1.

a) up

b) minimum

2.

AoS: $x = -\left(\frac{4}{2 \cdot 1}\right) = -2$

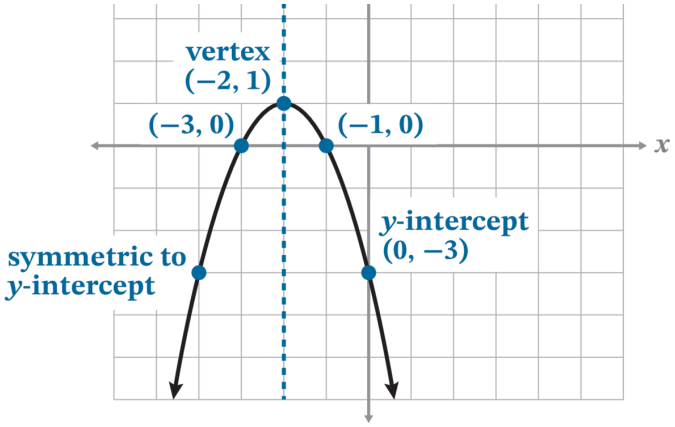
vertex: $y = (-2)^2 + 4(-2) = -4$

$(-2, -4)$

y-intercept: $y = (0)^2 + 4(0) = 0$

(0, 0) or c = 0

3.



4.

a) $x = -2$

b) $(-2, 1)$

c) $(0, -3)$

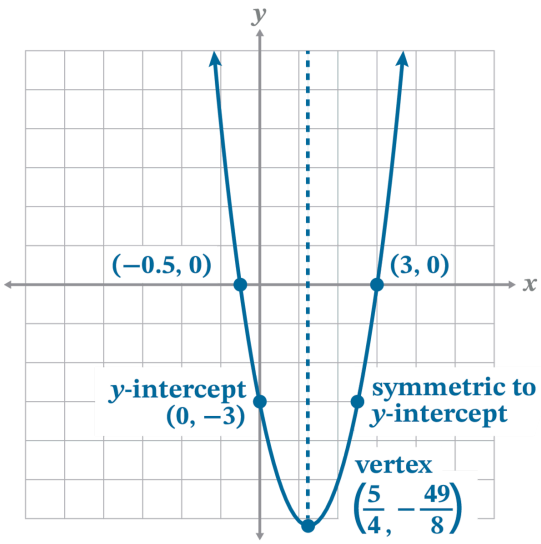
d) -3 and -1

5.

domain: $(-\infty, \infty)$

range: $(-\infty, 1]$

6.



7.
domain: $(-\infty, \infty)$
range: $[-\frac{49}{8}, \infty)$

8.

a) $x = -1.347, 2.597$

b) domain: $(-\infty, \infty)$
range: $[-7.78125, \infty)$

9.

a) no real solutions

b) domain: $(-\infty, \infty)$
range: $(-\infty, -\frac{2}{3}]$

10.

a) $x = -4.562, -0.438$

b) domain: $(-\infty, \infty)$
range: $[-4.25, \infty)$