Nov 22/13

MFM 1PI **Slopes And Equations Of Lines Review Note**

1 Slopes Of Line Segments

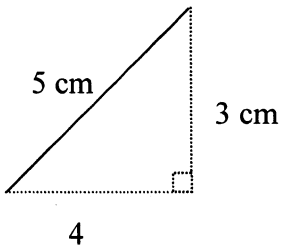
Ex. SLOPE is a measure of steepness

Ex. State 2 formulas for SLOPE.

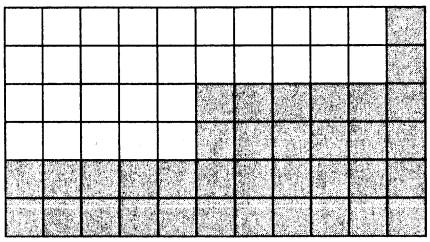
a) slope = $\frac{\text{rise}}{\text{run}}$ b) slope = $\frac{\Delta y}{\Delta x}$

Ex. State the slope of the following:

a)



b)



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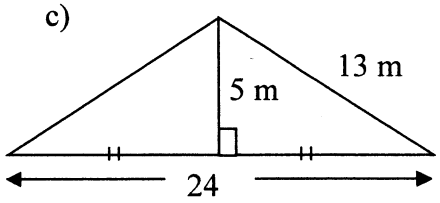


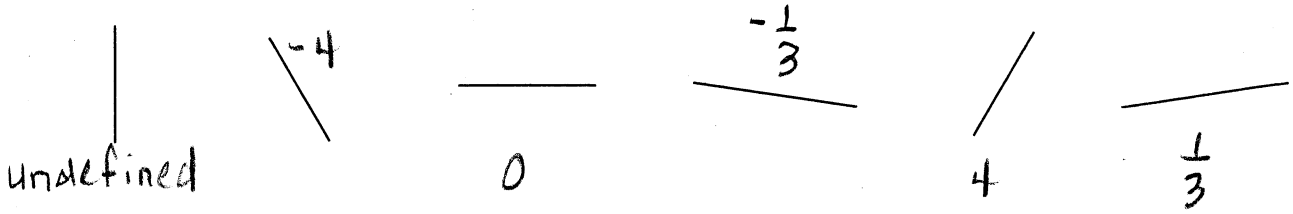
Slope = $\frac{\text{rise}}{\text{run}}$ = $\frac{3}{4}$

Slope = $\frac{\text{rise}}{\text{run}}$ = $\frac{2}{5}$

Slope = $\frac{\text{rise}}{\text{run}}$ = $\frac{5}{12}$

Ex. Slopes are given below. Match the slope with the line segment in the space below the line segment.

slopes: 4 $\frac{-1}{3}$ Undefined $\frac{1}{3}$ 0 -4



match:

Ex. Determine the **slope** between the given co-ordinates. State the formula.
Show your work. Answers in lowest terms.

a) A(7, 6), B(3, 1)

$\text{Slope} = \frac{\Delta y}{\Delta x}$

$= \frac{(6)-(1)}{(7)-(3)}$

$= \frac{5}{4}$

b) C(2, 3), D(–10, 6)

$\text{Slope} = \frac{\Delta y}{\Delta x}$

$= \frac{(3)-(6)}{(2)-(-10)}$

$= \frac{-3}{12}$

$= -\frac{1}{4}$

c) E(5, –4,), F(–2, –8)

$\text{Slope} = \frac{\Delta y}{\Delta x}$

$= \frac{(-4)-(-8)}{(5)-(-2)}$

$= \frac{4}{7}$

2 Graphing Lines Using Slope and y-intercept

Ex. i) State the slope and y–intercept for each line.
ii) Graph two lines per grid below using the slope and y–intercept.

a) $y = \frac{2}{3}x - 5$

slope = $\frac{2}{3}$

y-int = -5

b) $y = -3x + 4$

slope = $\frac{-3}{1}$

y-int = 4

c) $y = x + 2$

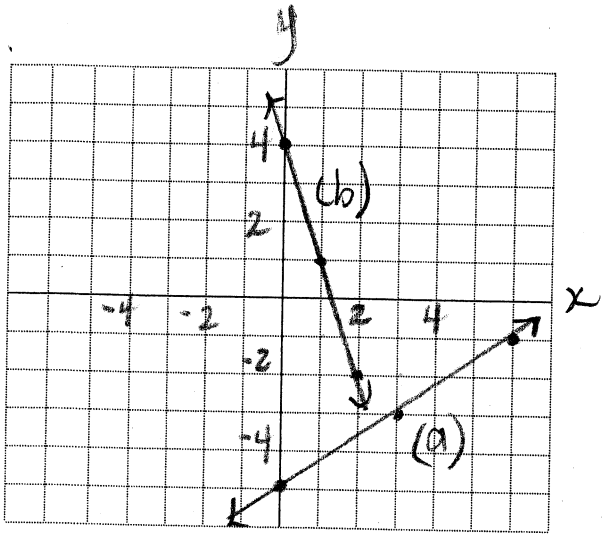
slope = 1

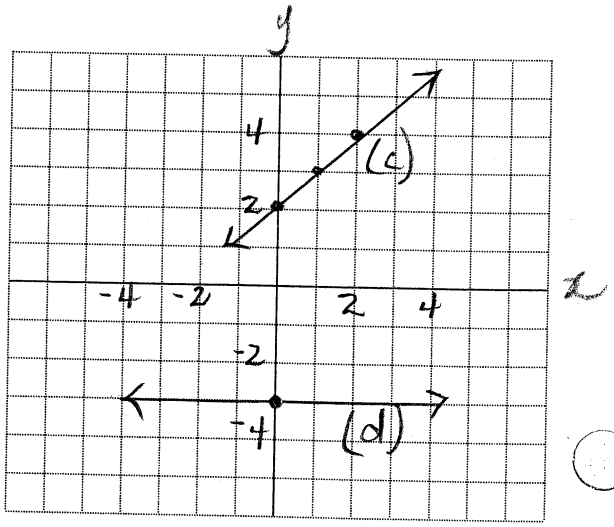
y-int = 2

d) $y = -3$

slope = 0

y-int = -3

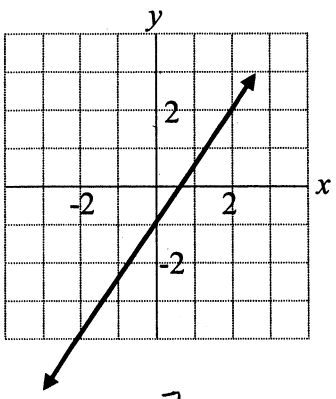




3 Writing the Equation Of A Line Given the Graph

Ex. Write the **equation of each line** by stating the slope and y-intercept of the graph.

a)

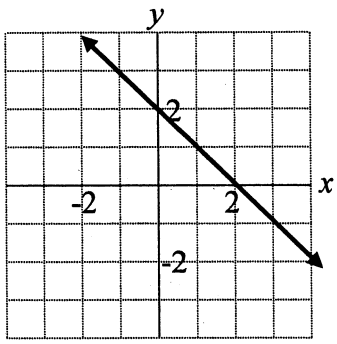


slope = $\frac{3}{2}$

y-int = -1

equation : $y = \frac{3}{2}x - 1$

b)

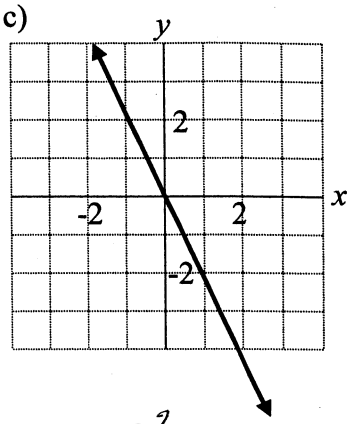


slope = $\frac{-2}{2} = -1$

y-int = 2

$y = -x + 2$

c)



slope = $\frac{-2}{1} = -2$

y-int = 0

$y = -2x$

4 Applications Of Slope

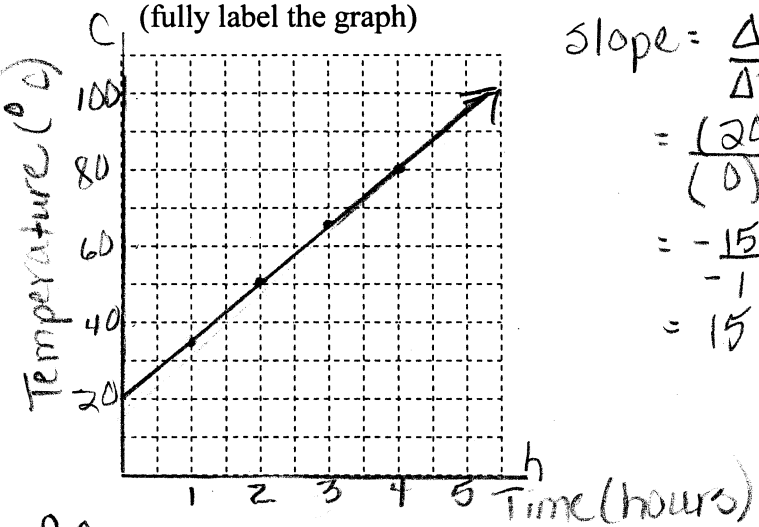
Ex. A water heater supply company claims that it's water tank will take 4 hours to heat cold water to the required hot water temperature. The temperature increases by 15°C / hour and starts at 20°C.

a) Complete the table of values.

x y

Number of Hours	Temperature (°C)
0	20
1	35
2	50
3	65
4	80

b) Graph the ordered pairs. (fully label the graph)



c) Determine the slope of the line.

$\text{slope} = \frac{\Delta y}{\Delta x}$

$= \frac{(20) - (35)}{(0) - (1)}$

$= \frac{-15}{-1}$

$= 15$

d) State the units of the rise: °C

State the units of the run: hours

State slope with units: 15°C/hour

e) State the units of the y-intercept: °C

State the y-intercept with units: 20°C

f) Does the line pass through the origin? no

g) This is called partial variation.

Ex. Linda burns 65 kiloJoules / minute when dancing.
Write an equation to represent E, the energy burned in kiloJoules for T, the time in minutes.

Slope with units: 65 kj/minute

y–intercept with units 0 kj

Equation: $E = 65T$

This is called direct variation.

Ex. The amount of gas remaining in the tank of a large truck can be calculated using the following formula:
$V = 250 - 0.12d$ where V is the volume of gas in litres left in the tank and d is the distance driven in kilometres.

a) State units of V: Litres

b) State units of d: km

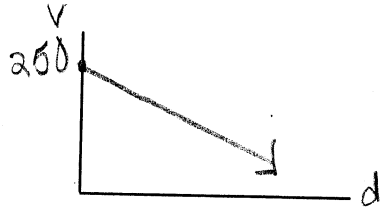
c) State the slope with units: -0.12 L/km

d) What does the slope mean in words: decrease of 0.12 L for each km

e) State the y–intercept with units: 250 Litres

f) What does the y-intercept mean in words: starting # of litres in the tank

g) Sketch a graph using slope and y–intercept. (label the axes and y-intercept)



i) What volume of gas remains after travelling 850 kilometres?

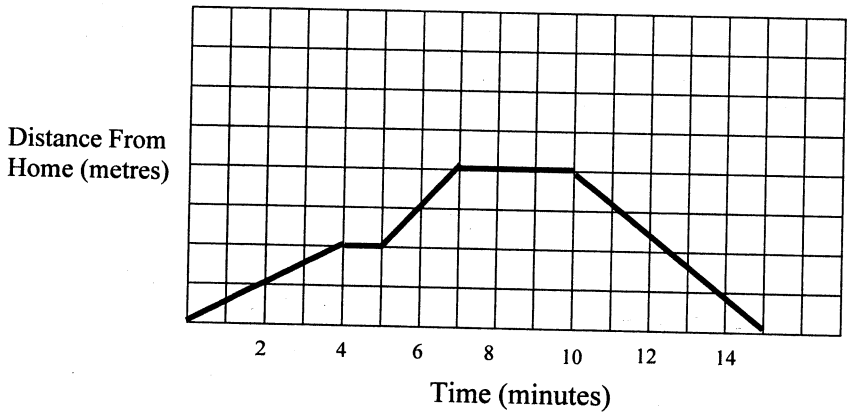
$V = 250 - 0.12d$
$= 250 - 0.12(850)$
$= 250 - 102$
$= 148$

∴ the remaining volume of gas is 148 Litres.

h) What type of variation is this? partial

5 Story Graphs

Ex. The following is a graph of John's taking a trip to the park.



Write story describing John's trip to the park.

John left home walking slow. After 4 minutes he stopped for 2 minutes. He walked a bit faster for 2 minutes. Then he stayed at the park for 3 minutes and then hurried home.