

Lesson Title 3.5 Equations of Parallel & Perpendicular Lines DAY ONE Notes HGEO Date \_\_\_\_\_

Identifying Slopes

To find the slope of a line passing through two ordered pairs, you should use the

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

formula and think the reminder of  $\frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$

TASK 1:

Match the 4 types of lines with the appropriate slopes.

- a) **Zero Slope**
- b) **Undefined Slope**
- c) **Positive Slope**
- d) **Negative Slope**

1. Rising lines have a c
2. Falling lines have a d
3. Horizontal lines have a a
4. Vertical lines have a b

Pairs of Lines

1) Parallel Lines have the same slope but different y-int.



2) Coinciding Lines have the same slope & y-int. (Same line)



3) Intersecting Lines have different slope



TASK 2:

Determine if the following lines are parallel, perpendicular, or neither.

a)  $\overline{MN}$  &  $\overline{PQ}$  when M(-3, 1), N(1, 3), P(8, 4) & Q(2, 1)

$$\overline{PQ} = \frac{1-4}{2-8} = \frac{1}{2}$$

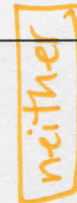
$$\overline{MN} = \frac{1-3}{-3-1} = \frac{1}{2}$$



b)  $\overline{XY}$  &  $\overline{ZW}$  when X(-2, 5), Y(6, -2), Z(-3, 6) & W(4, 0)

$$\overline{XY} = \frac{5+2}{-2-6} = \frac{7}{8}$$

$$\overline{ZW} = \frac{0-6}{4+3} = -\frac{6}{7}$$



c)  $\overline{JK}$  &  $\overline{JL}$  when J(-4, -2), K(4, -2), & L(-4, 6)

$$\overline{JK} = \frac{-2+2}{-4-4} = 0$$

$$\overline{JL} = \frac{-2-6}{-4+4} = \text{undefined}$$



d)  $\overline{MN}$  &  $\overline{PQ}$  when M(1, 1), N(4, 2), P(10, 4) & Q(100, 34)

$$\overline{PQ} = \frac{1}{3}$$





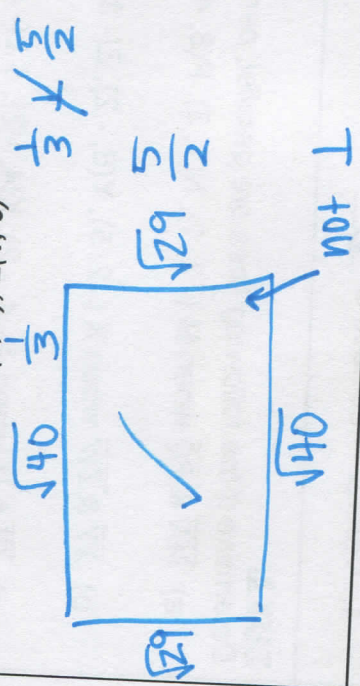
### Parallel Lines

Two non-vertical lines have the same (slope)  $m$  iff they are parallel.

### TASK 3:

Determine if the following quadrilateral with the given vertices is a parallelogram. Could it be a rectangle? **No** ✓

$$W(-5, -2), X(-3, 3), Y(3, 5), Z(1, 0)$$
$$WX = \frac{5}{2} \quad XY = \frac{1}{3} \quad WZ = \frac{1}{3}$$
$$YZ = \frac{5}{2}$$



$$XY = \frac{1}{3} \perp YZ = -2$$

### Perpendicular Lines

Two non-vertical lines are perpendicular iff the **product of their slopes** is  $-1$ .

Perpendicular lines always form  $90$  degree angles.

### TASK 4: Draw a visual to help you break down the steps.

What is the equation of a line perpendicular to  $\overline{TK}$  with T(0, 2) and K(5, 0) going through point (3, -4)?

$$m_{\overline{TK}} = \frac{\Delta y}{\Delta x} = \frac{0-2}{5-0} = -\frac{2}{5}$$
$$\perp m = \frac{5}{2}$$
$$y - y_1 = m(x - x_1)$$
$$y + 4 = \frac{5}{2}(x - 3)$$

Still need help with: