LINEAR FUNCTIONS

Function – Each x-coord is paired with EXACTLY ONE y-coord.

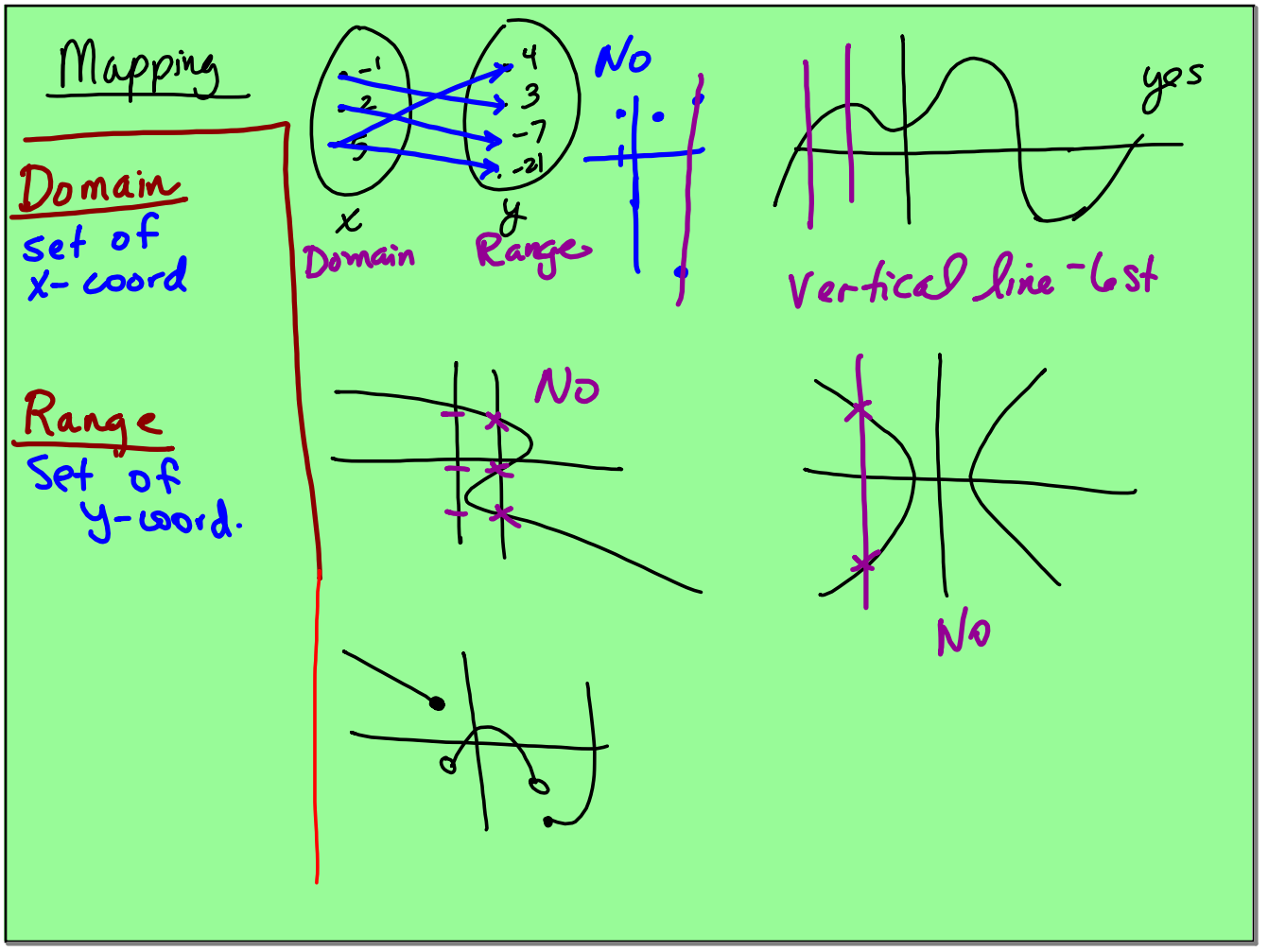
$\{(2,7)\ (3,-1)\ (4,8)\ (-9,6)\}$ yes

$\{(4,5)\ (6,-3)\ (7,-4)\ (4,11)$ No

$\{(8,-7)\ (-3,-7)\ (14,-7)\}$ yes

x's should not repeat!

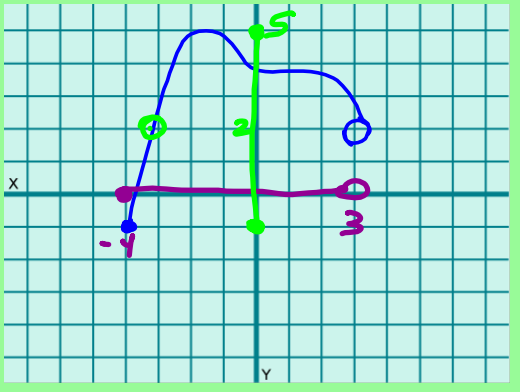
* What is a function?
* Domain & Range
* Function Notation
* Lines
  * slope
  * Eq. of line


Mapping
Domain
set of
x-coord
Range
Set of
y-coord.
-1
2
5
4
3
-7
-21
x
Domain
y
Range
No
yes
Vertical line test
No
No

$\{(-3,4)(5,-8)(7,2)(4,-5)\}$

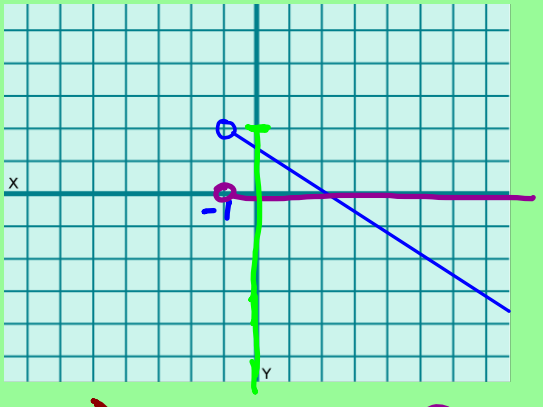
Domain: $\{-3, 4, 5, 7\}$

Range: $\{-8, -5, 2, 4\}$



Domain: $-4 \leq x < 3$

Range: $-1 \leq y \leq 5$



Domain: L to R $x > -1$

Range: Low to High $y < 2$

Function Notation

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

$y =$

Find $f(2) = (2)^2 + 2(2) - 3$

$= 4 + 4 - 3$

$= 5$

$(2, 5)$

$g(x) = \frac{3x - 1}{x^2}$

$g\left(\frac{1}{2}\right) = \frac{3\left(\frac{1}{2}\right) - 1}{\left(\frac{1}{2}\right)^2}$

$= \frac{\frac{3}{2} - \frac{2}{2}}{\frac{1}{4}} = \frac{\frac{1}{2}}{\frac{1}{4}}$

$\left(\frac{1}{2}, 2\right)$

$\frac{1}{2} \cdot \frac{4}{1} = 2$

$f(x) = \frac{x+1}{3}$ D: $\{-5, -1, 1/2, 8\}$ Find range.

$f(-5) = \frac{-5+1}{3} = -\frac{4}{3}$

$f(-1) = \frac{-1+1}{3} = 0$

$f(1/2) = \frac{\frac{1}{2}+1}{3} = \frac{3/2}{3} = \frac{3}{2} \cdot \frac{1}{3} = \frac{1}{2}$

$f(8) = \frac{8+1}{3} = 3$

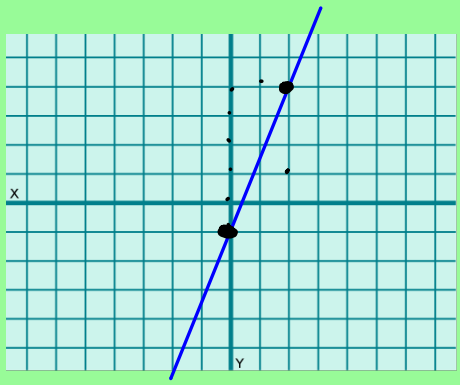
R: $\{-\frac{4}{3}, 0, 1/2, 3\}$

LINES

$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$(2, -3)\ (4, -9)$ Find slope.

$$m = \frac{-3 + 9}{2 - 4} = \frac{6}{-2} = -3$$



$$m = \frac{5}{2}$$

Babysitting

Kelly

flat fee $10

$6 per hour

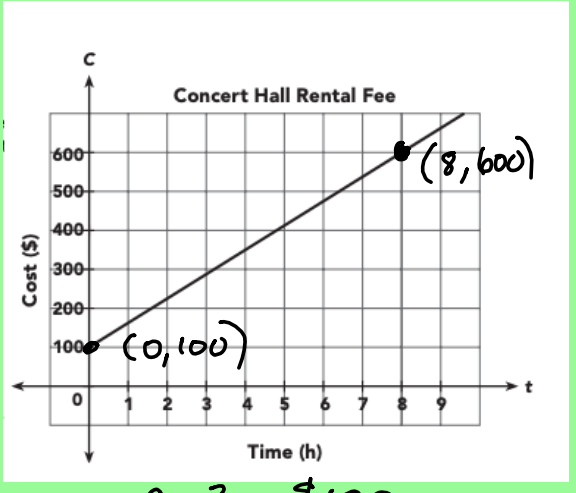
Kim

Hrs	$
1	22
2	26
3	30
4	34

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{26-22}{2-1} = \frac{\$4}{1} = \$4$ hour

Who charges more per hour? Kelly

What is Kim's flat fee? $18



Flat fee? $100

Hourly Rate: $\frac{600-100}{8-0} = \frac{500}{8} = \$62.50$

Container P

$m = \frac{1000-100}{0-60} = \frac{900}{60} = -15 \frac{mL}{min}$

$y = mx + b$ (m: slope, b: y-int)

$y = -15x + 1000$

Container Q $= \frac{800-200}{0-60} = \frac{600}{-60} = -10 \frac{mL}{min}$

$y = -10x + 800$