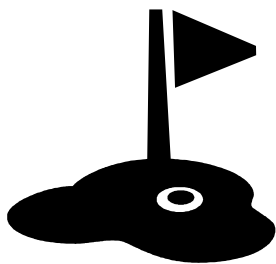


Golf-ing Graphing



Tiger Woods is a great golfer who uses the path of a parabola to judge how far a golf ball must travel to reach the green. Obviously distance is an important measurement depending on where the green is located, but sometimes height must be a concern as well. The golf ball takes the path of a parabola and you can track the height of the ball of one particular shot using this equation:

$$y = -\frac{4}{5}x^2 + 16x$$

The variables x and y are assigned as follows:

Let x = time (in seconds) Let y = height (in feet)



1. Does the parabola of this golf shot open up or down? Explain how you know before graphing?

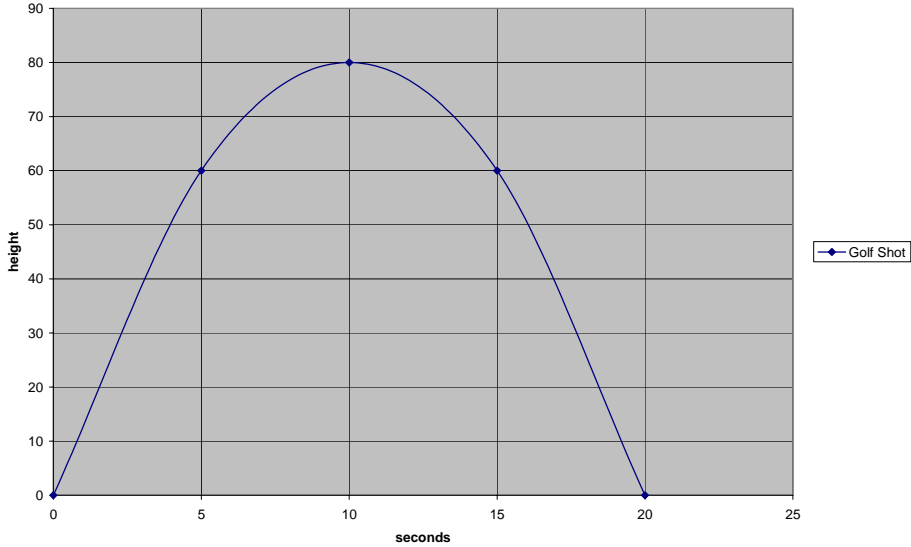
The parabola opens downward. Looking at the equation you can tell this because the coefficient (“a” value) of the x^2 term is negative.

2. Generate a table of values in order to graph the function. Use the values 0, 5, 10, 15, and 20 seconds for the “ x ” values. Substitute those values into the given equation to find the “ y ” values.

Time in Seconds	Height in Feet
0	0
5	60
10	80
15	60
20	0

3. Label and number the axes.
4. Graph the table as ordered pairs, the x -value representing the time in seconds, and the y -value representing the height in feet, $(x,y) = (\text{seconds},\text{feet})$.

Golfing Graph



5. What does the x represent in this graph? **The x represents time in seconds.**

6. What does the y represent in this graph? **The y represents height in feet.**

7. Does the parabola have a maximum or minimum point?
Because it opens downward, it has a maximum point.

8. What is this point called? **The point is called the vertex.**

9. What is the axis of symmetry in the form of $x=?$ **$x = -b/2a$**
 { see hint \rightarrow } **$x = -16/[2 * (-4/5)]$**
 $x = 10$

9. Hint: to find the axis of symmetry of a parabola you can use the formula $x = \frac{-b}{2a}$

10. What is the number value of the maximum or minimum?
 { use your answer from #9 above to find the (x,y) }

when $x = 10, y = 80$ (10,80)
from: $y = -4/5 x^2 + 16x$
 $y = -4/5(10)^2 + 16(10)$
 $y = -4/5(100) + 160$
 $y = -80 + 160$
 $y = 80$

11. How long will the ball be in the air before its first bounce?

10 seconds + 10 seconds = 20 seconds (10 seconds up, 10 seconds down)
or 20 seconds will elapse before the height of the ball is back at zero feet

12. What is the height of the golf ball at:

0 sec.= **0** ft; 5 secs. = **60**ft; 10 secs. = **80**ft; 15 secs. = **60**ft; 20 secs. = **0**ft.

13. What is the highest the golf ball reaches? **The maximum height is 80 feet.**