MAT 1275 CO/OL27 - Class #3

Tues Aug 31

- Office hours tomorrow (Wed)
  10a - 11:30a (on Blackboard Collab)

Finish reviewing equations + graphs of lines:

Point-slope equation of a line:

(x_0, y_0) — m

$$y - y_0 = m(x - x_0)$$

[equivalently: $y = y_0 + m(x - x_0)$]

Slope-intercept equation of a line:

m — y-int $(0, b)$

$$y = mx + b$$

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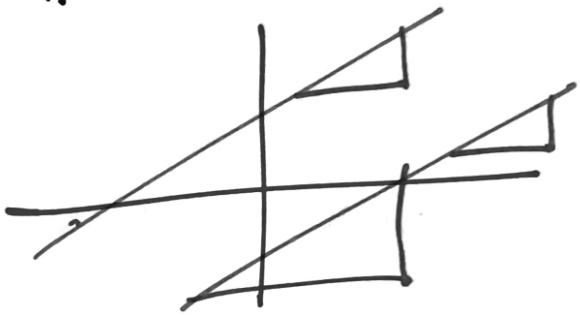
where the slope of a line is

$$m = \frac{y_1 - y_0}{x_1 - x_0} \left(= \frac{\text{rise}}{\text{run}} \right)$$

} where (x_0, y_0) and (x_1, y_1) are any 2 pts on the line.

Parallel and perpendicular lines

- 2 lines are parallel if and only if they have the same slope



WebWork example:

Equation of line passing thru $(6, -3)$, parallel to $y = \frac{3}{2}x + 2$?

Solution (use pt-slope!):

$$y - (-3) = \frac{3}{2}(x - 6)$$

$$y + 3 = \frac{3}{2}(x - 6)$$

Perpendicular lines :

slopes of perpendicular lines are "negative reciprocals of each other"

Example : In prev. example, we had a line with slope $m = \frac{3}{2}$

Q: What slope will a line perpendicular to those lines have?

→ $m_p = -\frac{2}{3}$

(Let's graph this on Desmos!)

Next topic : "Linear systems"

ie. "systems" of linear equations.

more than 1 equation

§4.1 : "2×2 ⊛ linear systems"

∴ i.e., systems of 2 linear equations in 2 variables.

Ex (WebWork, Graphinglines)

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

y-int : $(0, -2)$

slope $m = \frac{\text{rise}}{\text{run}} = \frac{-1}{2}$

$y = \frac{1}{3} + 3$

In WebWork (and/or Desmos),

We found the "solution of that linear system"

graphically

found the single point (x_0, y_0) which is on both lines, ie, satisfies both equations.

Next time: we will show how to solve such "2×2 linear systems" algebraically