Given two points on a line, find an equation for the line.

Determine an equation for the line containing the points (9,2) and (15,6).

1) Find the slope of the line.

Δx	x	y	Δy	Δy/ Δx
	9	2		
6	15	6	4	2/3

So, the line's slope is 2/3.

2) An equation for the line may take the form $y = mx + b$ where "m" gives the line's slope and "b" gives the intercept on the vertical axis. Since the slope of the line through (9,2) and (15,6) is 2/3, we seek a value for "b" so that the coordinates of those points will satisfy the resulting equation.

So, in the following equation we will choose a value for "b" so the equation is true when $x = 9$ and $y = 2$.

$$y = (2/3)x + b$$

Replacing the "x" with "9" and "y" with "2" we obtain

$$2 = (2/3)(9) + b.$$

Solving for b we obtain $b = -4$.

Hence, an equation for the line through (9,2) and (15, 6) is

$$y = (2/3)x - 4.$$

3) Check: Let's verify that the coordinates of the other point (15,6) satisfy the equation.

$$6 = (2/3)(15) - 4$$
$$= 10 - 4 = 6 \ \ (\text{checks})$$

Practice Exercise: Find an equation for the line through the points (20, 4) and (80, 34).