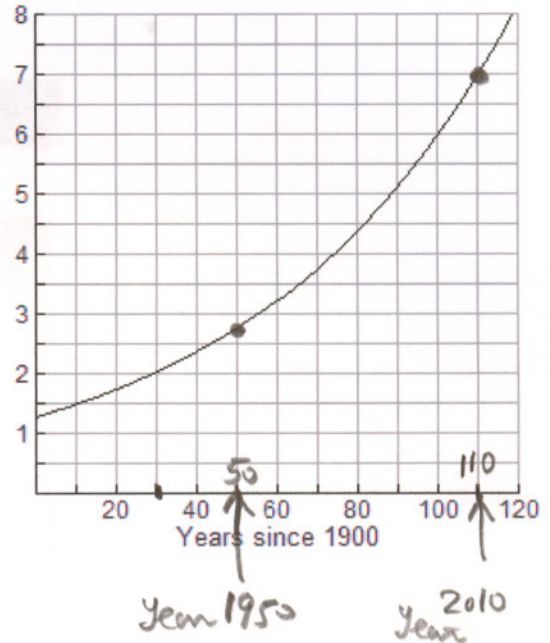


1. The graph shown models  $W(t)$ , the world population (in billions), where  $t$  is measured in years since 1900. Use this graph to estimate the average rate of change in the world population from 1950 to 2010 and write a sentence interpreting your result. Be sure to use appropriate units in your answer.

World Population in Billions



$(1950, 2.75)$

$(2010, 7)$

$$m = \frac{7 - 2.75}{2010 - 1950} = 0.0708 \frac{\text{Billion}}{\text{year}}$$

Therefore, the average rate of change in world population from 1950 to 2010 was 0.0708 Billion people per year.

2. If a ball is projected vertically upward from the surface of the moon with a speed of 64 ft/s, its height in feet after  $t$  seconds is given by  $h(t) = -2.6t^2 + 64t$ .
- (a) Find the average speed of the ball during each of the following time intervals. Use **appropriate units in your answers**. Write your answers correct to at least two decimal places.

<p>(i) <math>[5, 5.5]</math> <math>(5, 255)</math> <math>(5.5, 273.35)</math></p> $m = \frac{273.35 - 255}{5.5 - 5} = 36.7 \frac{\text{ft}}{\text{sec}}$	<p>(ii) <math>[5, 5.1]</math> <math>(5, 255)</math> <math>(5.1, 258.774)</math></p> $m = \frac{258.774 - 255}{5.1 - 5} = 37.74 \frac{\text{ft}}{\text{sec}}$
<p>(iii) <math>[5, 5.01]</math> <math>(5, 255)</math> <math>(5.01, 255.37974)</math></p> $m = \frac{255.37974 - 255}{5.01 - 5} = 37.974 \frac{\text{ft}}{\text{sec}}$	<p>(iv) <math>[5, 5.001]</math> <math>(5, 255)</math> <math>(5.001, 255.038)</math></p> $m = \frac{255.038 - 255}{5.001 - 5} = 38 \frac{\text{ft}}{\text{sec}}$

- (b) Estimate the speed when  $t = 5$  seconds.

speed at  $t = 5$  seconds is approximately  $38 \frac{\text{ft}}{\text{sec}}$