$y = ax^2 + bx + c$

Graphing Quadratic Functions, Using the Zeroes (x-intercepts)

EXAMPLES

1) $y = x^2 - 9$

a) Standard Form: $y = x^2 - 9$

b) $a =$ 1, $b =$ 0, and $c =$ −9.

c) axis of symmetry: $x = 0$ (line of symmetry) → $x = \frac{-b}{2a}$

d) upward or downward? a: positive ↑ a: negative ↓ $x = \frac{0}{2}$

e) vertex: (0, −9) → $x = 0$ into the equation: $y = 0^2 - 9$

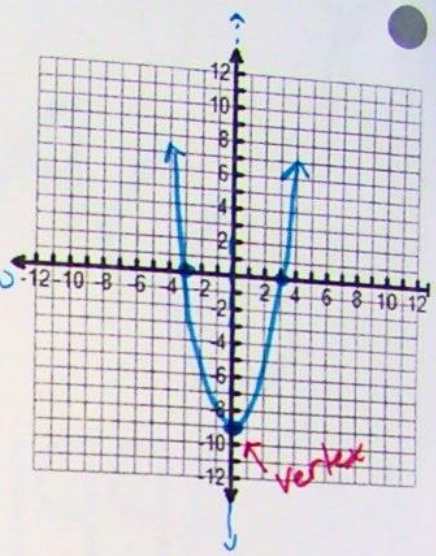
f) y-intercept: (0, −9) $x = 0$

g) Factored form of related function: $0 = (x+3)(x-3)$ $y = -9$

$y = 0$

h) x-intercepts: (3, 0) ; (−3, 0) $x = \pm 3$

g) Sketch the graph.



2) $6x - x^2 + y = 8$

$+x^2$ $+x^2$

a) Standard Form: $y = x^2 - 6x + 8$

b) $a =$ 1, $b =$ −6, and $c =$ 8.

c) axis of symmetry: $x = 3$ (vertical line) $x = \frac{6}{2 \cdot 1} = 3$

d) upward or downward?

e) vertex: (3, −1) → $y = (3)^2 - 6(3) + 8$, $y = 9 - 18 + 8$, $y = -1$

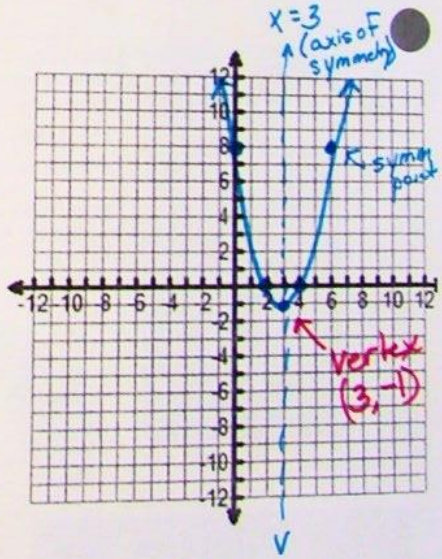
f) y-intercept: (0, 8) $x = 0$

g) Factored form of related function: $0 = (x-4)(x-2)$

$y = 0$

h) x-intercepts: (4, 0) ; (2, 0) $x = 4$; $x = 2$

g) Sketch the graph



Steps to Graph Quadratic Functions (Parabolas)

1st Transform the equation into standard form. $y = ax^2 + bx + c$

2nd State what a = ___, b = ___, and c = ___.

3rd Find the axis of symmetry $x = \frac{-b}{2a}$

4th Remember if a is positive, the graph turns upward
If a is negative, the graph turns downward

5th Find the vertex. Substitute the x-value from the axis of symmetry into the original equation to find the y-value.

6th The y-intercept is c.

7th Factor, if possible, to find the x-intercepts.