

F U N C t i o n N o t a t i o n ☺

$f(x)$

$$y = ax^2 + bx + c$$

$$y = mx + b$$

$$, y = cx^2 + dx + f$$

$P(x)$

$f(x)$ say
"f of x"

$g(x)$

⇒ Name

→ No math operator

$$y = f(x)$$

$$f(x) = 7x + 3$$

$$f(4) = 7(4) + 3$$

$$= 28 + 3$$

$$f(4) = 31$$

coordinate pt

$$(4, 31)$$

x y

$$f(b) = 7(b) + 3$$

$$f(5a) = 7(5a) + 3$$

$$f(5a) = 35a + 3$$

$$(5a, 35a + 3)$$

$$f(x+4) = 7(x+4) + 3$$

$$= 7x + 28 + 3$$

$$= 7x + 31$$

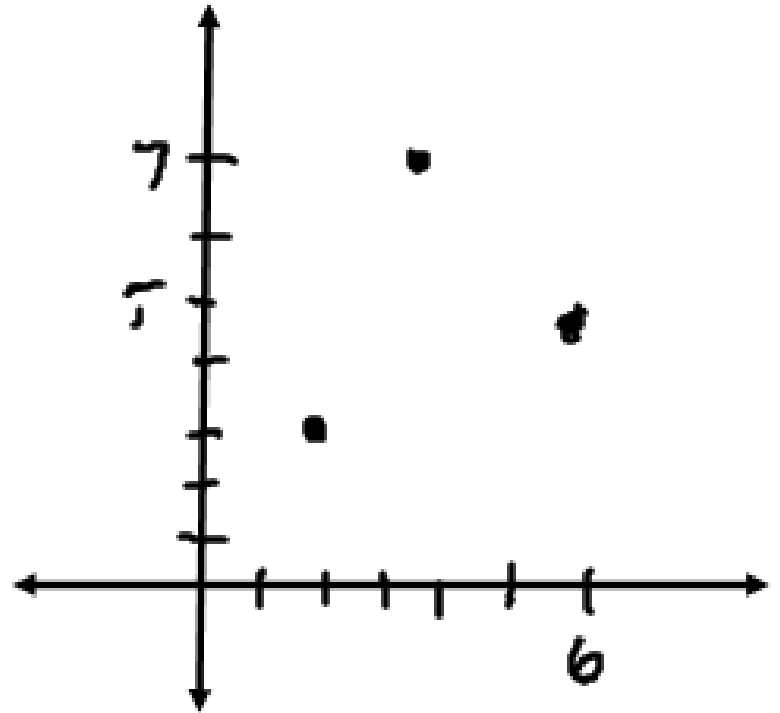
$$\left. \begin{aligned} f(2) &= 3 \\ f(4) &= 7 \\ f(6) &= 5 \end{aligned} \right\}$$

Coordinates
I can graph it

$$(2, 3)$$

$$(4, 7)$$

$$(6, 5)$$



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

$$g(x) = x + 5 \quad q(x) = 3x - 7$$

① find x when $f(x) = 0$

$$0 = x^2 + 3x + 2$$

$$0 = (x+2)(x+1)$$

$$x+2=0 \quad x+1=0$$

$$x = -2 \quad x = -1$$

② find x when $g(x) = q(x)$

$$x+5 = 3x-7$$

$$5+7 = 3x-x$$

$$\frac{12}{2} = \frac{2x}{2}$$

$$6 = x$$

Quadratics Review

vertex form: $y = a(x-h)^2 + k$
vertex (h, k)

standard: $y = ax^2 + bx + c$
y-int $(0, c)$

factored: $y = a(x-p)(x-q)$
x-int $(p, 0)$ $(q, 0)$

Complete the Square 😊

$$y = x^2 + 12x + 5 \quad \leftarrow \text{put in vertex form...}$$

$$\left(\frac{12}{2}\right)^2 = (6)^2 = 36$$

perfect square: $4 = 2^2$
 $25 = 5^2$

$$y = x^2 + 12x + 36 - 36 + 5$$
$$= (x^2 + 12x + 36) - 31$$

$$y = (x+6)^2 - 31$$

vertex $(-6, -31)$

$$x^2 + 6x + 9 = (x+3)^2$$

$(x+3)(x+3)$
 $x^2 + 3x + 3x + 9$

$$y = (3x^2 + 15x) - 12$$

$$y = a(x-h)^2 + k$$

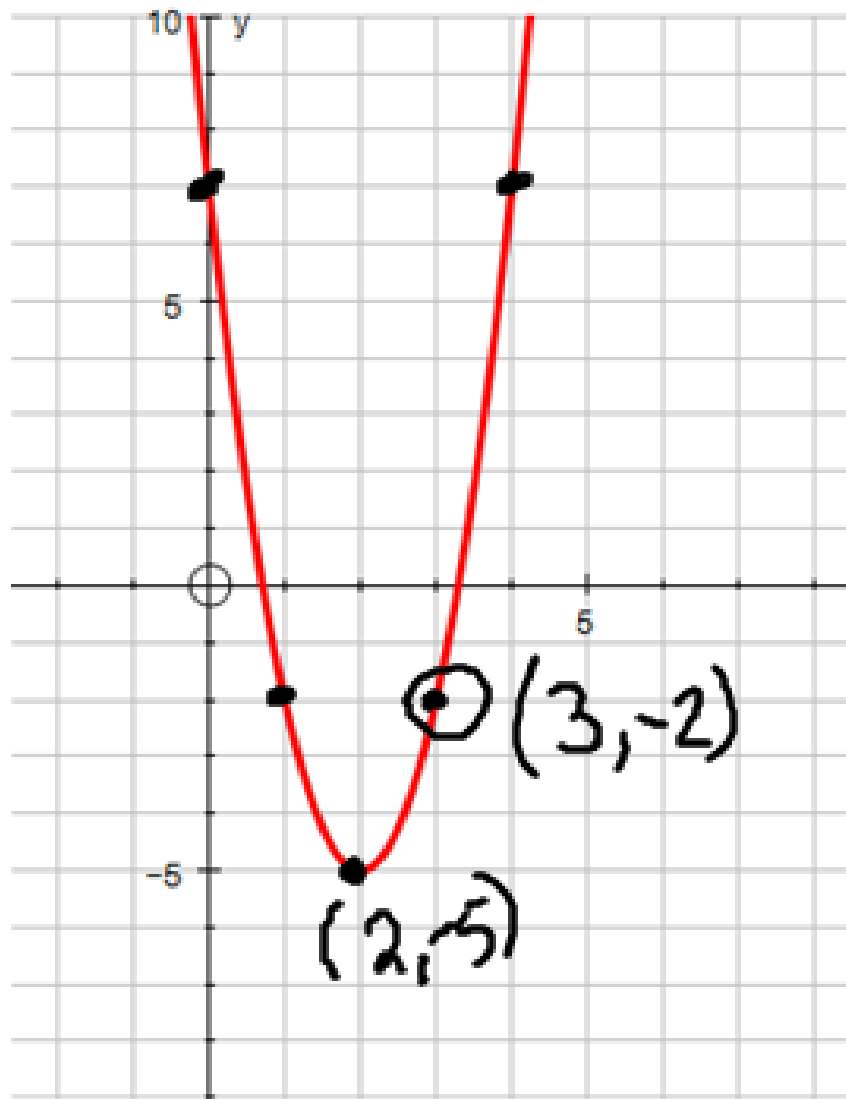
$$y = 3(x^2 + 5x) - 12$$

$$\left(\frac{5}{2}\right)^2 = \frac{25}{4}$$

$$y = 3\left(x^2 + 5x + \frac{25}{4}\right) - 12 - 3\left(\frac{25}{4}\right)$$

$$y = 3\left(x + \frac{5}{2}\right)^2 - \frac{48}{4} - \frac{75}{4}$$

$$y = 3\left(x + \frac{5}{2}\right)^2 - \frac{123}{4}$$



$$y = a(x-h)^2 + k$$

① find vertex $(2, -5)$
 h, k

$$y = a(x-2)^2 - 5$$

use another coord
 pt and solve

$$-2 = a(3-2)^2 - 5$$

$$-2 = a(1)^2 - 5$$

$$3 = a$$

$$y = 3(x-2)^2 - 5$$

Discriminant $\rightarrow \Delta = b^2 - 4ac$

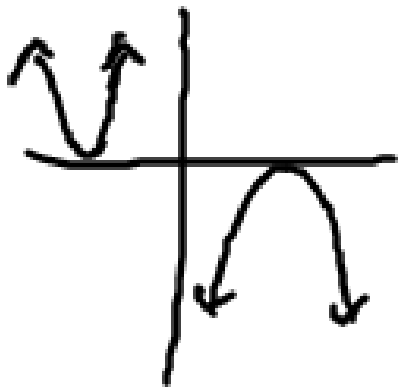
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

\rightarrow x value of the vertex

$$x = \frac{-b}{2a}$$

$$\Delta = 0$$

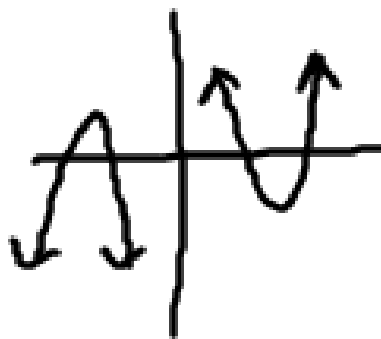
1 x-int



x-int (vertex)

$$\Delta > 0$$

2 x-int



$$\Delta < 0$$

0 x-int

