

**EXERCISE A**

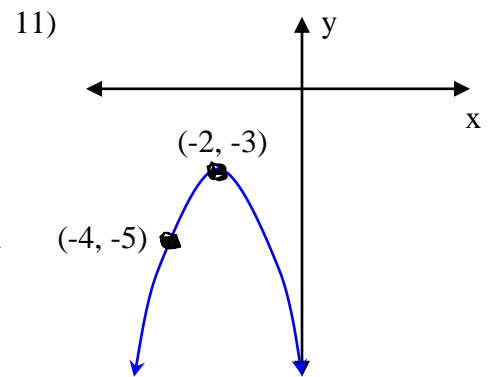
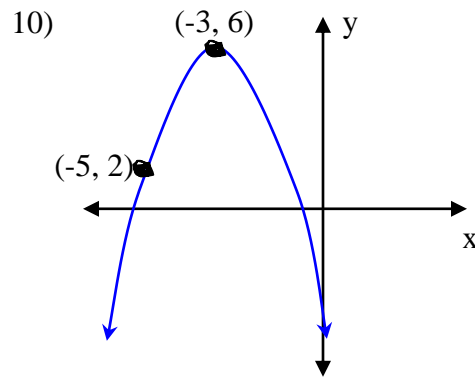
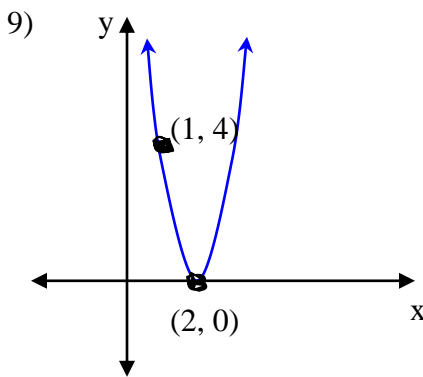
Write each quadratic equation in vertex form  $[y = a(x - h)^2 + k]$ , if not already in that form. Then identify the vertex, axis of symmetry and direction of opening.

1)  $y = 5(x + 3)^2 - 1$       2)  $y = -(x - 8)^2 + 5$       3)  $y = x^2 + 8x - 3$       4)  $y = x^2 - 8x + 16$

Graph each function.

5)  $y = 3(x + 3)^2$       6)  $f(x) = -\frac{1}{3}(x - 1)^2 + 3$       7)  $y = x^2 - 2x - 5$       8)  $f(x) = x^2 + 4x$

Write an equation in vertex form for the parabola shown in each graph below.

**EXERCISE B**

Write each quadratic equation in vertex form  $[y = a(x - h)^2 + k]$ , if not already in that form. Then identify the vertex, axis of symmetry and direction of opening.

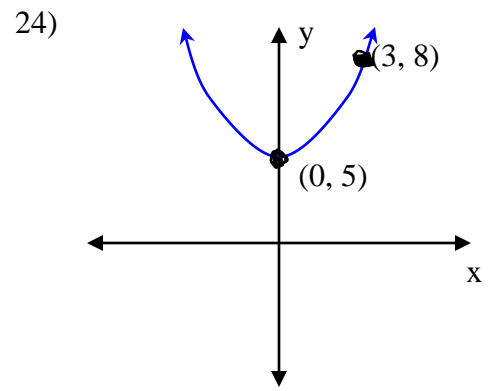
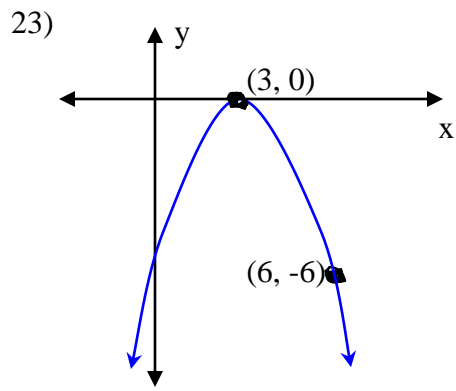
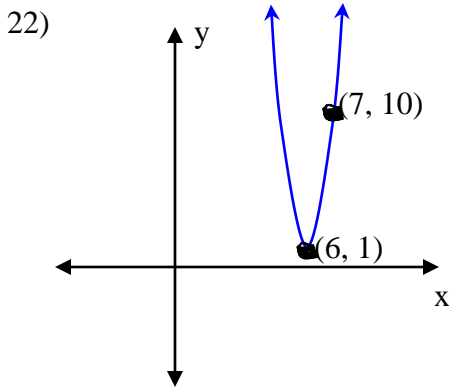
12)  $y = -2(x + 3)^2$       13)  $y = \frac{1}{3}(x - 1)^2 + 2$       14)  $y = x^2 - 4x$

15)  $y = x^2 - 6x + 1$       16)  $y = 5x^2 - 6$       17)  $y = -8x^2 + 3$

Graph each function.

18)  $y = 4(x + 3)^2 + 1$       19)  $f(x) = -(x - 5)^2 - 3$       20)  $y = x^2 + 6x + 2$       21)  $y = x^2 - 8x + 16$

Write an equation in vertex form for the parabola shown in each graph below.



## EXERCISE C

Graph each function.

25)  $y = -4x^2 + 16x - 11$

26)  $y = -\frac{1}{2}x^2 + 5x - \frac{27}{2}$

Write each function in vertex form.

27)  $f(x) = 4x^2 + 24x$

28)  $y = 3x^2 + 3x - 1$

Write an equation in vertex form for the parabola with the given coordinates.

29) vertex: (-4, 3)  
point: (-3, 6)

30) vertex: (5, 4)  
point: (6, 1)

31) NASA's KC135A aircraft flies in a parabolic arc to simulate the weightlessness experienced by astronauts in space. The height  $h$  of the aircraft (in feet)  $t$  seconds after it begins its parabolic flight can be modeled by the equation:  $h(t) = -9.09(t - 32.5)^2 + 34,000$ . What is the maximum height of the aircraft during this maneuver and how long into its arc does it occur?



ANSWERS:

1)  $V(-3, -1)$

$x = -3$

up

3)  $y = (x + 4)^2 - 19$

$V(-4, -19)$

$x = -4$ , up

5-8) See Mr. Paull

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

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

13)  $V(1, 2)$

$x = 1$

up

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

$V(3, -8)$

$x = 3$ , up

17)  $y = -8(x + 0)^2 + 3$

$V(0, 3)$

$x = 0$ , up

18-21) See Mr. Paull

23)  $y = -\frac{2}{3}(x - 3)^2$

25-26) See Mr. Paull

27)  $f(x) = 4(x + 3)^2 - 36$

29)  $y = 3(x + 4)^2 + 3$

31) 34,000 ft, 32.5sec.