

Algebra Functions – Quadratics, Piece-wise, Absolute Value, Exponentials, Inverses

1. The quadratic function  $f(x)$  has these characteristics:

- The vertex is located at  $(8, -2)$ .
- The range is  $-2 \leq f(x) < \infty$ .

Which function could be  $f(x)$ ?

find vertex for each

**A.**  $f(x) = \frac{1}{2}x^2 - 8x + 30$   $\frac{-b}{2a} = \frac{-(-8)}{2 \cdot \frac{1}{2}} = \frac{8}{1} = 8$   $V = (\frac{-b}{2a}, f(\frac{-b}{2a}))$  or (find h, plug h in)  
 $\rightarrow \frac{1}{2}(8)^2 - 8(8) + 30 = -2 \rightarrow V = (8, -2) \checkmark$

**B.**  $f(x) = \frac{1}{2}x^2 - 8x + 31$

**C.**  $f(x) = -\frac{1}{2}x^2 + 8x - 34$

**D.**  $f(x) = -\frac{1}{2}x^2 - 2x + 6$

2. The vertex of the quadratic function  $g(x)$  is located at  $(4, 2)$ . An x-intercept of  $g(x)$  is located at  $(5, 0)$ . What is the y-intercept of  $g(x)$ ?

**A.**  $(0, -30)$   $\leftarrow$  is when  $x=0$  so plug in 0

**B.**  $(0, -14)$

**C.**  $(0, -4)$

**D.**  $(0, 3)$

$y = -2(0-4)^2 + 2$   
 $y = -30$   
 so  $(0, -30)$

$h=4$   $k=2$

Slope =  $\frac{-2}{1} = -2$

so  $y = -2(x-4)^2 + 2$

3. What are the solutions to the equation  $289 = \left(\frac{1}{3}x - 8\right)^2$ ?

**A.**  $x = -27$  only

**B.**  $x = 75$  only

**C.**  $x = -27$  and  $x = 75$

**D.**  $x = -75$  and  $x = 75$

Sq. root both sides

$+ 17 = \frac{1}{3}x - 8$

now solve for x and

$-17 = \frac{1}{3}x - 8$

so  $-9 = \frac{1}{3}x$

$75 = x$

$-27 = x$

answers  
 or plug into equations and see what works