Solving Problems Involving Linear Equations – Constant Rate

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Sauyo High School

How to Solve Problems Involving Linear Equations that have Constant Rate?

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3. Solve the equation.

Example 1

According to science, the ambient temperature varies with height. The ground temperature is 33 °C and the ambient temperature in Tagaytay, situated at a height of 639 meters, is 29 °C. Assuming that the relationship between the temperature and height is linear, express the temperature T (in °C) in terms of the height h (in meters). Hint: ground temperature is at 0 meters elevation. What is the ambient temperature in La Trinidad, Benguet which is situated at 1318 meters above sea level?

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Given: y = temperature T (in °C)

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x = height h in meters

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h_L &= 1318 \text{ m. (height of La Trinidad)}
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\text{Find:} \quad T_L &= \text{temperature in La Trinidad}
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$$y = mx + b$$

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$$y = mx + b$$

$$T = -\frac{4}{639}$$

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$$y = mx + b$$

$$T = -\frac{4}{639}h$$

Example 1

Given: y = temperature T (in °C)

x = height h in meters

$$m = \frac{y}{x} = \frac{T}{h} = \frac{29-33}{639} = \frac{-4}{639}$$

$b = 33$

h_L = 1318 m. (height of La Trinidad)

$$y = mx + b$$

$$T = -\frac{4}{639}h + 33 \quad \text{Substitution Property}$$

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Given: y = temperature T (in °C)

x = height h in meters

$$m = \frac{y}{x} = \frac{T}{h} = \frac{29-33}{639} = \frac{-4}{639}$$

$b = 33$

h_L = 1318 m. (height of La Trinidad)

$$y = mx + b$$

$$T = -\frac{4}{639}h + 33 \quad \text{Substitution Property}$$

$\therefore$ the working equation is $T = -\frac{4}{639}h + 33$

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Given: $h_L = 1318$ m. (height of La Trinidad)
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$$T_L = -8.25 + 33$$

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$$T = -\frac{4}{639}h + 33$$

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$$T_L = -8.25 + 33 \quad \text{Simplification}$$

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$$T_L = 24.75$$

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Given: $h_L = 1318$ m. (height of La Trinidad)
Find: $T_L =$ temperature in La Trinidad

$$T = -\frac{4}{639}h + 33$$

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$$T_L = 24.75 \quad \text{Simplification}$$

$\therefore$ the temperature in La Trinidad is 24.75 °C.

Example 2

A small company buys computer equipment for 200,000 pesos. After 2 years the value of the computer equipment is expected to be 120,000 pesos. What linear equation can be used to assess the value V of the equipment given a time t in years after it is bought? What will be the value of the computer equipment 4 years after it was bought?

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Given: y $=$ value V of equipment

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Given: $y = \text{value } V \text{ of equipment}$

$x = \text{time } t \text{ in years}$

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t_4 &= \text{time after 4 years}
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2. Use the facts of the problem to form a working equation.

Example 2

Given: y = value V of equipment

x = time t in years

$m = \frac{y}{x} = \frac{V}{t} = \frac{120,000 - 200,000}{2} = -40,000$

$b = 200,000$

t_4 = time after 4 years

Find: V_4 = value after 4 years

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$$y = mx + b$$

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Given: $y = \text{value } V \text{ of equipment}$

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$b = 200,000$

$t_4 = \text{time after 4 years}$

Find: $V_4 = \text{value after 4 years}$

$y = mx + b$

$V =$

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Given:	y	$=$	value V of equipment
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Find:	V_4	$=$	value after 4 years

$$y = mx + b$$

$$V = -40,000$$

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$$y = mx + b$$

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Find: $V_4 = \text{value after 4 years}$

$y = mx + b$

$V = -40,000t + 200,000$ Substitution Property

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Find: $V_4 = \text{value after 4 years}$

$y = mx + b$

$V = -40,000t + 200,000$ Substitution Property

$\therefore$ the working equation is

$V = -40,000t + 200,000$

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2. Use the facts of the problem to form a working equation.
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Given: $t_4 = $ time after 4 years
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Find: $V_4 = $ value after 4 years

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$\therefore$ the value of the equipment after 4 years is ₱40,000.

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3. Solve the equation.

Thank you for watching.