Grab a Notes Sheet!

**Opener**

Find the slope of a line passing through the points (2, -7) and (-6, 5)

\[
\frac{\text{rise}}{\text{run}} = \frac{Y_2 - Y_1}{X_2 - X_1}
\]

\[
\frac{-7 - (-5)}{2 - (-6)} = \frac{-2}{8} = -\frac{1}{4}
\]
Today's Agenda
• Unit 6- Coordinate Geometry
Brainstorm
What comes to mind when you think about graphing lines?

Coordinate points \((x, y)\)

- Slope
- y-int
- x & y axis
Refresher
Finding a slope from a graph:

\[
m = \frac{\text{change in } y}{\text{change in } x} = \frac{\text{rise}}{\text{run}}
\]

\[
\frac{-9}{3} = \frac{-3}{1} = -3
\]
Finding a slope from two points:

\[ \frac{\text{rise}}{\text{run}} = \frac{Y_2 - Y_1}{X_2 - X_1} \]

Ex. (4, 9) and (-6, 0)

\[ \frac{0 - 9}{-6 - 4} = \frac{-9}{-10} = \frac{9}{10} = 0.9 \]

Write the equation of a line with a slope of 4/5 and a y-intercept of -8:

\[ y = mx + b \]

\[ y - \text{int} \quad \text{Slope} \]

\[ y = \frac{4}{5}x - 8 \]
With your groups: Work on #1-4

#1 Write a definition for parallel lines: 2 lines that don’t intersect

#2 Find the slopes of these two parallel lines.

\[ m = \frac{3}{4} \quad m = \frac{3}{4} \]

#3 Write the equations of the parallel lines graphed.

\[ y = -\frac{3}{4}x + 9 \]
\[ y = \frac{3}{4}x - 2 \]

#4 What is true about the slopes of parallel lines?

**Same Slope**
With your groups: Work on #5-8

#5 Write a definition for perpendicular lines:

2 lines that cross at 90°

#6 Find the slopes of these two perpendicular lines.

\[ m = \frac{-4}{2} = -2 \quad \frac{3}{6} = \frac{1}{2} \]

#7 Write the equations of the perpendicular lines graphed.

\[ y = -2x - 6 \quad y = \frac{1}{2}x + 4 \]

#8 What is true about the slopes of perpendicular lines?

Slopes are flipped & negative

L7 opposite reciprocal
#9 Graph the line parallel to $AB$ that passes through point $P$ and write the equation of the line.

\[
\frac{-2}{x} = -1
\]

$y = -1x - 2$
#10 Are $\overrightarrow{AB}$ and $\overrightarrow{CD}$ perpendicular? Why or why not?

- $\frac{1}{3}$
- $\frac{3}{1} = 3$

$\text{Flipped & negative}$

Yes, perpendicular
#11 a. Graph the line that passes through \((2, -2)\) and has a slope \(-1/3\).

b. Write the equation of the new line.

\[
y = \frac{-1}{3}x + b
\]

Can we write this equation in slope-intercept form?
**Point-Slope Form**

\[ y - y_1 = m(x - x_1) \]

Point \((x_1, y_1)\)

Slope \(m\)

Line that passes through \((2, -2)\) and has a slope \(-\frac{1}{3}\)

\[
\begin{align*}
    y + 2 &= \frac{-1}{3}(x - 2) \\
    y + 2 &= \frac{-1}{3}x + \frac{2}{3} \\
    y &= \frac{-1}{3}x - \frac{4}{3}
\end{align*}
\]
On your own: #12-13

#12  a) Graph the line \( y = -2x + 3 \)  
     b) Graph a parallel line that passes through \((-1, 2)\)  
     c) Write the equation of the new line

\[
y = -2x - 4
\]

#13  a) Graph the line \( y = -\frac{2}{3}x + 5 \)  
     b) Graph a perpendicular line passing through \((5, 0)\)  
     c) Write the equation of the new line

\[
y - 0 = \frac{3}{2} (x - 5) \\
y = \frac{3}{2} x - \frac{15}{2}
\]