

Quantities of one kind are said to be *inversely proportional* to quantities of another kind, if the ratio of any two of the first kind is equal to the inverse ratio of the corresponding two of the other kind.

If 6 men can do a piece of work in 4 days, then 8 men can do it in 3 days, or $6 : 8$ equals the inverse ratio of $4 : 3$, *i.e.* $3 : 4$. Hence the number of men required to do some work, and the time necessary to do it, are inversely proportional.

181. *In any proportion the product of the means is equal to the product of the extremes.*

Let $a : b = c : d$,

or $\frac{a}{b} = \frac{c}{d}$.

Clearing of fractions, $ad = bc$.

182. *The mean proportional between two numbers is equal to the square root of their product.*

Let the proportion be $a : b = b : c$.

Then $b^2 = ac$. (§ 181.)

Hence $b = \sqrt{ac}$.

183. *If the product of two numbers is equal to the product of two other numbers, either pair may be made the means, and the other pair the extremes, of a proportion. (Converse of § 181.)*

If $mn = pq$, and we divide both members by nq , we have

$$\frac{m}{q} = \frac{p}{n}.$$

Ex. 1. Find x , if $6 : x = 12 : 7$.

$$12x = 42. \quad (\S 181.)$$

Hence $x = \frac{42}{12} = 3\frac{1}{2}$.

Ex. 2. Determine whether the following proportion is correct or not:

$$8 : 5 = 7 : 4\frac{3}{8}.$$

$8 \times 4\frac{3}{8} = 35$, and $5 \times 7 = 35$; hence the proportion is correct.