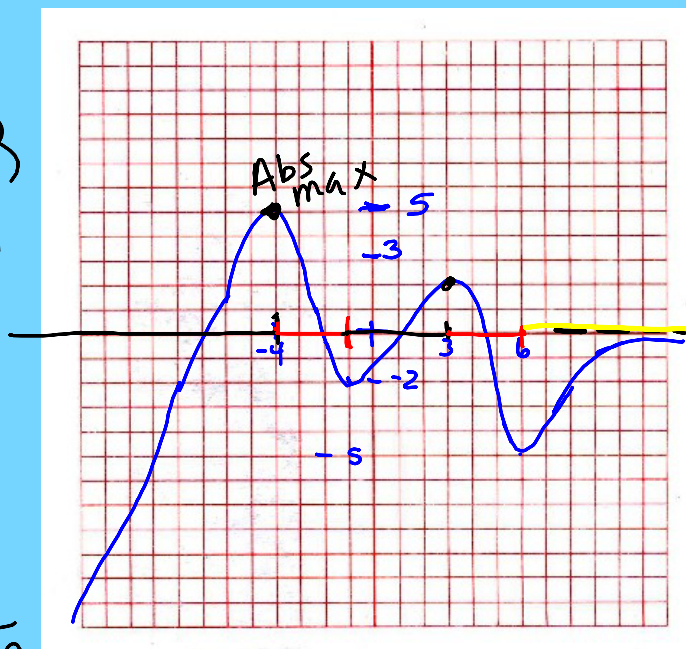
Identifying Features of a Graph



Relative Maximum (3, -2) (-4, 5)
↳ compared to points around

Relative Minimum
(-1, -2) (6, -5)

Absolute maximum
(-4, 5)

Absolute Minimum
None

Increasing Interval
Use x-coord! $(-\infty, -4)$ $(-1, 3)$ $(6, \infty)$

Decreasing Intervals
$(-4, -1)$ $(3, 6)$

a) Graph char.
b) Quadratics
$y = ax^2 + bx + c$
c) Inverse of eq. & graph

$(-\infty, -3]$
$(2, 7]$

QUADRATICS

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

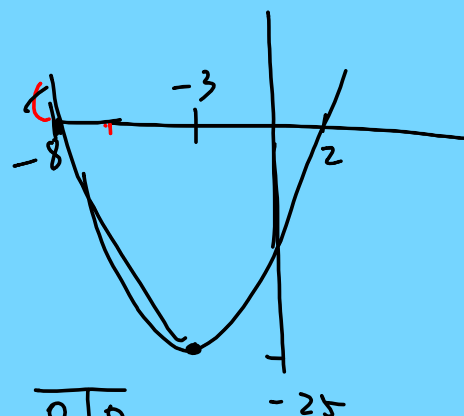
$y = a(x-h)^2 + K$
vertex form

Vertex:
$x = \frac{-b}{2a}$ $y =$ sub in x-coord

$y = ax^2 + 6x - 16$

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

$y = (-3)^2 + 6(-3) - 16$
$= 9 - 18 - 16$
$= -25$ $\boxed{(-3, -25)}$



0	0
1	1
2	4
3	9

Find x-int.
Let $y = 0$

$0 = x^2 + 6x - 16$
$0 = (x+8)(x-2)$
$x = -8, 2$

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

Vertex: $(2, -5)$

Point: $(\underset{x}{4}, \underset{y}{7})$

<u>Find the eq.</u>

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

$$7 = a(4-2)^2 - 5$$

$$7 = a \cdot 4 - 5$$

$$7 = 4a - 5$$

$$12 = 4a$$

$$3 = a$$

$$\boxed{y = 3(x-2)^2 - 5}$$

Inverses

If $f = (x, y)$, then $f^{-1} = (y, x)$

Find the equation of f^{-1}

$\cancel{f(x)}\, y = \dfrac{3x+7}{4x-5}$

1) Switch x & y
2) Solve for y

$(4y-5)x = \dfrac{3y+7}{\cancel{4y-5}} \cancel{(4y-5)}$

$4xy - 5x = 3y + 7$

$4xy - 3y = 5x + 7$

$\dfrac{y\cdot(4x-3)}{4x-3} = \dfrac{5x+7}{4x-3}$

$$\boxed{f^{-1} = \frac{5x+7}{4x-3}}$$

$f(x) = \frac{x+6}{3}$ $g(x) = 3x-6$

Are f + g inverse functions?

Inverses: $f \circ g = x$
OR
$g \circ f = x$

$f \circ g = \frac{\cancel{3}x \cancel{-6+6}}{\cancel{3}}$
$= x$

Yes, They are inverses! ☺

Graph

$\cancel{f(x)}\ y = \sqrt[3]{x-2} + 7$

& its inverse.

1) switch x & y
2) solve for y

$$\boxed{x = \sqrt[3]{y-2} + 7}$$

0	0
1	1
8	2

$$(x-7)^3 = \left(\sqrt[3]{y-2}\right)^3$$

$$(x-7)^3 = y-2$$

$$\boxed{(x-7)^3 + 2 = f^{-1}}$$

0	0
1	1
2	8