



Name: Wm Rm Hm (27)

Class: 3E1

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MA303.2.X1 – Semi-Log Graphs

Understanding the magnitude of an earthquake

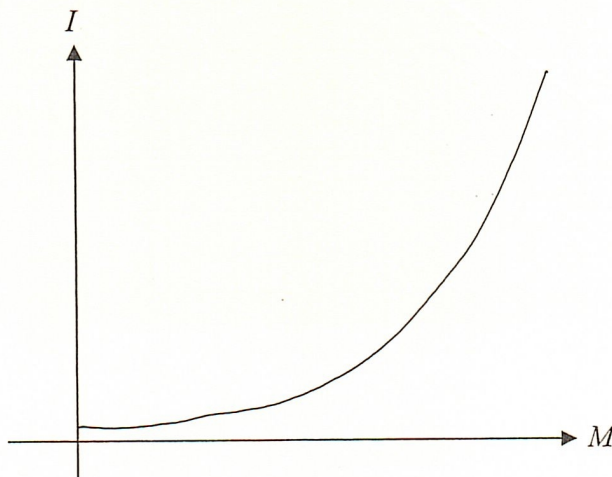
When an earthquake occurs, the most commonly used indicator to describe the strength of the earthquake is the Richter scale. The scale is a set of numbers typically measured from 2 to 9.

Every increase of 1 in the scale actually represents a 10 times increase in the strength of the earthquake. In other words, a scale of 4.0 is 10 times stronger than 3.0, a 5.0 earthquake is 10 times stronger than a 4.0 earthquake, and so on.

Hence, the relationship is exponential:

$$I = k(10^M)$$

where I measures the intensity, M is the magnitude of the earthquake, and k is an arbitrary constant.

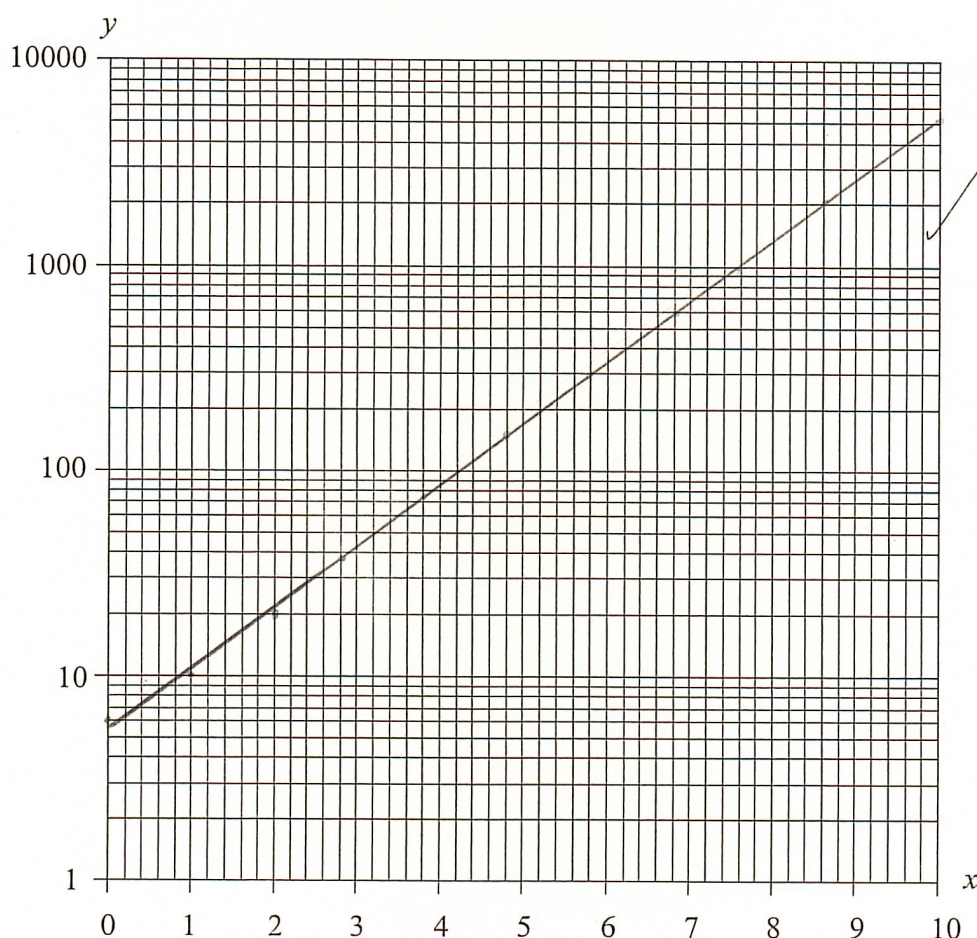


The semi-log graph

S1. Consider the equation $y = 5(2)^x$.

Using the axes shown below, plot the points for integral x between 0 and 10 (inclusive) and join the points. What do you observe?

x	0	1	2	3	4	5	6	7	8	9	10
y	5	10	20	40	80	160	320	640	1280	2560	5120



The above is an illustration of the semi-log graph, a special graph that shows the exponential increase on a non-linear scale. What advantages can you find using such scales?

No need for linear law.