

Vertex Form of Parabolas

Use the information provided to write the vertex form equation of each parabola.

1) $y = x^2 + 16x + 71$

2) $y = x^2 - 2x - 5$

3) $y = -x^2 - 14x - 59$

④ $y = 2x^2 + 36x + 170$

$$y = 2(x^2 + 18x) + 170$$

$$y = 2(x^2 + 18x + 81) + 170$$

$$y = 2(x^2 + 18x + 81) + 170 - 162$$

⑤ $y = x^2 - 12x + 46$

$$y = (x^2 - 12x + 36) + 46 - 36$$

$$y = (x - 6)^2 + 10$$

6) $y = x^2 + 4x$

$$y = 2(x + 9)^2 + 8$$

⑦ $y = x^2 - 6x + 5$

$$y = (x^2 - 6x + 9) + 5 - 9$$

$$y = (x - 3)^2 - 4$$

⑧ $y = (x + 5)(x + 4)$ $y = x^2 + 9x + 20$

$$y = (x^2 + 9x + \frac{81}{4}) + 20 - \frac{81}{4}$$

$$\downarrow$$

$$(\frac{9}{2})^2$$

10) $6x^2 + 12x + y + 13 = 0$

$$y = (x + \frac{9}{2})^2 - \frac{1}{4}$$

11) $162x + 731 = -y - 9x^2$

12) $x^2 - 12x + y + 40 = 0$

⑬ $y = x^2 + 10x + 33$

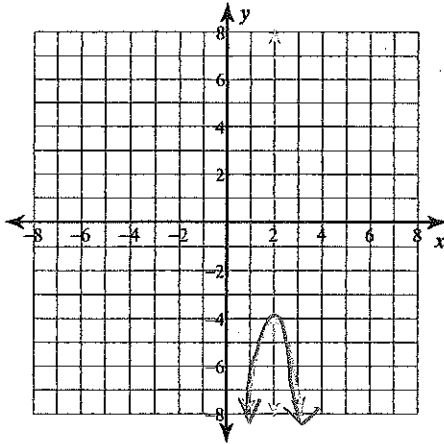
$$y = (x^2 + 10x + 25) + 33 - 25$$

$$y = (x + 5)^2 + 8$$

14) $y + 6 = (x + 3)^2$

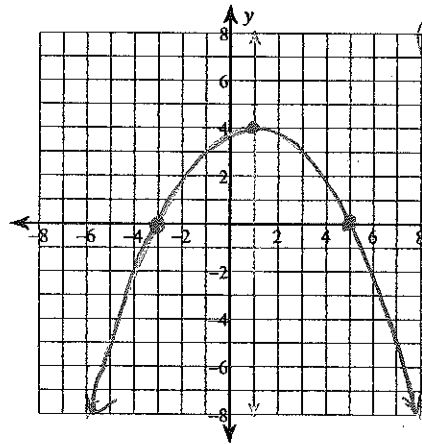
Identify the vertex and axis of symmetry of each. Then sketch the graph.

15) $f(x) = -3(x-2)^2 - 4$



Vertex: (2, -4)
Axis of Sym.: x = 2

16) $f(x) = -\frac{1}{4}(x-1)^2 + 4$



Vertex: (1, 4)
Axis of Sym.: x = 1

Find another pt by inputting a value for x and solving for y.

$$f(5) = -\frac{1}{4}(5-1)^2 + 4$$

$$f(5) = -\frac{1}{4}(16) + 4$$

$$f(5) = -4 + 4$$

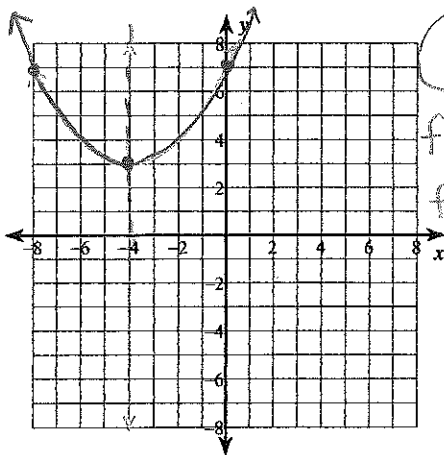
$$f(5) = 0$$

(5, 0) then

Vertex: (-5, 2) also plot

Axis of Sym.: x = -5
another symmetrical point.

17) $f(x) = \frac{1}{4}(x+4)^2 + 3$



Vertex: (-4, 3)
Axis of Sym.: x = -4

$$f(0) = \frac{1}{4}(0+4)^2 + 3$$

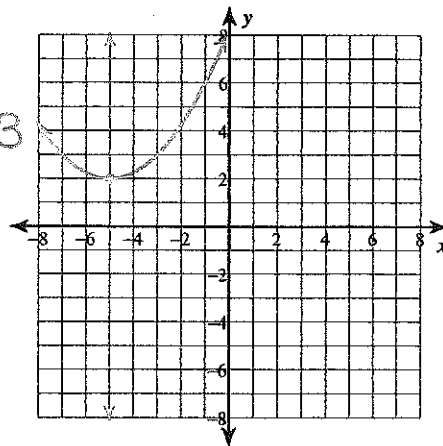
$$f(0) = \frac{1}{4}(16) + 3$$

$$f(0) = 4 + 3$$

$$f(0) = 7$$

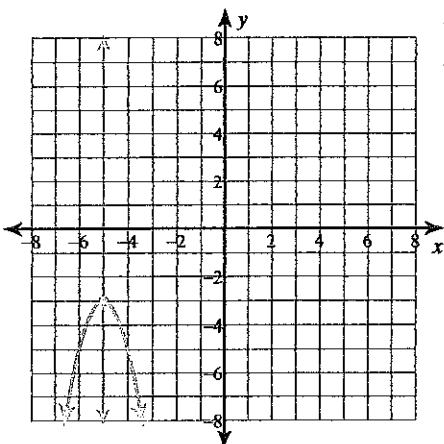
$$(0, 7)$$

18) $f(x) = \frac{1}{4}(x+5)^2 + 2$



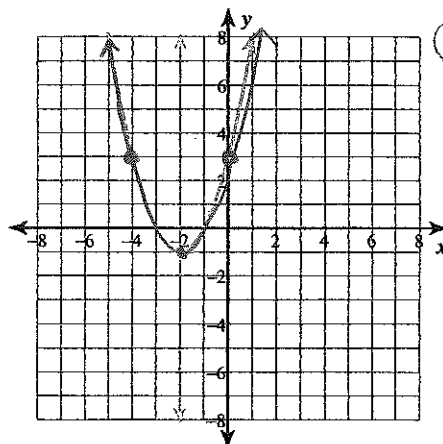
Vertex: (-5, 2)
Axis of Sym.: x = -5

19) $f(x) = -2(x+5)^2 - 3$



Vertex: (-5, -3)
Axis of Sym.: x = -5

20) $f(x) = (x+2)^2 - 1$



Vertex: (-2, -1)
Axis of Sym.: x = -2

$$f(0) = (0+2)^2 - 1$$

$$f(0) = 4 - 1$$

$$f(0) = 3$$