Linear Functions & Equations

1. A function assigns the inputs and corresponding outputs shown in the table below.

a) Does the function appear to be linear? Check at least three pairs of inputs and their corresponding outputs.

Input	Output
3	9
9	17
12	21
15	25

b) Can you write a linear equation that describes the function?

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Input	Output
3	9
9	17
12	21
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$$\frac{9-17}{3-9}=\frac{-8}{-6}=\frac{4}{3}$$

$$\frac{17-21}{9-12}=\frac{-4}{-3}=\frac{4}{3}$$

$$\frac{21-25}{12-15}=\frac{-4}{-3}=\frac{4}{3}$$

Yes. The rate of change is the same when I check pairs of inputs and corresponding outputs. Each time it is equal to $\frac{4}{3}$. *Since the rate of change is the same, the function does appear to be linear.*

b) Can you write a linear equation that describes the function?

Using the assignment of 9 *to* 3

$$9=\frac{4}{3}(3)+b$$
$$9=4+b$$
$$5=b$$

The equation that describes the function is $y=\frac{4}{3}x+5$. *(We check that for each of the four inputs given, this equation does indeed produce the correct matching output.)*