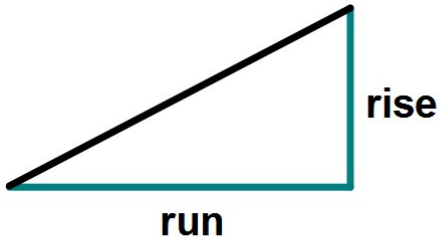
Linear Equations and Linear Graphs

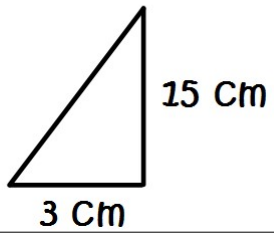
Recall: Slope

The **slope** of a line is a measure of its **steepness**. It also refers to the **rate of change** at which the *dependent variable changes with respect to the independent variable.*

$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

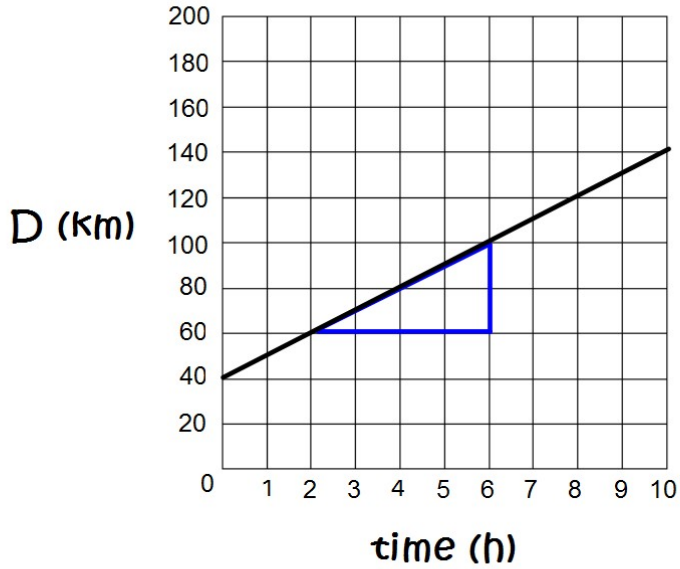


Example:



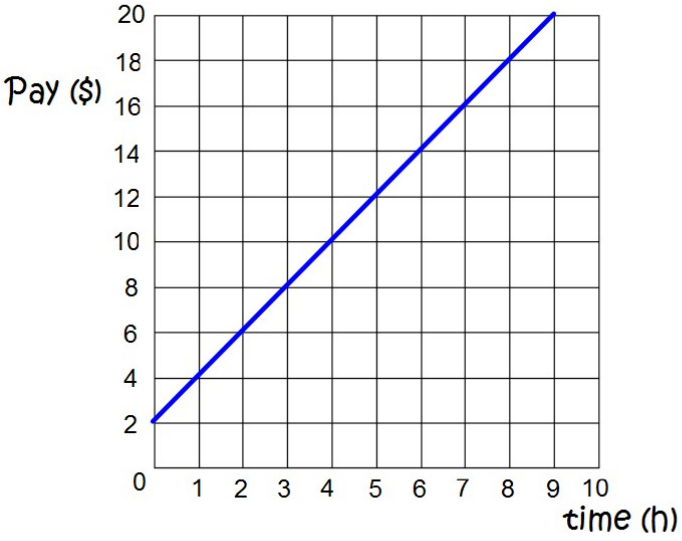
$$\text{slope} = \frac{15\text{ Cm}}{3\text{ Cm}} = 5$$

When we determine the slope of a line on a graph we need to draw in our own "rise-run" triangle:

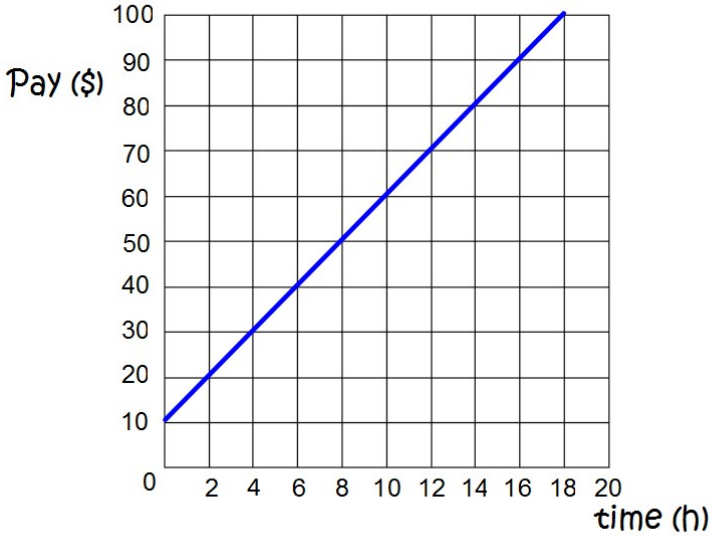


$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

Determine the slope of each of the lines below.



slope =

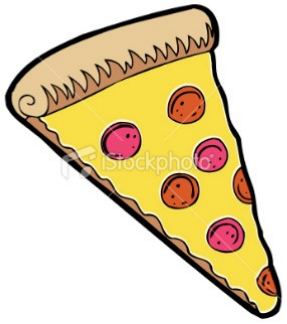


slope =

The cost for a pizza is $ 8.00 plus $ 2.00 per topping.

Let **C** represent the...

Let **n** represent the...



Drag the coloured numerical values and variables into the boxes below to show the equation that represents the relationship between **cost** and **number of toppings**:

☐ = ☐ + ☐

The cost for a pizza is $ 8.00 plus $ 2.00 per topping.

C represents cost
n represents number of toppings

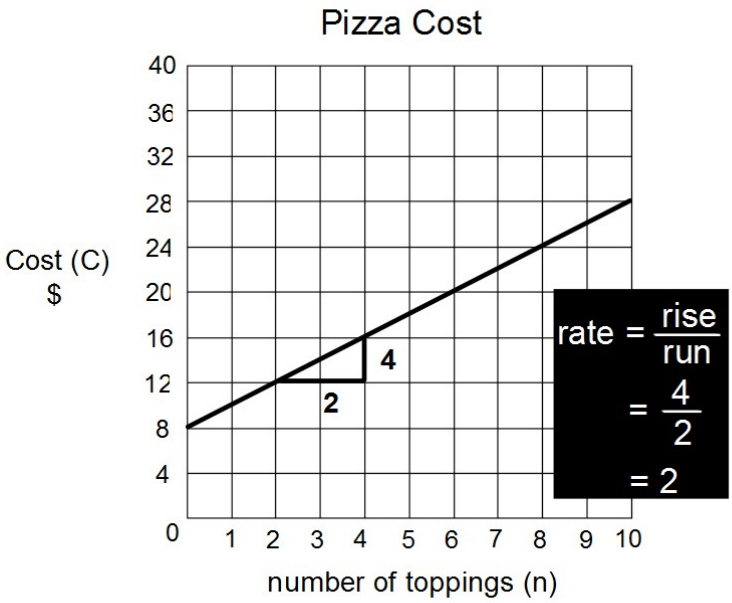
$$C = 8 + 2n$$

The graph also shows the relationship between the **cost** of a pizza and the **number of toppings**.

$$C = 8 + 2n$$

How is this value shown in the graph?

How is this value shown in the graph?



A plumber charges an initial charge of $ 20 plus an additional $ 10 per hour.

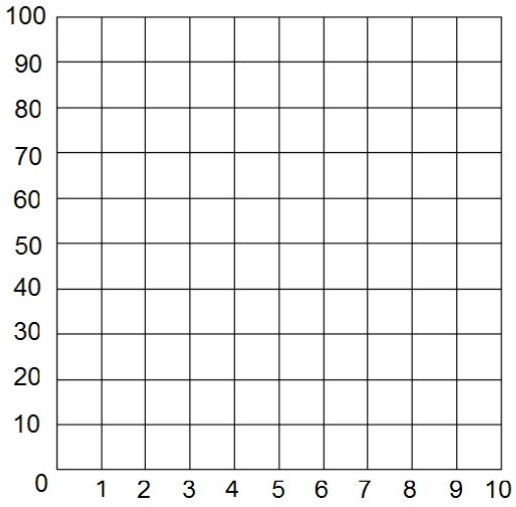
The equation that relates total cost (C) and number of hours (n) is:

$$C = 20 + 10n$$

Label the independent and dependent variable axes on the graph by dragging the appropriate variables (letters) from the equation.

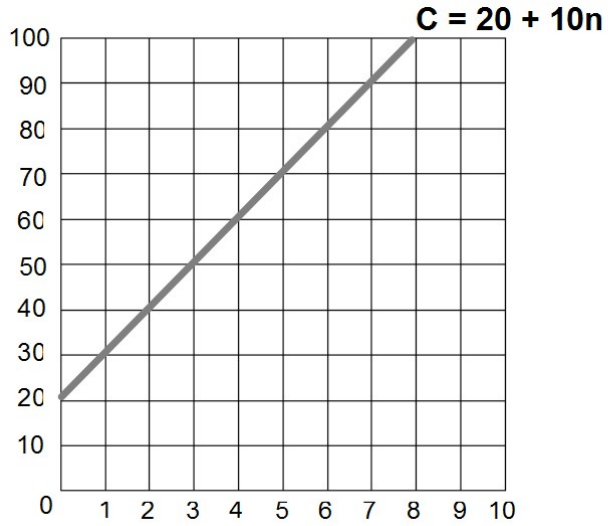
The red data point (●) represents the initial charge. Drag this data point to its appropriate position on the graph.

The blue data point (●) represents the total cost for each hour that is worked. Drag the data point to show the cost after 1, 2, 3, 4, 5, 6, 7 and 8 hours.



Another plumber charges an initial fee of $10 plus $20 per hour.

$C = 10 + 20n$



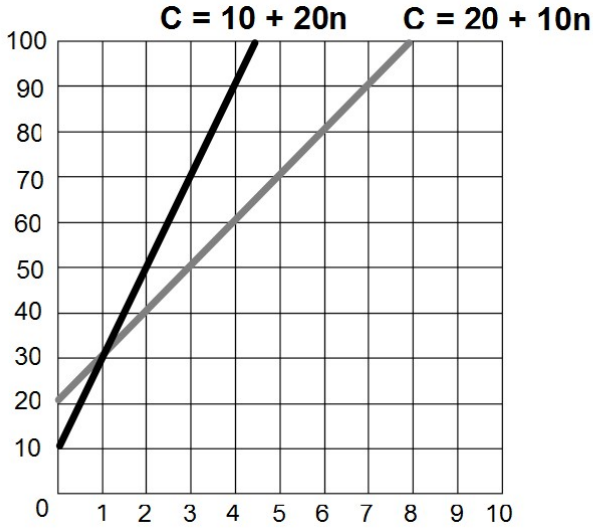
Label each axis.

Drag the red data point to the position on the graph that represents the initial cost.

Drag the blue data point to the positions on the graph that represent the new cost after each hour.

A third plumber charges an initial fee of $40 plus $5 per hour.

$C = 40 + 5n$

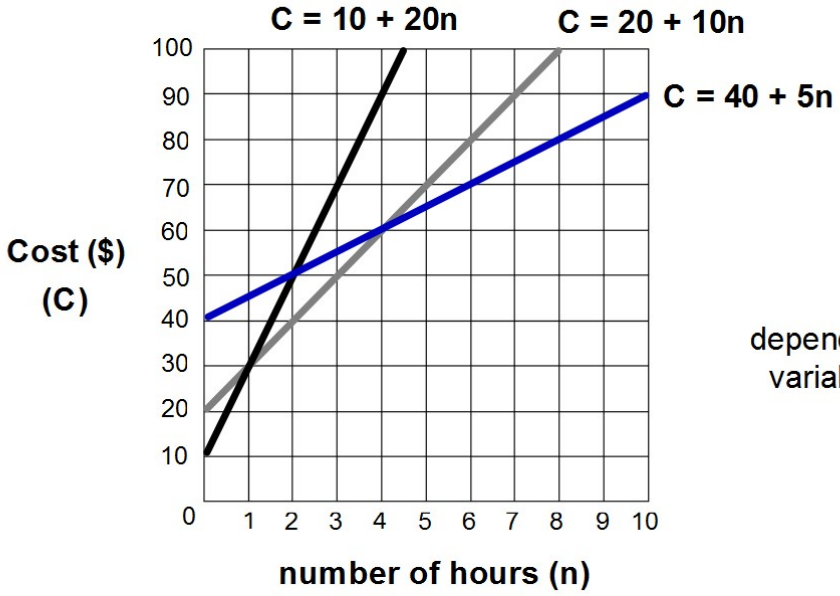


Label each axis.

Drag the red data point to the position on the graph that represents the initial cost.

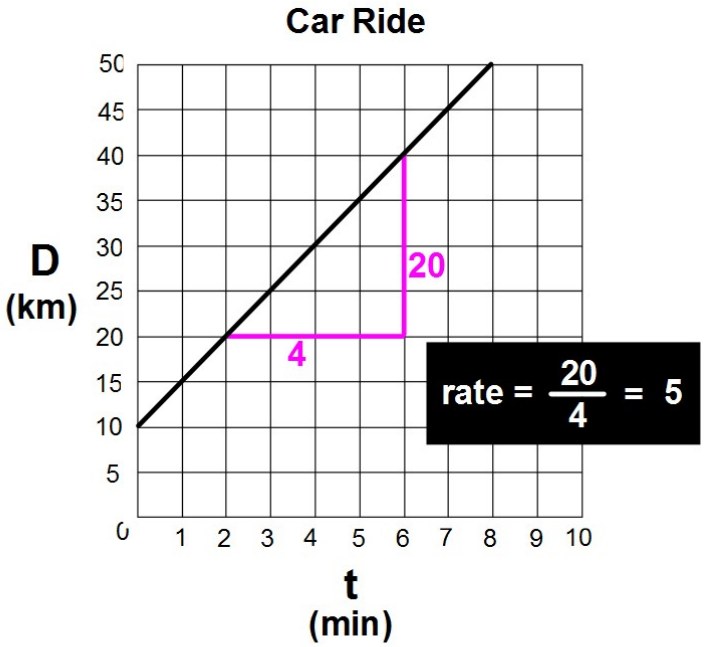
Drag the blue data point to the positions on the graph that represent the new cost after each hour.

Summary:



dependent variable = initial value + rate x independent variable

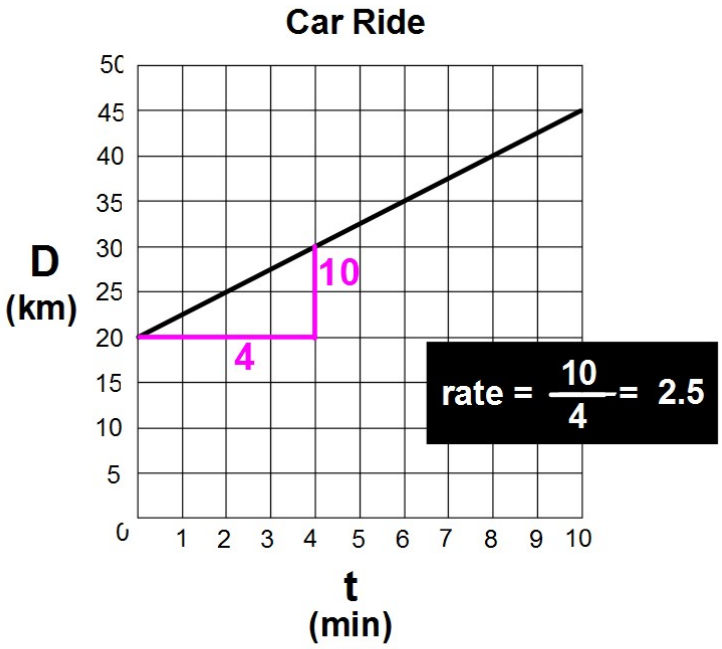
The graph shows the relationship between distance (D) and time (t) for a car ride.



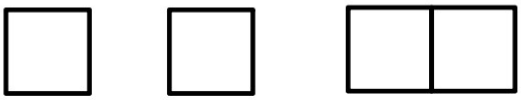
Drag the appropriate **numerical values** and **variables** *from the graph to* show what the equation is that relates distance and time:

= + − x ÷

The graph shows the relationship between distance (D) and time (t) for a car ride.



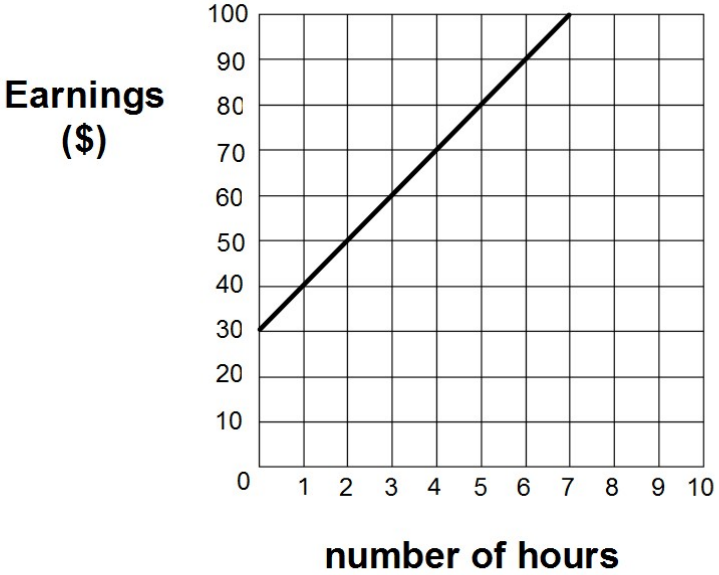
Drag the appropriate **numerical values** and **variables** *from the graph to* show what the equation is that relates distance and time:



= + − x ÷

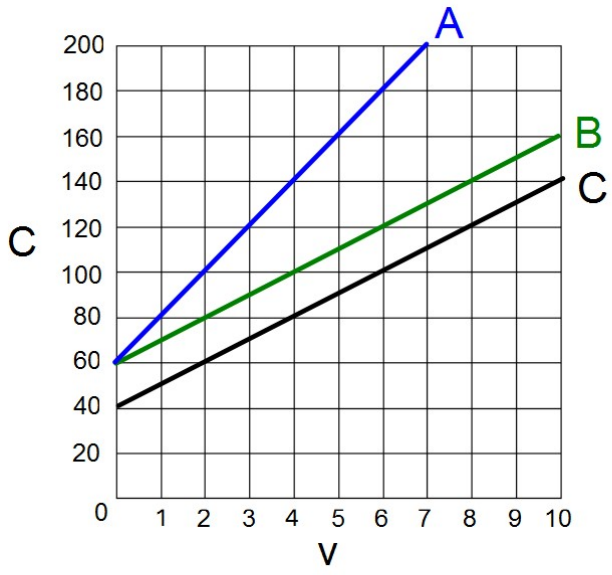
What is the equation of the line shown on the graph below:

Remember to define your variables!



A gym pass costs $60 plus an additional rate of $10 per visit.

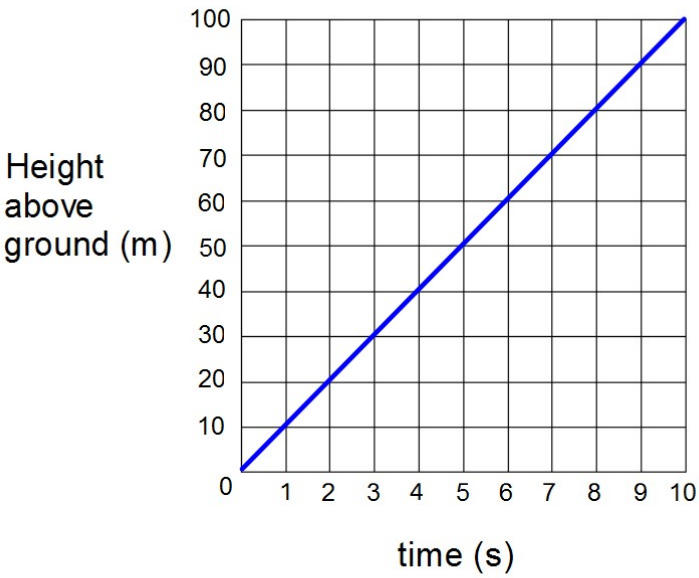
The equation that relates the total cost (C) for a gym pass and the number of visits (v) is:



Which of the lines shows this relationship?

Justify your answer!

The graph shows how the height of a rocket changes with time...



Which of the equations matches the relationship shown by the graph? ***Justify your answer!***

H = 20 + 10t

H = 10t

H = 10 + 10t

H = 100

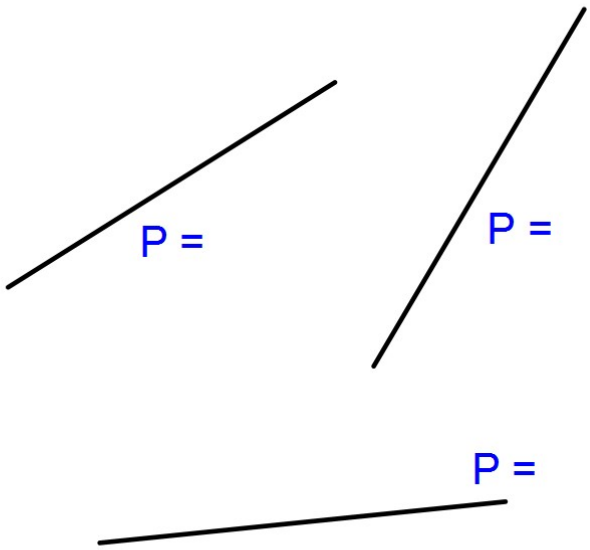
The hourly pay rates (P) for three employees are shown by the three equations and lines below.

Drag the equations to the corresponding lines.

P = 12.50t

P = 2.00t

P = 25.00t



Drag the variables to the axes on the graph to show possible relationships.

Cost

Number of guests

Earnings

Number of hours

Time

Distance

Height

Number of games played