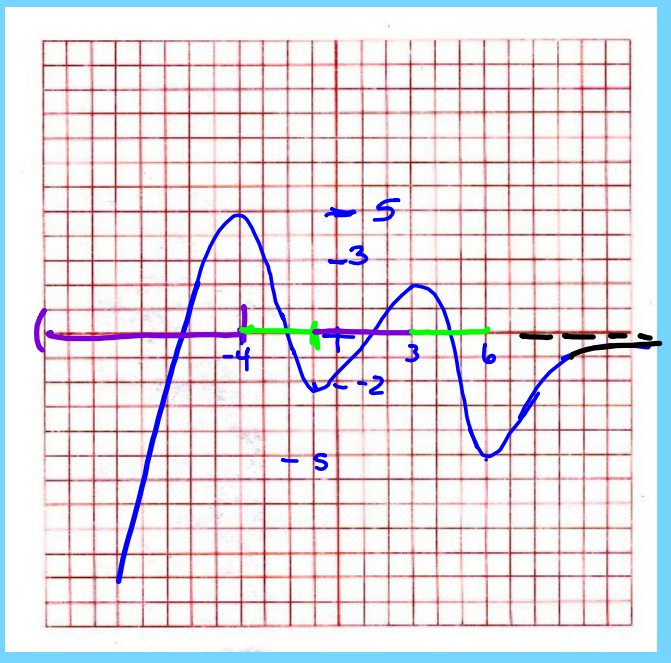
Identifying Features of a Graph



Relative Maximums

$(-4, 5)$ $(3, 2)$

Relative Minimums

$(-1, -2)$ $(6, -5)$

Absolute Max $(-4, 5)$

Absolute Minimum None

Increasing Intervals

use x-coord

$(-\infty, 4)$ $(-1, 3)$ $(6, \infty)$

Decreasing Intervals

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

QUADRATICS

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

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

y = sub in x-coord

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

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

Vertex $(-3, -5)$

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

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

$y = (-3)^2 + 6(-3) - 16$

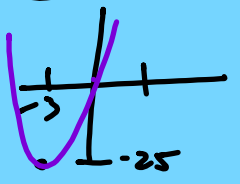
$= 9 - 18 - 16$

$= -25$

$(-3, -25)$

0	0
-1	-4
-2	-9
-3	-16

x-intercepts. Let $y = 0$.



$0 = x^2 + 6x - 16$

$0 = (x+8)(x-2)$

$x = -8, 2$

x-int: $(-8, 0)$ $(2, 0)$

What if $0 = x^2 + 5x + 16$

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

$= \frac{-5 \pm \sqrt{25 - 4(1)(16)}}{2(1)}$

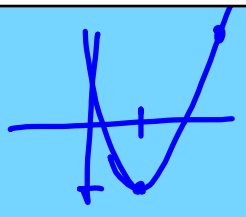
$= \frac{-5 \pm \sqrt{25 - 64}}{2}$

$= \frac{-5 \pm \sqrt{-29}}{2}$

No x-int.

Vertex: $(2, -5)$

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



Find the eq. of parabola

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

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

$7 = 4a - 5$

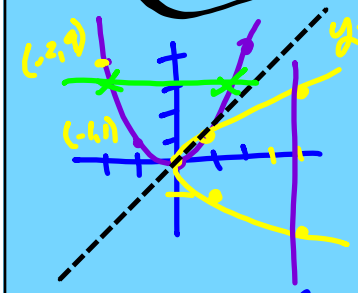
$12 = 4a$

$3 = a$

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

INVERSES

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



all reflect over $y = x$.

- Use horiz. line test on the original func to determine if f^{-1} will be a function

Find the equation of f^{-1}.

$f(x) = \sqrt{4x-3}$

$y = \sqrt{4x-3}$

$(x)^2 = \left(\sqrt{4y-3}\right)^2$

$x^2 = 4y - 3$

$x^2 + 3 = 4y$

$\frac{x^2+3}{4} = f^{-1}$

1) switch, x's & ys
2) Solve for y.

Find $f^{-1}(x)$.

$f(x) = \frac{3x+7}{4x-5}$

y

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

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

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

$y(4x-3) = 5x + 7$

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

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

Are f & g inverse functions?

If $f \circ g$ or $g \circ f = x$, then f & g are inverses

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

$= x$

Yes, f & g are inverses.

Graph $f(x) = \sqrt[3]{x-2} + 7$ & its inverse.

0	0
1	1
8	2

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

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

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

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

0	0
1	1
2	8