ACT Study Modules
Topic: Finding slope from parallel and perpendicular lines

Khan Academy Link: https://www.khanacademy.org/math/geometry-home/analytic-geometry-topic/parallel-perpendicular-lines-coordinate-plane/v/classify-lines

To determine the slope of parallel lines from an equation:

Step one: arrange the equation in the form, $y = mx + b$
Step two: determine the slope (m value)
Step three: compare the slopes
Step four: compare the "b" values

If the b values are different and the slope is the same, then the lines are parallel.

Example: $-3x + y = -9$ $y - 5 = 3x$
            Add $3x$ to both sides   add 5 to both sides
               of the equation   of the equation
                $y = 3x - 9$ $y = 3x + 5$

In the functions, $y = 3x - 9$ & $y = 3x + 5$ the slope is 3, and the b values are different, making the lines parallel.

To determine the slope of perpendicular lines from an equation:

Step one: arrange the equation in the form $y = mx + b$
Step two: determine the slope (m value)
Step three: compare the slopes

If the slopes are negative reciprocals, the lines are perpendicular.

Example: $y - 5x = -4$ $y + 8 = -1/5x$
            Add $5x$ to both sides   Subtract 8 from both sides
               of the equation   of the equation
                $y = 5x - 4$ $y = 3x + 5$

Slopes are 5 and -1/5, the slopes are negative reciprocals, making the lines perpendicular.

Example: In the standard (x, y) coordinate plane which of the lines are perpendicular to the line $y = -2x + 2$ that passes through the point (0,3)

Step one: determine the slope of the perpendicular line:. The slope of the original line is -2
the negative reciprocal of -2 is $\frac{1}{2}$

Step two: $y = \frac{1}{2}x + b$

Step three: to determine b, substitute the x and y- values of the point, (0,3)
$$3 = \frac{1}{2}(0) + b$$
$$3 = b$$

Step four: write the equation, $y = \frac{1}{2}x + 3$

Practice:

Line	Equation of a parallel line	Equation of a perpendicular line
$y = 2x - 5$		
$2x - 3y = 12$		
$y = -\dfrac{3}{4}x - 1$		
$5x + 2y = 15$		