

HARMONIC MEAN

* HARMONIC MEAN — "The harmonic mean of a series is the reciprocal of the arithmetic mean of the reciprocal of the individual numbers."

* IF there are n terms as $x_1, x_2, x_3, \dots, x_n$ then the Harmonic mean —

$$H.M. = \frac{N}{\frac{1}{x_1} + \frac{1}{x_2} + \frac{1}{x_3} + \dots + \frac{1}{x_n}}$$

$$H.M. = \text{Reciprocal of } \left(\frac{\sum \text{Reciprocal}}{N} \right)$$

Ex-8. Calculate H.M. from the following data.
6, 10, 15, and 20

Solution —

$$\begin{aligned} H.M. &= \frac{N}{\frac{1}{x_1} + \frac{1}{x_2} + \frac{1}{x_3} + \frac{1}{x_4}} \\ &= \frac{4}{\frac{1}{6} + \frac{1}{10} + \frac{1}{15} + \frac{1}{20}} \\ &= \frac{4}{0.1667 + 0.10 + 0.066 + 0.05} \end{aligned}$$

$$H.M. = \frac{4}{0.3834}$$

$$\therefore H.M. = 10.43 \quad \} .$$

second solution

x	Reciprocal ($\frac{1}{x}$)
6	0.1667
10	0.1000
15	0.0667
20	0.0500
N=4	$\Sigma \text{Reciprocal}(\frac{1}{x}) = 0.3834$

$$\therefore H.M. = \text{Rec. of } \left(\frac{\Sigma \text{Reciprocal}}{N} \right)$$

$$= \text{Reciprocal of } \left(\frac{0.3834}{4} \right)$$

$$= \frac{4}{0.3834}$$

$$H.M. = 10.43 \quad \} .$$