MTH1W Grade 9 Mathematics

3.3 A Closer Look at Rate of Change

Goal(s) *- To determine rate of change from a statement, a table of values, and a graph*

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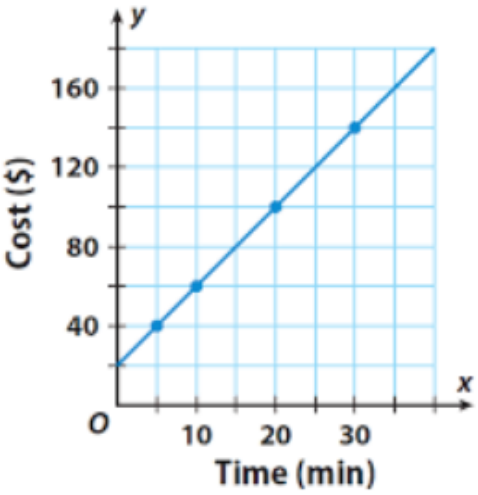
Determining Rate of Change from a Graph



Select two points. Beginning with the left most point:

- count the **vertical change** (up or down)

- count the **horizontal change** (count to the right!)

- state as a **ratio** $\frac{\text{vertical change}}{\text{horizontal change}}$

Remember to look at the increments on both scales!!

Determining Rate of Change from a Table of Values

- the **first differences** represent the vertical change on the graph

- the **change of the independent variable** represents the horizontal change on the graph

- state as a **ratio** $\frac{\text{vertical change}}{\text{horizontal change}}$

x	y	1st Differences
-2	10	
0	7	-3
2	4	-3
4	1	-3
6	-2	-3

(2 between each pair of x-values)

Vertical change $= -3$

Horizontal change $= 2$

$\Rightarrow$ Ratio (rate of change) $= \frac{-3}{2}$

Determining Rate of Change from a Statement

- identify the independent and dependent variable

- express as a rate $\frac{y}{x}$

- where possible, express as a **unit rate**

where the change in x is one

A mobile phone plan costs \$110 for two months of service.

$= 110 \div 2 = \$55$ per month

A cistern is losing water at a rate of 250 L every 5 minutes.

$= 250 \div 5 = 50$ L/min

The table shows the amount a printing company charges for advertising flyers.

a) Identify the independent and dependent variables.

b) Determine the cost to print 1 flyer.

c) What is the cost to produce 1000 flyers?

d) How many flyers can be produced for $280?

initial value

Number of Flyers (n)	Cost (C)
0	100
100	120
200	140
300	160

100 < 0, 100 | 100, 120 > 20

a) Independent (number of flyers, n)
Dependent (Cost, $)

b) $\frac{\text{change in \$}}{\text{change in n}} = \frac{120-100}{100-0} = \frac{20}{100}$
$= \$0.20$ per flyer

c) 1 flyer = $0.20 + initial cost
$\Rightarrow 1000 \times \$0.20 + \$100 = \$300$

d) $0.20 \times n + 100 = 280$
$0.2n + 100 - 100 = 280 - 100$
$\frac{0.2n}{0.2} = \frac{180}{0.2}$ $n = 900$ flyers