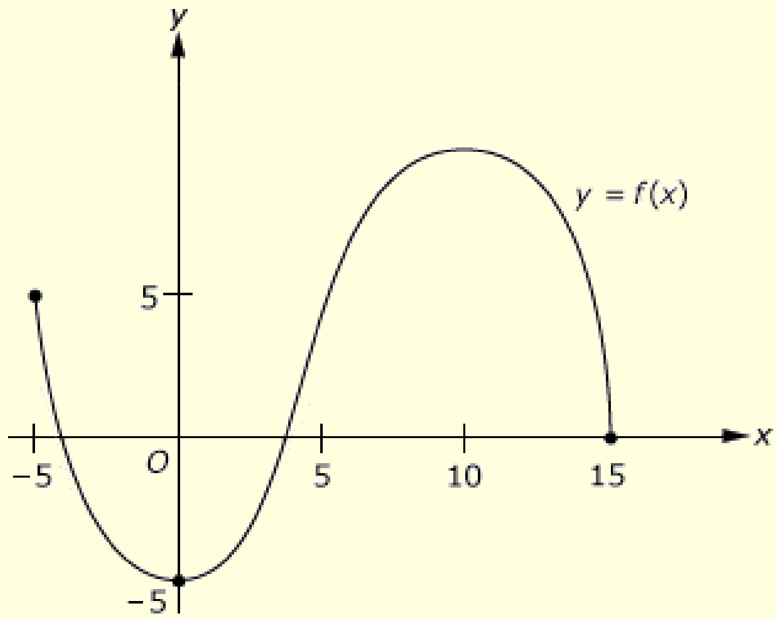
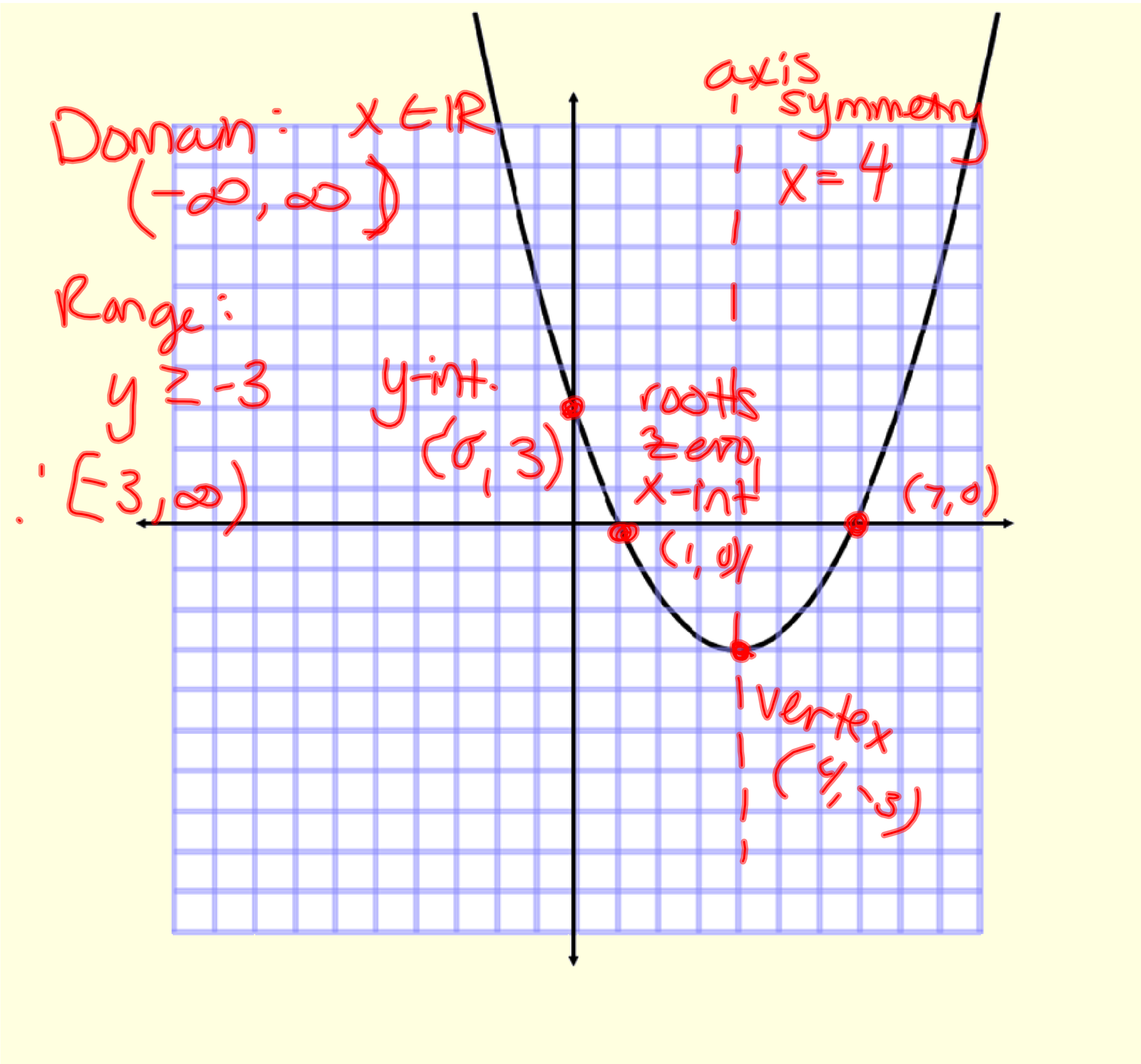
SAT



The function f is graphed in the xy-plane above. If the function g is defined by $g(x) = f(x) + 4$, for how many values of x between –5 and 15 does $g(x)$ equal 0?

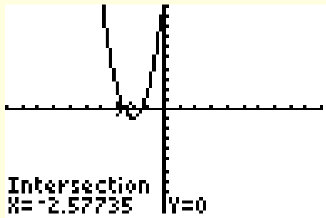
3-4 Quadratic Functions


Domain: x ∈ ℝ
(-∞, ∞)
Range:
y ≥ -3
[-3, ∞)
y-int.
(0, 3)
roots
zero
x-int
(1, 0)
(7, 0)
axis
symmetry
x = 4
vertex
(4, -3)

Domain: Domain of a quadratic function is always all real numbers. Why?
Range: depends on the vertex and whether it is opening up or down
Vertex: two ways to find it

- If in standard form: $f(x) = ax^2 + bx + c$, then the x-value of the vertex will be $-\frac{b}{2a}$
- How do we find the y-value of the vertex?
- If in vertex form: $f(x) = a(x - h)^2 + k$, then the vertex is (h , k)
- Back to range: up or down?

For the following quadratic functions, analytically find the domain, range, vertex, axis of symmetry, and y-intercept. Verify these and find the x-intercepts on your graphing calculator.



opens ↑

+

$$f(x) = 3(x+\underset{h}{\underline{2}})^2 \underset{k}{\underline{-1}}$$

Domain

$x \in \mathbb{R}$

Range

$[-1, \infty)$

$y \geq -1$

Vertex

$(-2, -1)$

A of Sym

$x = -2$

Y-int

$(0, 11)$

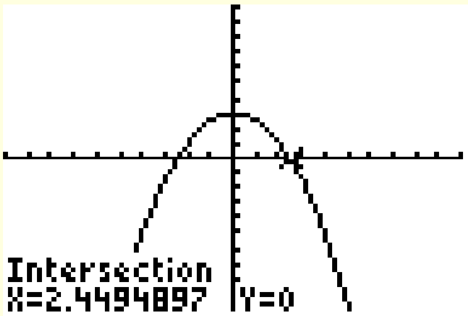
X-int $(-2.58, 0)$ + $(-1.42, 0)$

For the following quadratic functions, analytically find the domain, range, vertex, axis of symmetry, and y-intercept. Verify these and find the x-intercepts on your graphing calculator.

$y = ax^2 + bx + c$

opens down

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



Domain

$x \in \mathbb{R}$

Range

$y \leq 3$

$(-\infty, 3]$

Vertex

$x = \frac{-b}{2a} = \frac{-0}{2(-\frac{1}{2})} = 0$

$(0, 3)$

AofSym: $x = 0$

y-int $(0, 3)$

x-int

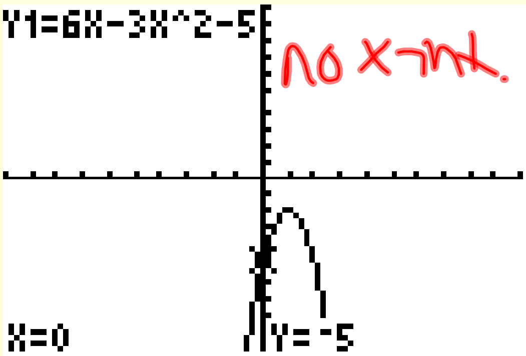
$(2.45, 0)$

$(-2.45, 0)$

For the following quadratic functions, analytically find the domain, range, vertex, axis of symmetry, and y-intercept. Verify these and find the x-intercepts on your graphing calculator.

$F(x) = -3x^2+6x-5$

$$f(x) = 6x - 3x^2 - 5$$



Domain

$x \in \mathbb{R}$

Vertex

$x = \frac{-6}{2(3)} = 1$

$(1,-2)$

Range

$(-\infty,-2]$

$y \leq -2$

Axis of S

$x=1$

y-int

$(0,-5)$

Homework Assignment

WS 3.4 1-10