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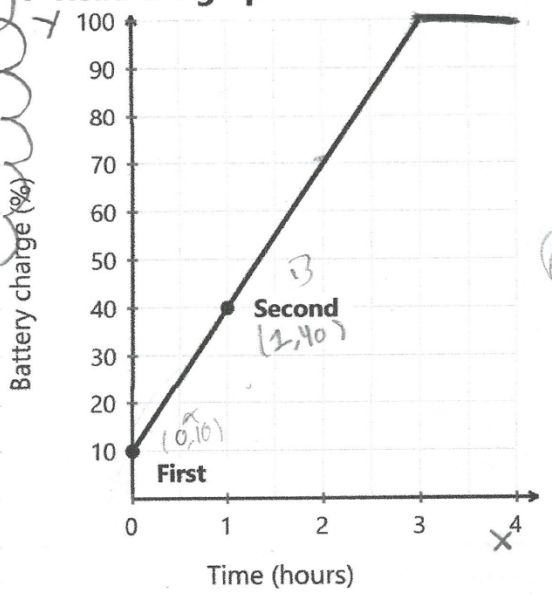
21A-C2 | MODEL A REAL SITUATION

FRONT • Work with your teacher

Writing a linear equation that models a real-world situation given a graph or a table of values

Ravi's tablet charges at a constant rate. The graph shows time x (hours) and battery charge y (%).

1 Read the graph



Extra fraction example $m = \frac{5}{2}$

Review after Step 3.

Use (1, −4): x = 1 and y = −4.

$-4 = \frac{5}{2}(1) + b$

Subtract the same product from both sides:

$-4 - [\frac{5}{2}(1)] = \frac{5}{2}(1) + b - [\frac{5}{2}(1)]$

Multiply. Rewrite −4 as a fraction with denominator 2. Subtract the numerators.

$b = -4 - \frac{5}{2} = \frac{-8}{2} - \frac{5}{2} = \frac{-13}{2}$

2 Find the slope m

Slope tells how much y changes when x increases by 1.

First point $(x_1, y_1) = (0, 10)$ **Second point $(x_2, y_2) = (1, 40)$**

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(\,40\,) - (\,10\,)}{(\,1\,) - (\,0\,)} = \frac{30}{1} = 30$$

Calculate 40 − 10 above the bar and 1 − 0 below it. Then divide.

Charge increases by 30 percentage points each hour.

3 Find b, the y-intercept (starting charge)

mx means m multiplied by x. Subtract that whole product from both sides.

$y = mx + b$

$y - [mx] = mx + b - [mx]$

$y - [mx] = b \quad \rightarrow \quad b = y - [mx]$

On the right, mx − mx is 0.

For (0, 10), replace x with 0, y with 10, and m with 30.

$10 = 30(0) + b \quad \rightarrow \quad 10 = 0 + b \quad \rightarrow \quad b =$ 10

Any point on the line works. Using x = 0 makes the product zero.

4 Write the equation

In y = mx + b, replace m with 30. Replace b with 10. Leave x and y as letters to describe the whole line.

Write the complete equation:

$y = 30x + 10$

5 Check your equation

Use (2, 70). Replace x with 2. Multiply 30 by 2, then add 10. Your result should be 70, its y-value.

Show the calculation:

$30 \times 2 = 60 + 10 = 70$

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NAME:		BLOCK: 2	DATE: 09/22/2026

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21A-C2 | PRACTICE THE SAME METHOD

500 = where she started

BACK • Show your thinking

First read what x and y measure. Then follow the numbered steps below.

1 Read the table (x = 0 is not shown)

x: Time (hours)	0	1	2	3
y: Distance remaining (km)	500	400	300	200

Amanda travels at a constant speed toward her exit.
Each column pairs time x (top) with distance y (below).
Use the columns for x = 1 and x = 2 to fill in the points below.

First (x_1, y_1) (1 , 400)

Second (x_2, y_2) (2 , 300)

2 Find the slope m

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(300) - (400)}{(2) - (1)} = \frac{-100}{1} = -100$$

Subtract, then divide to find the change in km per hour.

3 Find b using point (1, 400)

Replace x with 1, y with 400, and m with −100 in y = mx + b.

400 = −100(1) + b

Subtract the whole product −100(1) from both sides.

400 − [−100(1)] = −100(1) + b − [−100(1)]

b = 400 − (−100) = 400 + 100 = 500

b = y − [mx]
= 18 − [−2(1)]
= 18 − [−2]
= 18 + 2
b = 20

4 Write the equation

In y = mx + b, replace m with −100 and b with 500.
Leave x and y as letters. Write the equation below.

y = mx + b

y = −100x + 500

5 Check your equation

Use (3, 200). Replace x in your equation with 3.
Multiply, then add. The result should be 200.

y = −100(3) + 500 y = 200 + 500

b = y − [mx]

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1 Copy two points from your ALEKS problem

Question number: 1

Circle the source: graph / table

What does x measure?
Include its units.

Time (in Minutes)

What does y measure?
Include its units.

height (in Meters)

First (x_1, y_1) (1 , 18)

Second (x_2, y_2) (2 , 16)

2 Find the slope m

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(16) - (18)}{(2) - (1)} = \frac{-2}{1} = -2$$

3 Find b

Start with y = mx + b.

Replace m with your slope. Use your first point's x-value and y-value.

b = 18 − [−2(1)] = b = 18 − [−2] = 18 + 2 = 20

Subtract the whole mx product from both sides.

The units of m are Meters per Minute

Then b = 20

4 Write the equation

In y = mx + b, replace m with your slope number.
Replace b with your b-value. Leave x and y as letters.

y = −2x + 20

5 Check your equation

Use your SECOND point. Replace x with that point's x-value.
Calculate. The result must equal that point's y-value.

16 = −2(2) + 20 = 16 = −4 + 20 = 16 = 16

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