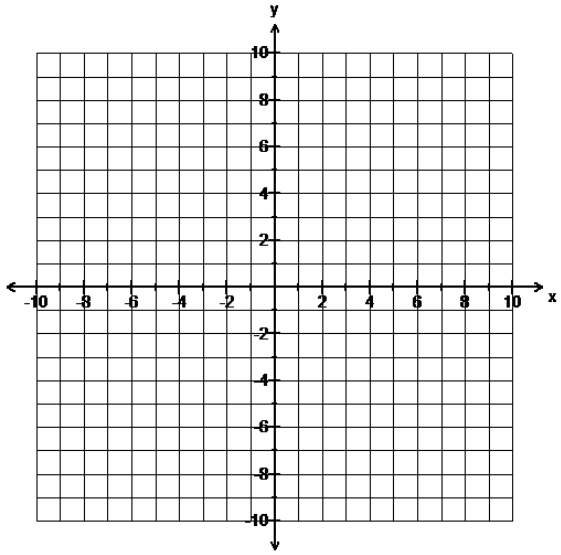
How could you use your graph to solve the equation $21 = x^2 + 5$?

x	y

Example 5:
Given the equation $y = x^2 + 2x + 1$, graph the equation and state the x-intercepts.

vertex:

x	y



x-intercepts:_____

True or False???

- Some quadratic equations have no x-intercepts.

- A quadratic equation will always cross the x-axis in two distinct places.

- The graph of $y = x^2 + 2x + 2$ intersects the x-axis twice.

In Summary

Key Ideas

- A quadratic equation can be solved by graphing the corresponding quadratic function.
- The standard form of a quadratic equation is

$$ax^2 + bx + c = 0$$

- The roots of a quadratic equation are the x-intercepts of the graph of the corresponding quadratic function. They are also the zeros of the corresponding quadratic function.

Need to Know

- A quadratic equation is any second-degree equation that contains a polynomial in one variable.
- If a quadratic equation is in standard form
  - you can graph the corresponding quadratic function and determine the zeros of the function to solve the equation
- If the quadratic function is not in standard form
  - you can graph the expression on the left side and the expression on the right side as functions on the same axes
  - the x-coordinates of the points of intersection of the two graphs are the roots of the equation
- For any quadratic equation, there can be zero, one, or two real roots. This is because a parabola can intersect the x-axis in zero, one, or two places.

Attachments

PM11-7s1.gsp

pm7s1-p8.tns

7s1e1 finalt.mp4

7s1e2 finalt.mp4

7s1e3 finalt.mp4

pm7s1-p1.tns

pm7s1-p2.tns

PM11-7s1-2.gsp