

Add the number needed to complete the square. Then, write the result as the square of a binomial.

1.  $x^2 + 2x + \dots$

$$(x+1)^2$$

2.  $x^2 - 2x + \dots$

$$(x-1)^2$$

3.  $x^2 - 6x + \dots$

$$(x-3)^2$$

4.  $x^2 + 8x + \dots$

$$(x+4)^2$$

Rewrite in vertex form by completing the square. Then graph.

5.  $f(x) = x^2 - 6x + 6$

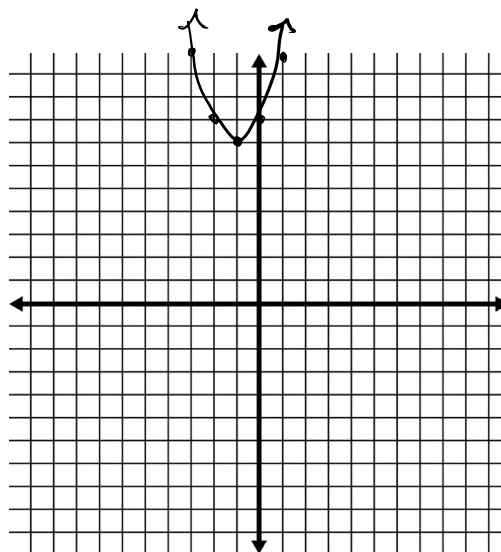
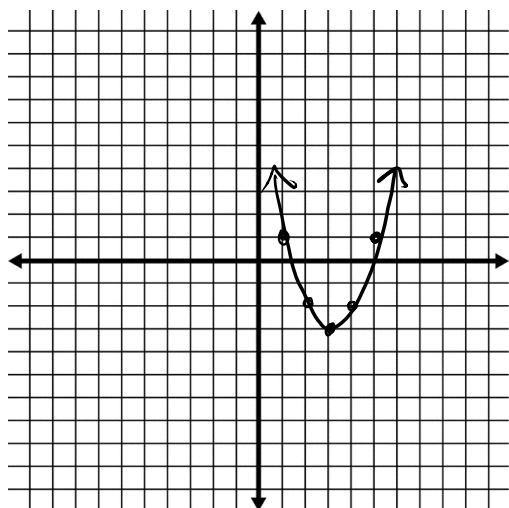
$$f(x) = (x^2 - 6x + 9) + 6 - 9$$

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

6.  $f(x) = x^2 + 2x + 8$

$$f(x) = (x^2 + 2x + 1) + 8 - 1$$

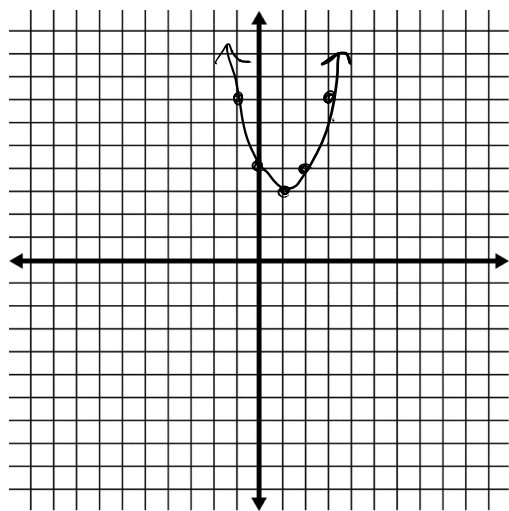
$$f(x) = (x+1)^2 + 7$$



6.  $f(x) = x^2 - 2x + 4$

$$f(x) = (x^2 - 2x + 1) + 4 - 1$$

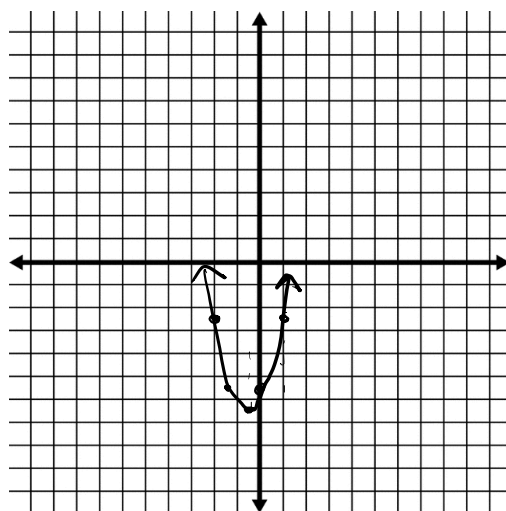
$$f(x) = (x - 1)^2 + 3$$



7.  $f(x) = x^2 + x - 6$

$$f(x) = (x^2 + x + 0.25) - 6 - 0.25$$

$$f(x) = (x + 0.5)^2 - 6.25$$



Rewrite in vertex form by completing the square.

8.  $f(x) = x^2 - 32x + 100$

$$f(x) = (x^2 - 32x + 256) + 100 - 256$$

$$f(x) = (x - 16)^2 - 156$$

9.  $f(x) = x^2 + 50x - 3$

$$f(x) = (x^2 + 50x + 625) - 3 - 625$$

$$f(x) = (x + 25)^2 - 628$$

10.  $f(x) = x^2 + 4x - 6$

$$f(x) = (x^2 + 4x + 4) - 6 - 4$$

$$f(x) = (x + 2)^2 - 10$$

11.  $f(x) = x^2 - 6x - 13$

$$f(x) = (x^2 - 6x + 9) - 13 - 9$$

$$f(x) = (x - 3)^2 - 22$$

Solve by completing the square.

12.  $x^2 - 8x = 65$

$$x^2 - 8x + 16 = 65 + 16$$

$$(x-4)^2 = 81$$

$$x-4 = \pm 9$$

$$x = 13, -5$$

13.  $c^2 - 12c = -38$

$$c^2 - 12c + 36 = -38 + 36$$

$$(c-6)^2 = -2$$

No solution

14.  $a^2 + 16 = -10a$

$$a^2 + 10a = -16$$

$$a^2 + 10a + 25 = -16 + 25$$

$$\sqrt{(a+5)^2} = \sqrt{9}$$

$$a+5 = \pm 3$$

$$a = -2, -8$$

15.  $m^2 = -20m - 64$

$$m^2 + 20m = -64$$

$$m^2 + 20m + 100 = -64 + 100$$

$$\sqrt{(m+10)^2} = \sqrt{36}$$

$$m+10 = \pm 6$$

$$m = -16, -4$$

16.  $b^2 - 18b + 47 = -10$

$$b^2 - 18b + 81 = -57 + 81$$

$$\sqrt{(b-9)^2} = \sqrt{24}$$

$$b-9 = \pm 2\sqrt{6}$$

$$b = 9 \pm 2\sqrt{6}$$

17.  $h^2 + 14h + 3 = 4$

$$h^2 + 14h + 49 = 1 + 49$$

$$\sqrt{(h+7)^2} = \sqrt{50}$$

$$h+7 = \pm 5\sqrt{2}$$

$$h = -7 \pm 5\sqrt{2}$$