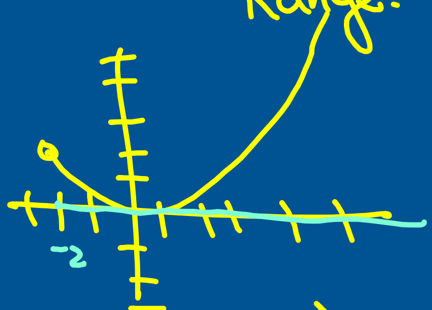
SEMESTER REVIEW

Domain/Range

Graph: Domain: x's L to R

Range: y's Low to High



Domain: $(-2, \infty)$

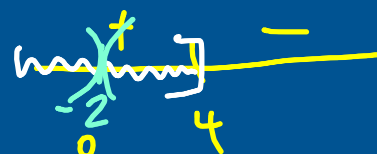
Range: $[0, \infty)$

$\sqrt[3]{-8} = -2$

	Domain
Polynomial x^3+2x^2+2x	$\mathbb{R}$
Rational $\frac{x+3}{x-3}$	Denom $\neq 0$ $x \neq 3$
Odd Root $\sqrt[3]{x-7}$	$\mathbb{R}$
Even Root $\sqrt{x-4}$	Must contain + values Testing Pts.

Like 3

$$f(x) = \frac{\sqrt{4-x}}{x+2}$$



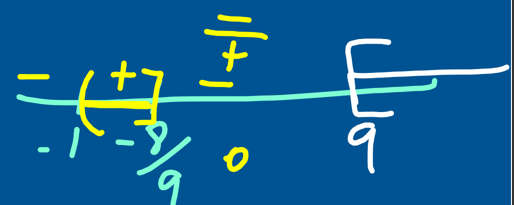
$(-\infty, -2) \cup (-2, 4]$

4) $f(x) = \sqrt{x-9}$ $\qquad g(x) = \dfrac{1}{x+1}$ $\qquad x \neq -1$

$$(f \circ g)(x) = \sqrt{\frac{1}{x+1} - \frac{9(x+1)}{1(x+1)}}$$

$$= \sqrt{\frac{1-9x-9}{x+1}}$$

$$= \sqrt{\frac{-9x-8}{x+1}}$$



No overlap –

No Domain

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

$\cancel{f(x)}\ y = \sqrt[3]{3x^2+1}$

$x^3 = \left(\sqrt[3]{3y^2+1}\right)^3$

$x^3 = 3y^2+1$

$\frac{x^3-1}{3} = \frac{3y^2}{3}$

$\sqrt{\frac{x^3-1}{3}} = \sqrt{y^2}$

$\pm\sqrt{\frac{x^3-1}{3}} = f^{-1}(x)$

1) Switch x & y
2) Solve for y.

Lines

$y = mx + b$

point-slope

$y - y_1 = m(x - x_1)$

$Ax + By = C$

$m = -\frac{A}{B}$

$3x + 7y = 19$

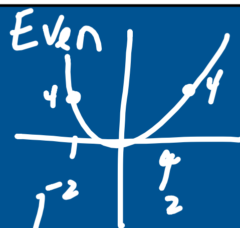
$m = \frac{-3}{7}$

EVEN/ODD

EVEN $f(-x)=f(x)$

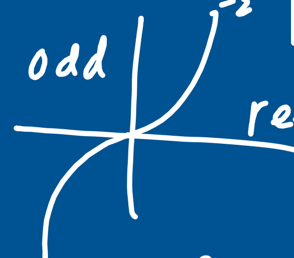
ODD $f(-x)=-f(x)$

Even



Reflect y-axis

odd



reflect across origin

$$f(x)=\frac{x^2+4}{x}$$

$$f(-x)=\frac{(-x)^2+4}{-x}=\frac{x^2+4}{-x}$$

$$-\frac{x^2+4}{x}$$

ODD

$$f(x)=x^3+1$$

$$f(-x)=(-x)^3+1$$

$$=-x^3+1$$

$$=-(x^3-1)$$

Neither

Asymptotes

$$y = \frac{x^2-9}{x^2-4x+3}$$

Vertical $\dfrac{(x+3)\cancel{(x-3)}}{(x-1)\cancel{(x-3)}}$

Holes $x-3=0$

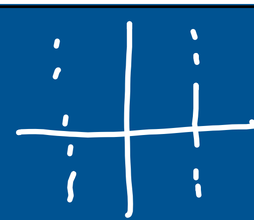
$x=3$

when terms cancel

Vertical $\boxed{x=1}$

Vertical

Denom = 0



Horizontal

1) Determine highest power
2) Take that term from num. & denom.

$\dfrac{x^2}{x^2} = 1$ Horiz: $y=1$

$\dfrac{0\cancel{x^2}}{\cancel{x^2}} = 0$ $y=0$

$\dfrac{\cancel{x^2}}{0\cancel{x^2}} = \dfrac{1}{0}$ undef. No horiz.

Slant – when numerator is one power higher

– Find using long division

$$f(x) = \frac{4x^2+6x+1}{2x-1}$$

$$\begin{array}{r|l} & 2x+4 \\ \hline 2x-1 & 4x^2+6x+1 \\ & -4x^2+2x \\ \hline & 8x+1 \end{array}$$

change signs

$$\boxed{y=2x+4}$$