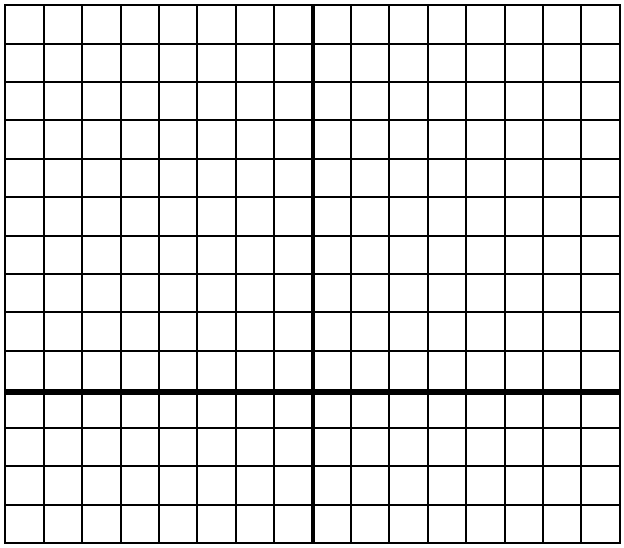
Working with Vertex Form

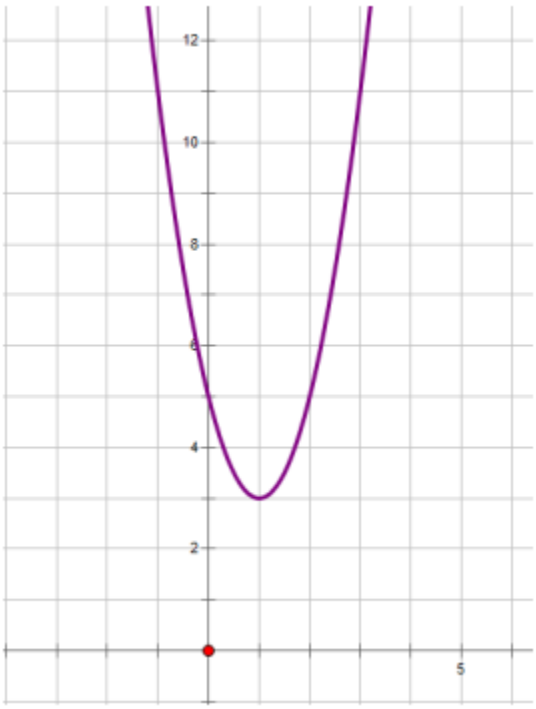
Warm-up

Complete the following table. Then graph each of the parabolas from the table.

Equation	Vertex	Direction of Opening	Step Pattern	Equation of Axis of Symmetry	RANGE
$f(x) = (x-1)^2 - 4$					
$g(x) = -0.5(x+3)^2 + 4$					
$h(x) = -x^2 + 6$					

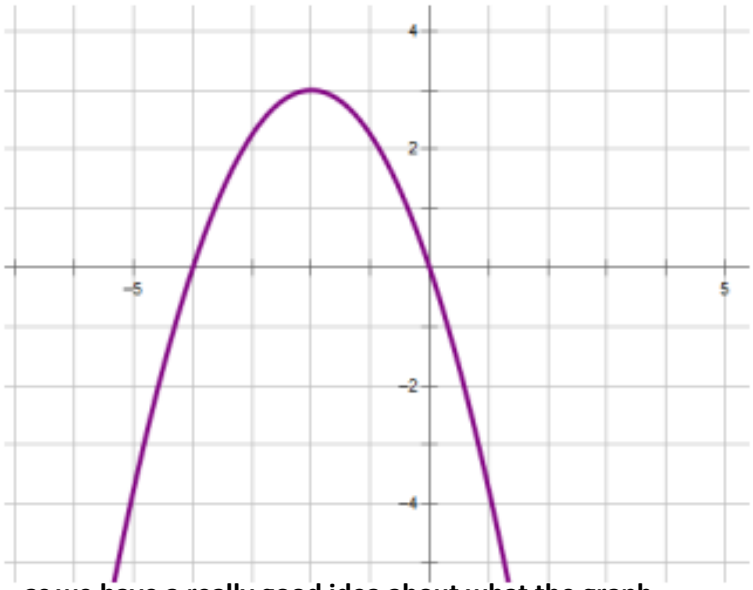


Find the equation of the parabola shown to the right.



Test a point to see if the equation works!

Sometimes the step pattern may not be obvious. In this case, find the equation algebraically.



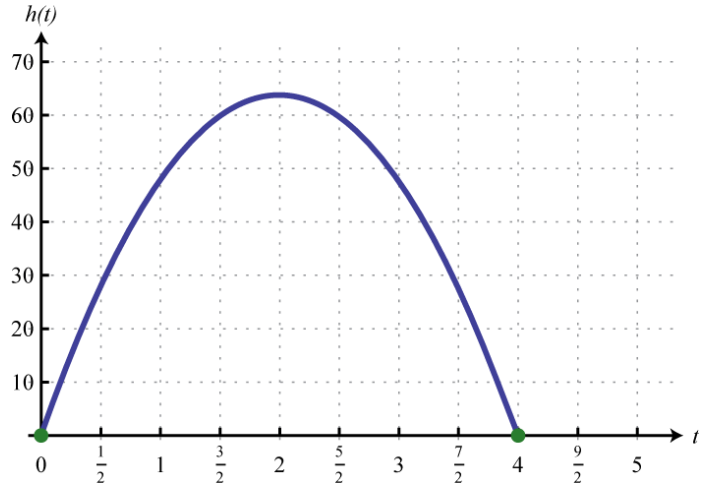
A quadratic equation in vertex form is also easy to work with – as we have a really good idea about what the graph looks like.

1. The path of a volleyball hit is given by the equation $h(x) = -2(x - 2.5)^2 + 12.6$ where *h(x)* is the height of the volleyball (in metres) and *x* is the horizontal distance travelled (in metres).

   a) What is the initial height of the volleyball?

   b) Draw a rough sketch of this graph. What is the maximum height the volleyball reaches?

2. The graph below shows the height of football, *h(t),* t seconds after it is thrown. Estimate the equation for this graph.

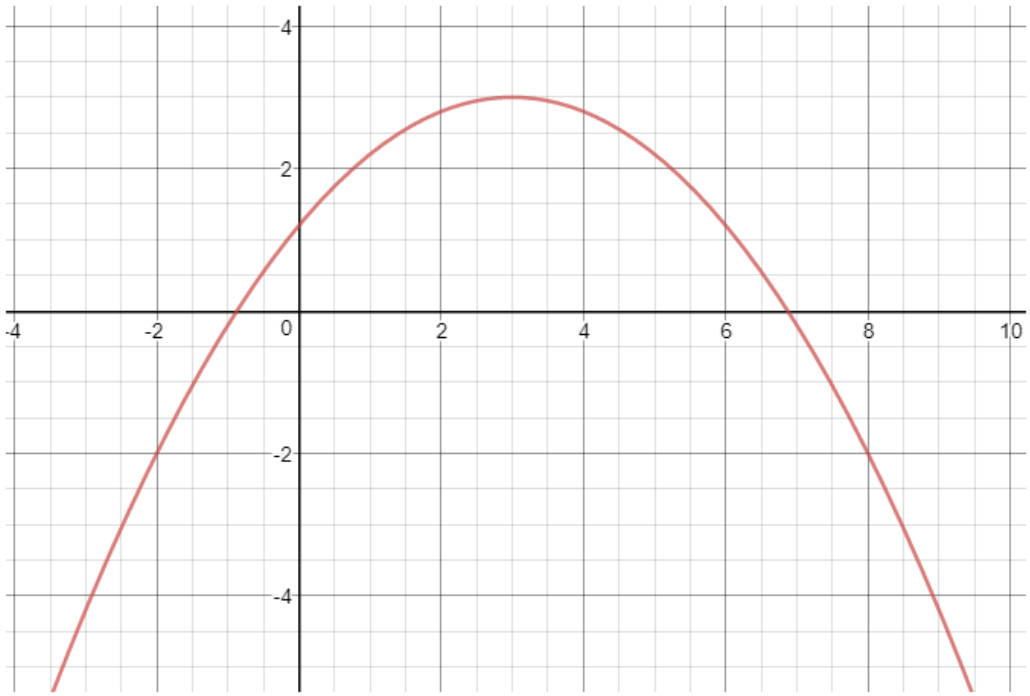


Working with Vertex Form – Problem Set

1. A parabola is shown below.

a) Find the equation of the parabola shown below.

b) Find the domain and range of the parabola.



2. A batter in baseball hits a pop fly into the air. The height of this ball is given by the equation $h(t) = -5(t-2)^2 + 21$, where *h* is the height of the ball, in metres, *t* seconds after it has been hit.

a) What is the maximum height of this ball and when does it occur?

b) What is the initial height?

c) Evaluate *h(1)* and interpret its meaning.

d) What is the range of this function?

3. **Text page 51 #8abce**
4. **page 57 #10 - 13**
5. **page 62 #2, 3 (also find the equation of each graph shown)**

ANSWERS

1. a) $y = -0.2(x-3)^2 + 3$ b) D: $\{x \epsilon R\}$ R: $\{y \epsilon R | y \leq 3\}$
2. a) 21 m after 2 seconds. b) 1 m c) h(1)=16 (height of ball after 1 second) d) $\{h(t) \epsilon R | 0 \leq h(t) \leq 21\}$