**Parallel and Perpendicular Lines**

*Parallel lines*: NEVER meet / cross (like train tracks

y = 3x + 6

Example:

What can we say about their slopes?

y = 3x + 2

**\*PARALLEL LINES HAVE THE SAME SLOPE\***

Usually, parallel lines do NOT have the same y-intercept. If they do, they are the SAME line, where one is directly on top of the other. We call them COINCIDENT LINES

**Example of a possible question...**

*Line AB is parallel to line CD and passes through point (3, 5). Line CD has the equation y = -3x + 1*

*What is the equation of line AB?*

* We know the slope because the lines are parallel and therefore have the same “a” variable.

y = -3x + b

y = ax + b

* To calculate the “b”, use the formula with a point on the line – in this case (3, 5).

b = y1 – a(x­1)

b = 14

b = 5 + 9

b = 5 - -9

b = 5 - -3(3)

The equation of line AB is y = -3x + 14

*Perpendicular Lines*: Meet at 90°

The slope of one line is the negative reciprocal of the other line

y = x +4

y = 3x – 1

\***PERPENDICULAR LINES HAVE FLIPPED, OPPOSITE SIGN SLOPES\***

To get the negative reciprocal slope, flip and change the sign of the slope.

Examples:

-2

-4

**Example of a possible question...**

*Line AB has the equation 2x + 4y – 8 = 0*

*Line CD is perpendicular to AB and passes through point (0, 0)*

*Find the equation of line CD.*

We need to find the slope of AB by changing the equation to functional form

2x + 4y – 8 = 0

4y = -2x +8

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Y = x + 2

4y = -2x +8

* To find the slope of line CD, we need to find the negative reciprocal of the slope of line AB

 Slope AB = Slope of CD = 2

* To solve for the “b”, replace x and y with a point on the line – in this case (0 , 0)

y = 2x + b

0 = 2(0) + b

0 = b

y = 2x