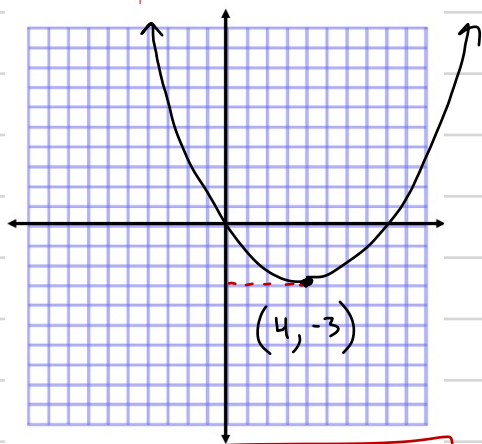
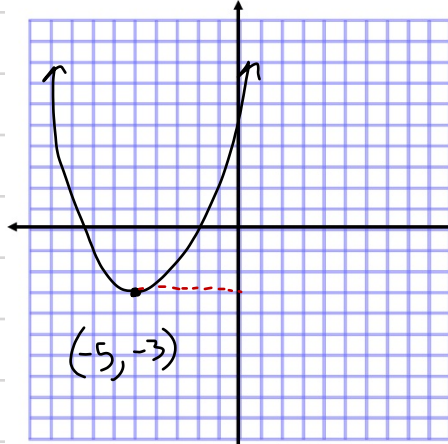


12/10/12 The maximum or minimum of a function

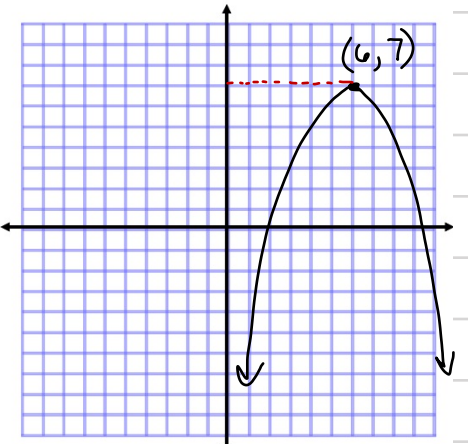
Determine the highest or lowest value of the graph (max or min).



min value -3



min value -3



max value 7

Note: The maximum or minimum value is simply the y-coordinate of the vertex.

Find the maximum or minimum value (tell whether max or min).

Ex

① $f(x) = 3x^2 - 6x + 11$ ② $f(x) = -2x^2 - 12x - 5$ ③ $y - 5 = -3(x + 5)^2$

$$\frac{y}{3} = \frac{3x^2}{3} - \frac{6x}{3} + \frac{11}{3}$$

$$\frac{y}{3} = x^2 - 2x + \frac{11}{3}$$

$$3\left(\frac{y}{3} = (x-1)^2 - 1 + \frac{11}{3}\right)$$

$$y = 3(x-1)^2 - 3 + 11$$

$$y = 3(x-1)^2 + 8$$

$$y - 8 = 3(x-1)^2$$

min: 8

$$\frac{y}{-2} = \frac{-2x^2}{-2} - \frac{12x}{-2} - \frac{5}{-2}$$

$$\frac{y}{-2} = x^2 + 6x + \frac{5}{2}$$

$$-2\left(\frac{y}{-2} = (x+3)^2 - 9 + \frac{5}{2}\right)$$

$$y = -2(x+3)^2 + 18 - 5$$

$$y = -2(x+3)^2 + 13$$

$$y - 13 = -2(x+3)^2$$

max: 13

max: 5

④ $y + 6 = \frac{1}{2}(x-4)^2$

min: -6

⑤ $f(x) = x^2 + 8x - 12$

$$y = x^2 + 8x - 12$$

$$y = (x+4)^2 - 16 - 12$$

$$y = (x+4)^2 - 28$$

$$y + 28 = (x+4)^2$$

min: -28

If "a" is + then ↗, and you have Min.
If "a" is -, then ↘, and you have a Max.