Linear Equations: y = mx + b

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Euclid site

Point and slope

Point = (1,3)   slope = 2
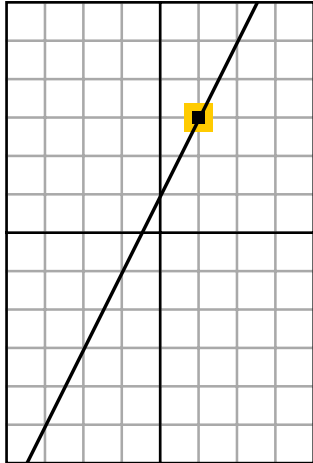
Question: What is the linear equation that has the point (1,3) on the line and has a slope of 2?

$$y = 2x + b$$

Write the equation with the slope = 2

$$(3) = 2(1) + b$$

From the point: x = 1 and y = 3
(Don't get them backwards)

$$3 = 2 + b$$

Multiply the slope 2 times (1)

$$\begin{array}{r} 3 = 2 + b \\ -2 \quad -2 \\ \hline 1 = b \end{array}$$

Solve for b:
Subtract the the 2 from the b side
and subtract 2 from the left side
to keep the equation balanced

$$y = 2x + 1$$

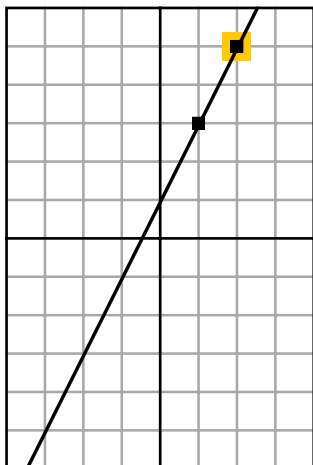Write the linear equation with the slope = 2
and b = 1

Two points

Points = (2,5)   2   5
          (1,3)   −1   −3
          ―――   ――   ――
                   1   2

Question: What is the linear equation that has the points (1,3) and (2,5) on the line?

Find the slope:
Subtract one point from the other
(it doesn't matter which one you subtract)

$$\text{slope} = \frac{2}{1}$$

Put the y over the x (rise over run)
The slope = 2

$$y = 2x + b$$

Write the equation with the slope = 2

$$(5) = 2(2) + b$$

From the first point: x = 2 and y = 5
(Or use the second point: x = 1 and y = 3)

$$5 = 4 + b$$

Multiply the slope 2 times (2)

$$\begin{array}{r} 5 = 4 + b \\ -4 \quad -4 \\ \hline 1 = b \end{array}$$

Solve for b:
Subtract the the 4 from the b side
and subtract 4 from the left side
to keep the equation balanced

$$y = 2x + 1$$

Write the linear equation with the slope = 2
and b = 1