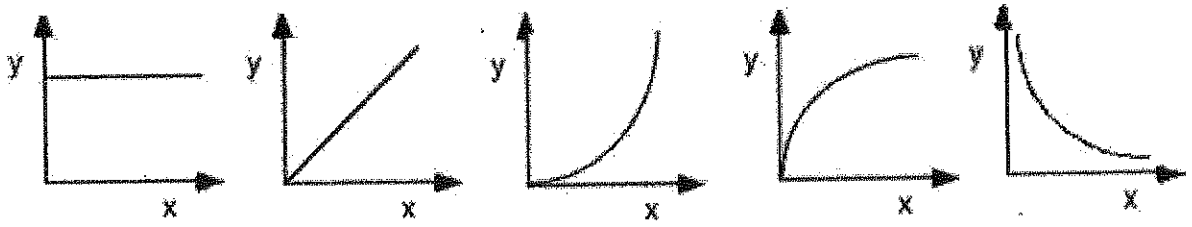
Topic 2D: Graphical Relationships

Dependent variable is represented by "y" ; Independent variable is represent by "x"

In order to identify graphical shape, solve equation in terms of dependent variable "y".

A B C D E

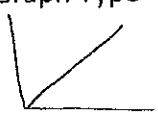


When x changes, y does not change	When x increases, y increases. The amount of increase in "y" dependent on the function of change in x (x, x^2 of $\sqrt{x}$). If x decreases, y decreases according the function of x.			When x increases, y does the opposite as a function of x.
y is not related to x	y is directly related to x	y is directly related to the square of x	y is directly related to the square root of x	y is directly related to the inverse of x or inverse square of x
If x is multiplied by 2, y does not change.	If x is multiplied by 2, y is multiplied by 2.	If x is multiplied by 2, y is multiplied by 2^2	If x is multiplied by 2, y is multiplied by $\sqrt{2}$	Inverse If x doubles, y is divided by 2 Inverse square If x doubles, y is divided by 2^2
$y \neq x$	**$y=mx$**	**$y=mx^2$**	**$y=m\sqrt{x}$**	**$y=\frac{m}{x}$ or $y=\frac{m}{x^2}$**

For each of the phenomena below:

i. Identify the equation which summarizes the relationship
ii. Rearrange in terms of the dependent variable (Assume 1st mentioned is dependent)
iii. State which graph represents the relationship (A-E)

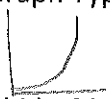
222. What happens to position (d) as time (t) increases for an object moving at equilibrium?

Equation - $d=vt$ direct Graph Type 

223. What happens to final velocity (v_f) as height (d_y) increases for an object in free-fall?

Equation - $V_f=\sqrt{2ad}$ direct square root Graph Type - 

224. What happens to the height of a fall (d_y) if the time (t) of fall increases?

Equation - $d = \frac{1}{2}at^2$ direct square Graph Type - 

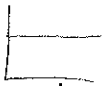
225. What happens to the time (t) of fall if the height (d_y) of fall increases for an object in free fall?

Equation - $t = \sqrt{\frac{2d}{g}}$ direct square root Graph Type - 

226. What happens to the final velocity (v_f) of a falling object as the time (t) of fall increases?

Equation - $V_f = at$ direct Graph Type – 

227. What happens the magnitude of the gravitational field (g) as the time of fall (t) increases?

Equation - $g = 9.81 m/s^2$ Graph Type - 

228. What happens to the time (t) of fall for an object as the strength of the gravitational field (g) increases when dropped from the same height on various planets?

Equation - $t = \sqrt{\frac{2d}{g}}$ Graph Type – 

For each of the following questions, find the equation that relates the variables and solve by applying the type of relationship. Ie direct, direct square, direct square root.

229. An object dropped from a height of 5m falls in 2 seconds on planet x. What is the height if it falls for 6 seconds on the same planet?

$d = \frac{1}{2}at^2$ $t \times 3$ so $d \times 3^2$ direct square $5m \times 9 = 45m$

230. The final velocity for an object that falls of 12 seconds on Mars is 43.2 m/s. What is the final velocity for an object that falls for 6 seconds on Mars?

$V_f = at$ $t \div 2$ direct $V_f \div 2$ $\frac{43.2 m/s}{2}$

233. An object moving at equilibrium for 5 seconds covers a distance of 20m. What distance will it cover in 15 seconds?

$d = vt$ direct $t \times 3$ $d \times 3$ $(20m) \times 3 = 60m$

234. An acorn takes 0.8 seconds to fall from a height of 3.2m. How much time will it take to fall from 9.6m?

$d = \frac{1}{2}at^2$ $t \times 3$ $d \times 3^2$ $(3.2m)(9) = 28.8m$