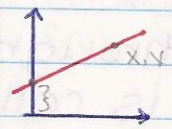
# High School Review

Mon, Sept 9, 2013



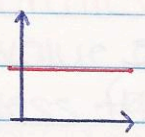

slope = m

y-intercept = c

① $y = mx + c$

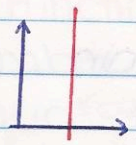
② $y - y_p = m(1 - x_c)$

↳ used if a point is given

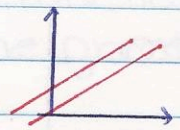


$m = 0$

$y = c$



$x = 0$



↳ parallel lines have the same slopes.

$ax^2 + bx + c = 0 \quad a \neq 0 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$\frac{a}{c} + \frac{b}{d} = \frac{ad + bc}{cd}$

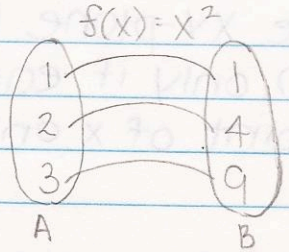
**open interval**: an interval that does not include the end point, the interval $(a, b)$ satisfies $a < x < b$

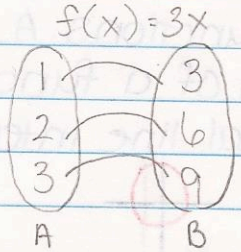
**closed interval**: an interval that includes the end points, the interval $[a, b]$ satisfies $a \leq x \leq b$

- sets can also be half open, such as $(a, b]$ or $[a, b)$

## 1.1 - Functions and Graphs

A function f is a rule that assigns only one element called $f(x)$ in a set B to each x in set A



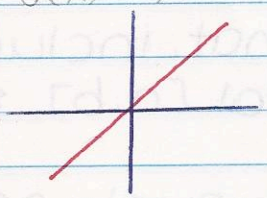



- the set A is called the domain of f
- the set of values $f(x)$ running through all elements of x on the domain is called the range of f

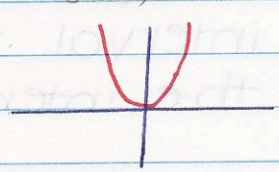
| Function | Domain | Range |
|---|---|---|
| $x^2$ | $(-\infty, \infty)$ | $[0, \infty)$ |
| $1/x$ | $(-\infty, 0) \cup (0, \infty)$ | $(-\infty, 0) \cup (0, \infty)$ |
| $x^2 - 5$ | $(-\infty, \infty)$ | $[-5, \infty)$ |
| $\sqrt{x}$ | $[0, \infty)$ | $[0, \infty)$ |
| $\sqrt{4 - x}$ | $(-\infty, 4]$ | $[0, \infty)$ |
| $\sqrt{x + 5}$ | $[-5, \infty)$ | $[0, \infty)$ |
| $2 + \sqrt{x}$ | $[0, \infty)$ | $[2, \infty)$ |

- the graph of a function f is the set of all points $(x, y)$ in the XY-plane and x is in the domain of f & $y = f(x)$

$f(x) = x$



$f(x) = x^2$

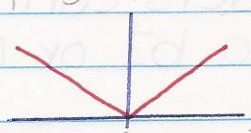


$f(x) = |x|$

$$|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

$|5| = 5$

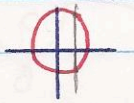
$|-5| = 5$



domain = $(-\infty, \infty)$

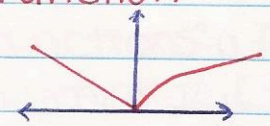
range = $[0, \infty)$

**Vertical Line Test**: not all curves on the XY-plane are functions. A curve in the XY-plane is the graph of a function $y = f(x)$ only if each vertical line intersects a point of x only once



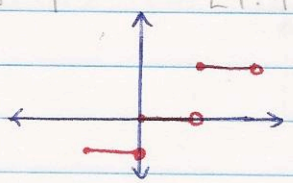
## Piecewise Defined/Split Function:

$$f(x) = \begin{cases} -x \rightarrow x \leq 0 \\ \sqrt{x} \rightarrow x > 0 \end{cases}$$



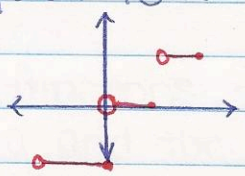
**Greatest Integer Function**: the function where the value of any number x is the greatest integer less than or equal to x

$\lfloor 1.2 \rfloor = 1$ $\lfloor 1.9 \rfloor = 1$ $\lfloor 2.1 \rfloor = 2$

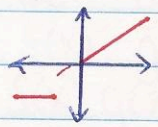


**Least Integer Function**: the function where at any number x is the smallest integer greater than or equal to x

$\lfloor 1.2 \rfloor = 2$



$$g(x) = \begin{cases} x \rightarrow x \geq 0 \\ -1 \rightarrow x < -2 \end{cases}$$



domain: $(-\infty, 2) \cup [0, \infty)$