

Math 10 Chp 7 Reference/Review

Note Title

2017-02-04

Recall: slope = $\frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$ \leftarrow dependent
 \leftarrow independent

Slope-intercept form: $y = mx + b$ \leftarrow y-intercept
 \leftarrow slope

It is very easy to graph, and we can use it to solve problems.

General Form (of a line) - $Ax + By + C = 0$

$A, B, C \in \mathbb{R}$, $A \neq 0$, A & B both not zero.

However, we generally have $A, B, C \in \mathbb{Z}$

Slope-Point Form: An easy to use form if you are not given the y-intercept: $y - y_1 = m(x - x_1)$

On a graph, lines are \parallel if they have the same slopes. Lines are \perp if the slopes multiply to -1 ; or if $m_{\perp} = -1/m$. (negative reciprocal)

Special cases: If $m = 0$, then m_{\perp} is undefined and vice-versa.

Property: \parallel lines will never meet; think of straight train tracks.

Property: \perp lines meet at 90° .

Finding the slope.

On a graph:

Count grid lines up/down for rise.

Count grid lines right for run.

Using points:

(x_1, y_1) to (x_2, y_2)

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

Table: Select 2 points then \leftarrow

SI: $y = mx + b$ SP: $y - y_1 = m(x - x_1)$

G: $Ax + By + C \Rightarrow m = -A/B$

Finding intercepts

SI: $y = mx + b$

G: $b = -C/B$

SP: $b = -mx_1 + y_1$

Anything else: x-int subst $y=0$
y-int " " $x=0$

Graphing: Start at y-intercept or a known point.
Then use the rise and run: positive rise is up, negative is down; run is to the right.
Or Plot 2 known points, then draw your line.

Algebra Examples:

$$Ax + By + C = 0 \Rightarrow By = -Ax - C \Rightarrow y = -A/Bx - C/B$$

$$y - y_1 = m(x - x_1) \Rightarrow y = mx + (-mx_1 + y_1)$$

$$y = \frac{c}{d}x + b \Rightarrow -\frac{c}{d}x + y - b = 0 \Rightarrow -cx + dy - db = 0 \\ \Rightarrow cx - dy + db = 0$$

In addition to algebra, use factoring and substitution.

$$ax + b = c \Rightarrow ax = c - b \Rightarrow x = \frac{c - b}{a}$$

$$ax + b = cx + d \Rightarrow ax - cx = d - b \Rightarrow x(a - c) = d - b \Rightarrow x = \frac{d - b}{a - c}$$

$$\frac{x}{a} + b = c \Rightarrow \frac{x}{a} = c - b \Rightarrow x = a(c - b)$$

$$\frac{x + a}{b} = c \Rightarrow x + a = bc \Rightarrow x = bc - a$$

$$\frac{a}{b}x = c \Rightarrow x = \frac{cb}{a}$$

$$\frac{a/b}{c} = \frac{a}{bc} \quad \frac{a}{b/c} = a\left(\frac{c}{b}\right) = \frac{ac}{b}$$

Word Problems.

- Determine the independent and dependent variables.
- Determine the slope or 2 values to calculate it.
- Determine if there is a y-intercept or a given point.
- Determine what you need to calculate for an answer.
It could be an intercept.
It could be a value to substitute, then calculate the remaining variable.