Geometry
3.3 and 3.4 Notes

Name Key
Date

- **Ex 1):** Find the slope between (-6, 2) and (3, -5)

$m = \frac{y_2 - y_1}{x_2 - x_1}$ $\frac{-5-2}{3-(-6)} = \frac{-7}{9}$ most students! Ah $= \boxed{\frac{-7}{9} = m}$

- The slope of a vertical line is undefined and the slope of a horizontal line is zero.
- Parallel lines are lines which have the same slope.
- Perpendicular lines are lines which have opposite and reciprocal slopes. The product of these slopes will be -1.

- If the slopes do not satisfy either of these conditions, then the lines are intersecting lines.

Ex 2) Determine whether $\overleftrightarrow{PQ}$ and $\overleftrightarrow{UV}$ are parallel, perpendicular, or neither.

a. P(-3,-2), Q(9, 1), U(3, 6), V(5, -2)

Slope of PQ= ¼ *Slope of UV = -4*

Perpendicular

b. P(-4, 0), Q(0, 3), U(-4,-3), V(8, 6)

Slope of PQ= ¾ *Slope of UV = ¾*

Parallel

c. P(-10, 7), Q(2, 1), U(4, 0), V(6, 1)

Slope of PQ= - ½ *Slope of UV = ¼*

Neither, just intersecting!

Writing Equations:

Ex 3.) Write the equation of a line in slope intercept and point slope form which pass through the points A(0,-3) and B(2,-1)

Slope intercept $y = mx + b$

① need slope $\frac{-1-(-3)}{2-0} = \frac{+2}{2}$

$\boxed{m = 1}$

② Find b

$-3 = 1(0) + b$

$\boxed{-3 = b}$

③ write Equation

$\boxed{y = x - 3}$

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

① Find Slope

$\frac{-1-(-3)}{2-0} = \frac{2}{2} = 1$

② Plug in (x_1, y_1) and m

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

$\boxed{y+1 = 1(x-2)}$ make sure it is simplified

OR

$y-(-3) = 1(x-0)$

$y+3 = 1(x)$

SAME SLOPE

Ex 4.) Write the equation of a line in slope intercept AND point-slope form which is parallel to $y + 2 = \frac{5}{3}x$ and passes through the point (-1,-4).

Slope intercept

① Find slope //

$Y + 2 = \frac{5}{3}x$

$-2 \quad -2$

$Y = \frac{5}{3}x - 2$

use $m = \frac{5}{3}$

② Find // slope

$m_{//} = \frac{5}{3}$

③ Solve for b

$Y = mx + b$

$-4 = \frac{5}{3}(-1) + b$

common denom.

$-\frac{12}{3} = -\frac{5}{3} + b$

$+\frac{5}{3} \quad +\frac{5}{3}$

$\frac{-7}{3} = b$

④ put in slope int Form

$Y = mx + b$

$Y = \frac{5}{3}x - \frac{7}{3}$

Point-Slope

① Find // slope

$m = \frac{5}{3}$

② $m_{//} = \frac{5}{3}$

③ plug into point slope

$Y - Y_1 = m(x - x_1)$

$Y - (-4) = \frac{5}{3}(x - (-1))$

$Y + 4 = \frac{5}{3}(x + 1)$

make sure this is simplified but still in point slope form!

Ex 5.) Write the equation of a line in slope intercept AND point-slope form which is perpendicular to $2 = \frac{5}{3}x + y$ and passes through the point (-1,-4).

Flip + change sign.

Slope intercept

① Find slope

$2 = \frac{5}{3}x + Y$

$-\frac{5}{3}x \quad -\frac{5}{3}x$

$Y = -\frac{5}{3}x + 2$

$m = -\frac{5}{3}$

② Find ⊥ slope

$m = -\frac{5}{3}$

so

$m_{\perp} = \frac{3}{5}$

③ Find b use $m_{\perp}$

$Y = mx + b$

$-4 = \frac{3}{5}(-1) + b$

$-\frac{20}{5} = -\frac{3}{5} + b$

$+\frac{3}{5} \quad +\frac{3}{5}$

$\frac{-17}{5} = b$

④ use $m_{\perp}$ and b for slope int form

$Y = \frac{3}{5}x - \frac{17}{5}$

Point-Slope

① Find slope

$m = -\frac{5}{3}$

② $m_{\perp}$ Perp slope

$m = -\frac{5}{3}$

$m_{\perp} = \frac{3}{5}$

③ Put into point slope form

$Y - Y_1 = m(x - x_1)$

$Y - -4 = \frac{3}{5}(x - -1)$

$Y + 4 = \frac{3}{5}(x + 1)$

Simplify but keep in point slope form!