

1. Use the parent graph $y = x^2$ to describe each transformation.

A) $f(x) = -(x-3)^2 + 1$ flip - Right 3 - Up one

B) $g(x) = -\frac{1}{2}x^2$ flip - wider

C) $h(x) = \left(\frac{1}{3}x\right)^2$ Wider

2. Write the quadratic function in vertex form if the parent graph $y = x^2$ is vertically stretched by a factor of 2, reflected over the x-axis, then translated 2 units right and 4 units up to create $f(x)$.

$-2(x-2)^2 + 4$

3. Using the function $f(x) = 5x^2 + 10x - 1$.

A) Does the graph open up or down? Up Explain. $a = 5$

B) Find the equation of the axis of symmetry. $x = -1$ $x = h = \frac{-b}{2a} = \frac{-10}{2(5)} = -1$

C) Find the vertex. $(-1, -6)$ Is it a maximum or minimum? Min
 $f(-1) = -6$

What is the maximum or minimum value? -6
K

D) Find the y-intercept. (E) Find the domain. (F) Find the range.

-1 All Reals $y \geq -6$
 $c = -1$ $y \geq \min(K)$

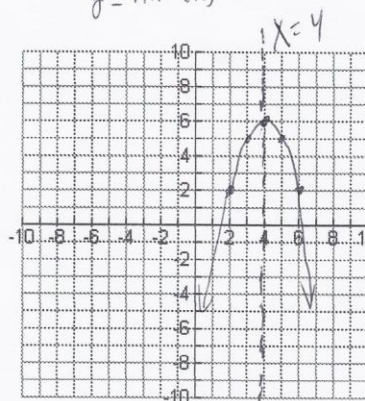
4. Graph the function $f(x) = -x^2 + 8x - 10$.

Identify the vertex, the equation of the axis of symmetry, and four additional points on the graph. Graph the axis of symmetry as a dashed line.

Vertex $(4, 6)$

Equation of the axis of symmetry $x = 4$

Coordinates of four additional points
 $(2, 2)$, $(3, 5)$
 $(5, 5)$, $(6, 2)$

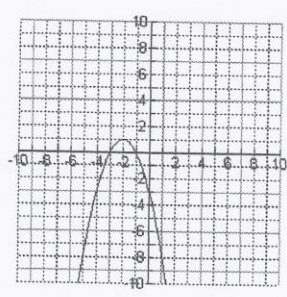


KEY

(2)

5. a) Write the equation of the graph in vertex form.

$$-(x+2)^2 + 1$$



b) Write the equation of the graph in x-intercept form.

$$-x^2 - 4x - 3 \quad -(x+1)(x+3)$$

6. Find the zeros of the function by factoring.

$$g(x) = 4x^2 - 8x - 5 \quad (2x-5)(2x+1) \quad \begin{matrix} 2x-5=0 & 2x+1=0 \\ 2x=5 & 2x=-1 \\ x=5/2 & x=-1/2 \end{matrix} \quad \left[\frac{5}{2} \text{ and } -\frac{1}{2} \right]$$

7. A ball is kicked from the ground with an initial vertical velocity of 80 ft/s. Write the equation used to solve this problem. After how many seconds will the ball hit the ground? 5 SECONDS

Use the projectile formula $h(t) = -16t^2 + v_0t + h_0$.

$$-16t^2 + 80t = 0 \quad -16t=0 \quad t=0 \quad t=5$$

$$h(t) = -16t^2 + 80t + 0$$

$$0 = -16t^2 + 80t$$

8. Find the roots of the equation by factoring.

$$7(x-7)(x+7) \quad x-7=0 \quad x+7=0 \quad x=7 \quad x=-7 \quad 7x^2 - 343 = 0 \quad [7 \text{ and } -7]$$

9. Find the roots of the equation by factoring.

$$6x^2 - x = 15 \quad 6x^2 - x - 15 = 0$$

$$(2x+3)(3x-5) = 0 \quad 2x+3=0 \quad 3x-5=0 \quad x=-3/2 \quad x=5/3$$

$$[-3/2 \text{ and } 5/3]$$

10. Write a quadratic function with zeros 7 and -4.

$$x=7 \quad x=-4 \quad (x-7)(x+4) = x^2 - 3x - 28$$

11. Write the function $f(x) = -2x^2 - 12x + 21$ in vertex form and identify its vertex.

$$-2(x+3)^2 + 39 \quad (-3, 39)$$

12. Solve. $2x^2 - 30 = 0$

$$2x^2 = 30 \quad x^2 = 15 \quad x = \pm\sqrt{15}$$

13. Write an equation for finding the dimensions of a rectangle in the figure, then solve the equation and state the dimensions of the rectangle. Label your answers.

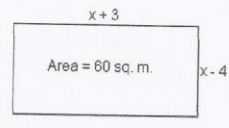
$$L = x-4 \quad W = x+3 \quad A = L \cdot W$$

$$60 = (x-4)(x+3) \quad x-9=0 \quad x=9$$

$$60 = x^2 - x - 12 \quad x+8=0 \quad x=-8$$

$$0 = x^2 - x - 72$$

$$0 = (x-9)(x+8)$$



$$x=9 \quad x+3=12 \quad x-4=5$$

$$[12 \text{ in by } 5 \text{ in}]$$