Assignment-1

AI1110: Probability And Random Variables
IIT Hyderabad

Shivanshu Ai21btech11027
March 30,2022

Q7(b) The model of a building is constructed with the scale factor 1:30.

(i) If the height of the model is 30 cm,find the actual height of the building in meters.

(ii) If the actual volume of the tank at the top of the building is $27m^2$,find the volume of the tank at the top of the model.

Solution:-
(i) Given height of model building = 80cm
Also the given scale factor is 1:30

$$\rightarrow 1:30 = \textit{Model height : Actual height} \quad (1)$$
$$\rightarrow \textit{Actual height} = \textit{Model height} \times 30 \quad (2)$$
$$\rightarrow \textit{Actual height} = 80 \times 30 = 2400cm. \quad (3)$$

(ii) Actual volume of $tank = 27m^2$
and given scale factor is $1:30$

$$\frac{1}{30} = \frac{\textit{Model height}}{\textit{Actual height}} \quad (4)$$
$$\frac{1}{30} = \frac{\textit{Model width}}{\textit{Actual width}} \quad (5)$$
$$\frac{1}{30} = \frac{\textit{Model length}}{\textit{Actual length}} \quad (6)$$

As we know that,

$$volume = length \times width \times height \quad (7)$$

So,

$$\frac{1}{30 \times 30 \times 30} = \frac{\textit{Model volume}}{\textit{Actual volume}} \quad (8)$$
$$\textit{Model volume} = \frac{\textit{Actual volume}}{27000} \quad (9)$$
$$\textit{Model volume} = \frac{27}{27000} = 0.001m^2 \quad (10)$$

on converting it into centimeter square = 0.001×10^6
volume of model tank $= 1000cm^2$