

Identify the axis of symmetry for the graph of each function.

1.  $f(x) = -2(x-2)^2 - 4 \quad x=2$

2.  $g(x) = 3x^2 + 4 \quad x=0$

3.  $h(x) = (x+5)^2 \quad x=-5$

For each function, A) determine if the graph opens up or down, B) axis of symmetry, C) vertex, D) graph.

4.  $f(x) = -x^2 - 2x - 8$

$$a = -1 \quad b = -2 \quad c = -8$$

$$-\frac{b}{2a} = -\frac{-2}{2(-1)} = -1 \quad (x = -1)$$

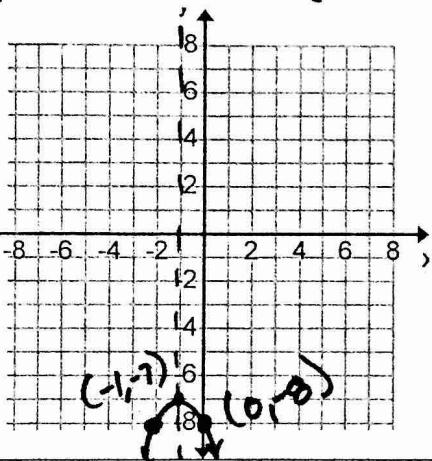
A) Up  Down

B)  $\frac{c-a}{b} = \frac{-8-(-1)}{-2} = -1 \quad (x = -1)$

C)  $(-1, -7)$

D)  $(0, -8)$   int  $(0, -8)$

E)



5.  $g(x) = x^2 - 3x - 2$

$$a = 1 \quad b = -3 \quad c = -2$$

$$-\frac{b}{2a} = -\frac{-3}{2(1)} = 1.5 \quad (x = 1.5)$$

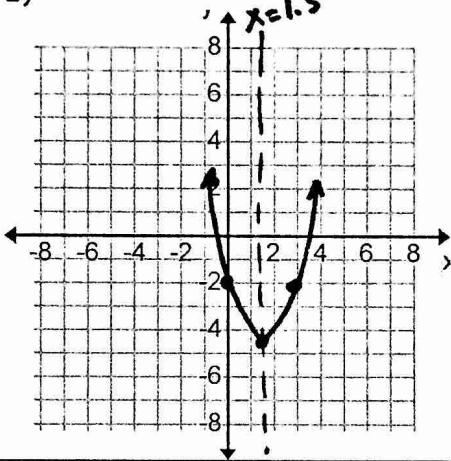
A)  Up Down

B)  $\frac{c-a}{b} = \frac{-2-1}{2} = -1.5 \quad (x = 1.5)$

C)  $(1.5, -4.25)$

D)  $(0, -2)$   int

E)



6.  $h(x) = 4x - x^2 - 1$

$$-x^2 + 4x - 1$$

$$-\frac{b}{2a} = -\frac{4}{2(-1)} = 2 \quad (x = 2)$$

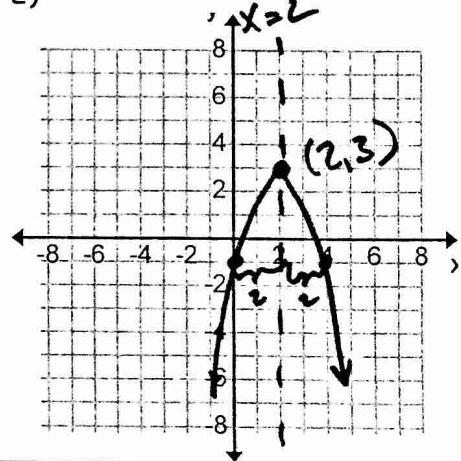
A) Up  Down

B)  $\frac{c-a}{b} = \frac{-1-4}{2} = -2.5 \quad (x = 2)$

C)  $(2, 3)$

D)  $(0, -1)$   int

E)



Find the minimum or maximum for each function. Then state the domain and range.

7.  $f(x) = x^2 - 1$

$a$   Dom  $R$   $y \geq k$   $y \leq k$  Range

$\text{Min or Max}$   $(0, -1)$

D:  $\text{R}$

R:  $y \geq -1$

$y \leq k$

8.  $g(x) = -x^2 + 3x - 2$

$a$   down  $-\frac{b}{2a} = -\frac{3}{2(-1)} = 1.5$   $-(1.5)^2 + 3(1.5) - 2$

$\text{Min or Max}$   $(1.5, 2.25)$

D:  $\text{R}$

R:  $y \leq 2.25$

9.  $h(x) = -16x^2 + 32x + 4$

$a$   $-\frac{b}{2a} = -\frac{32}{2(-16)} = 1$   $-16(1)^2 + 32(1) + 4$

$\text{Min or Max}$   $(1, 20)$

D:  $\text{R}$

R:  $y \leq 20$

Solve each problem.

10. The path of a soccer ball is modeled by the function  $h(x) = -0.005x^2 + 0.25x$ , where  $h$  is the height in meters and  $x$  is the horizontal distance that the ball travels in meters. What is the maximum height that the ball reaches?

$\text{Max}$   $(25, 3.125)$

Time  $\frac{-b}{2a} = \frac{0.25}{2(-0.005)} = 25$

Height  $3.125 \text{ m}$

11. The daily temperature in Death Valley, CA, in 2003 can be modeled by  $T(d) = -0.0018d^2 + 0.657d + 50.95$ , where  $T$  is temperature in degrees F and  $d$  is the day of the year. What was the maximum temperature in 2003 to the nearest degree?

$(182.5, 111)$

Day  $\frac{-b}{2a} = \frac{0.657}{2(-0.0018)} = 182.5$

Temp  $111^\circ$