

Q1.) a) $(2,1)$ $(4,5)$
 x_1, y_1 x_2, y_2

$$\text{slope } m = \frac{x_2 - x_1}{y_2 - y_1} \quad \leftarrow \begin{array}{l} \text{rise} \\ \text{run} \end{array}$$

$$m = \frac{4-2}{5-1} = \frac{2}{4} = \frac{1}{2}$$

positive number so
the line is rising.

Q3.) 1.) $3x+6$ $(4,7)$ parallel
 x_1, y_1

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

$$y - 7 = 3(x - 4)$$

$$y - 7 = 3x - 12$$

+7

$$y = 3x - 5$$

Q5.) a) Line 1: $(1,2)$ $(3,1)$
 x_1, y_1 x_2, y_2

$$m = \frac{x_2 - x_1}{y_2 - y_1} = \frac{3-1}{1-2} = \frac{2}{-1} = -\frac{2}{1}$$

Line 2: $(0,-1)$ $(2,0)$
 x_1, y_1 x_2, y_2

$$m = \frac{x_2 - x_1}{y_2 - y_1} = \frac{2-0}{0-(-1)} = \frac{2}{1}$$

So neither parallel nor
perpendicular.

(But if $-\frac{2}{1}$ and $+\frac{1}{2}$, then
it would have been perpendicular!)

Q2.) 1.) $y = 3x+4$
 $y = 3x+7$

Same slope,
so parallel

5.) $y = \frac{3}{5}x - 3$

$$\begin{cases} 5y = 3x - 10 \\ \frac{5}{5} \quad \frac{5}{5} \quad \frac{5}{5} \\ y = \frac{3}{5}x - 2 \end{cases}$$

so same slope,
so parallel.

Q4.) perpendicular

1.) $y = -\frac{5}{1}x + 1$ $(2,-1)$
 x_1, y_1

$$m = +\frac{1}{5} \text{ or } 0.2$$

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

$$y - (-1) = 0.2(x - 2)$$

$$y + 1 = 0.2x - 0.4$$

$$\frac{-1}{-1} = \frac{-0.4}{-1}$$

$$y = 0.2x - 1.4$$

Q6.) Can two lines
with negative slopes
be perpendicular?

NO!