Bell Ringer

Grab a large notecard - put your name on it:

Look in your notes and put:
~ all equations of a line (4 forms)
~ slope formula for a line
~ information about parallel & perpendicular lines
~ root form of a parabola
~ vertex form of a parabola

$y = mx + b$

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

$\cancel{Ax + By = C}$

$\cancel{\frac{x}{a} + \frac{y}{b} = 1}$

root form
$y = a(x - r_1)(x - r_2)$

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

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$\parallel$ have same slope

$\perp$ have opposite reciprocal slope

$\frac{2}{3} \xrightarrow{\perp} -\frac{3}{2}$

Agenda

Bell Ringer Answers
Review: Domain & Range of Functions
Notes: Composites $f(g(x))$
Domain & ~~Range~~ of Composites
CW: If I were the teacher...
Closure
HW Time (?)

Domain & Range of Functions: Polynomials

$\mathbb{R}$

odd
$\mathbb{R}$

even
min $y \geq \#$
max $y \leq \#$

line
parabola/quadratic
quartic
cubic
quintic

Domain & Range of Functions: Square Roots

$y = \sqrt{x}$ $\quad y = \sqrt{x+2}$ $\quad y = \sqrt{3-x} + 2$

no − # inside the $\sqrt{\ }$

D: $x \geq 0$ $\quad$ D: $x+2 \geq 0$, $x \geq -2$ $\quad$ $3-x \geq 0$, $3 \geq x$

range

$y \geq 0$ $\quad y \geq 0$ $\quad y \geq 2$

Domain & ~~Range~~: Rational Functions (Fractions)

cannot divide by 0

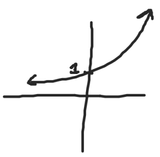
$\frac{1}{x}$ $\quad \frac{1}{x+3}$ $\quad \frac{1}{x^2-4}$

D: $x \neq 0$ $\quad x+3 \neq 0$, $x \neq -3$ $\quad x^2-4 \neq 0$, $(x+2)(x-2) \neq 0$, $x \neq 2$ $x \neq -2$

$y = \frac{x}{3}$

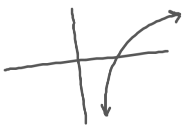
$\mathbb{R}$

Domain & Range: Exponents & Logarithms



D: $\mathbb{R}$

R: $y > 0$



D: $x > 0$

R: $\mathbb{R}$

Composites $f \circ g \rightarrow f(g(x))$

$f(g(2)) = f(4) = 56$

$f(g(\star)) = f(2\star)$

$f(g(x)) = f(2x)$
$= 4(2x)^2 - 2(2x)$
$= 16x^2 - 4x$

$f(x) = 4x^2 - 2x$

$f(4) = 4(4)^2 - 2(4)$
$64 - 8$
56
$4(2\star)^2 - 2(2\star)$
$16\star^2 - 4\star$

$g(x) = 2x$

$g(2) = 2(2) = 4$

$g(\star) = 2\star$

$f(x) = x^2 + x$ $\quad$ $g(x) = x + 1$

D: $\mathbb{R}$ $\quad$ D: $\mathbb{R}$

$g(f(x)) = g(x^2+x) = (x^2+x)+1$

x^2+x+1 $\quad$ $\mathbb{R}$

$f(g(x)) = f(x+1) = (x+1)^2 + (x+1)$

$x^2+2x+1+x+1$

x^2+3x+2 $\quad$ $\mathbb{R}$

$f(x) = x^3$ $\quad$ $g(x) = \sqrt{x}$ $\quad$ $x \geq 0$

$\mathbb{R}$

$h(x) = x - 4$ $\quad$ $j(x) = 2x$

$\mathbb{R}$ $\quad$ $\mathbb{R}$

$f(h(x)) =$

$f(x-4)$

$(x-4)^3$

$(x^2-8x+16)(x-4)$

$x^3-4x^2-8x^2-32x+16x-64$

$x^3-12x^2-16x-64$ $\quad$ $\mathbb{R}$

$h(f(x)) =$

$h(x^3) =$

x^3-4

$\mathbb{R}$

$j(f(x)) =$

$j(x^3) = 2x^3$

$\mathbb{R}$

$f(x) = x^3$ $\quad$ $g(x) = \sqrt{x}$

$h(x) = x - 4$ $\quad$ $j(x) = 2x$

$h(g(x))$

$h(\sqrt{x})$

$\sqrt{x} - 4$

$x \geq 0$

$f(g(x))$

$f(\sqrt{x})$

$(\sqrt{x})^3$

$x^{3/2}$

$x \geq 0$

$j(g(x))$

$j(\sqrt{x})$

$2\sqrt{x}$

$x \geq 0$

$f(x) = x^3$ $\quad$ $g(x) = \sqrt{x}$

$h(x) = x - 4$ $\quad$ $j(x) = 2x$

$g(j(x))$

$g(2x)$

$\sqrt{2x}$

$2x \geq 0$

$x \geq 0$

$g(f(x))$

$g(x^3)$

$\sqrt{x^3}$

$x^3 \geq 0$

$x \geq 0$

$g(h(x))$

$g(x-4)$

$\sqrt{x-4}$

$x-4 \geq 0$

$x \geq 4$

If I were the teacher...

On a sheet of paper: write a question that would be a good quiz questions.

~ composite - create two functions

~ be able to find the domain of each

~ pick a combination $f(g(x))$ OR $g(f(x))$

~ find the domain of the composite

Why is this a good quiz questions?

Too easy? Too hard? Take too long? 5pt +3 bonus pts

Closure

Think about the domain of a function.

Partner A: Explain how to find the domain of a square root. Travis

Partner B: Explain how to find the domain of a rational function. Hadley

Partner A: Explain how to find the domain of a exponential function. Shivali

Partner B: Explain how to find the domain of a logarithmic function. Rachel

Be prepared to share