Inverse Proportion

Understanding of Inverse Proportion

- Two quantities are said to be in inverse proportion when an increase in one quantity results in a proportional decrease in the other and vice-versa.
- If x and y are two quantities, then $x \times y$ = constant or $x_1 \times y_1 = x_2 \times y_2$.
- In inverse proportion, the product of the two quantities remains the same.

Important Points

- If $x \times y = k$ (constant), then x and y are in inverse proportion
- More x means less y, and less x means more y
- Graph of inverse proportion is a curve, not a straight line
- **Formula used:** $x_1 \times y_1 = x_2 \times y_2$
- Use cross multiplication method to find unknown values

Examples with Solutions

Example: Men and Days

➢ **8 men can build a wall in 15 days. How many days will 12 men take to build the same wall?**

Solution: $8 \times 15 = 12 \times x$

$120 = 12x$

$x = 10$ days

Example: Workers and Work Time

➢ **20 workers can complete a work in 30 days. How many workers are required to finish it in 15 days?**

Solution: $20 \times 30 = x \times 15$

$600 = 15x$

$x = 40$ workers

Example: Speed and Time

- **A car takes 6 hours to cover a distance at 50 km/h. How long will it take at 75 km/h?**

Solution: $50 \times 6 = 75 \times x$

$300 = 75x$

$x = 4$ hours

Example: Number of Pipes and Filling Time

- **2 pipes can fill a tank in 12 hours. How many pipes are needed to fill it in 6 hours?**

Solution: $2 \times 12 = x \times 6$

$24 = 6x$

$x = 4$ pipes

Example: Inverse Relation between Quantity and Price per kg

- **If 5 kg of rice costs ₹200, what will be the price per kg if only 2 kg is bought for the same total price?**

Solution: $5 \times 40 = 2 \times x$ (since price per kg × quantity = total price)

$200 = 2x$

$x = 100$

Price per kg = ₹100

Summary Points

- In inverse proportion, $x \times y$ remains constant
- Increase in one quantity leads to decrease in another
- Formula: $x_1 \times y_1 = x_2 \times y_2$
- Use cross multiplication to solve easily
- Graph between x and y forms a curved line