

## LESSON 12

# Multiplication Of Fractions (By Prime Factorizations)

Fractions can be multiplied together to get a reduced answer by writing each number as a product of primes and cancelling like primes in the numerator and denominator.

Example 1: Multiply  $\frac{52}{85} \times \frac{51}{91}$

- First Factor Into Primes
- Next Cancel Like Primes In The Numerator  
With Those In the Denominators.

$$\frac{52}{85} \times \frac{51}{91} = \frac{2 \times 2 \times \cancel{13}}{5 \times \cancel{17}} \times \frac{3 \times \cancel{17}}{7 \times \cancel{13}} = \frac{12}{35}$$

## Find A Reduced Answer By Making Products Of Primes

1. $\frac{38}{69} \times \frac{46}{57} =$	$\frac{2 \times \cancel{19}}{3 \times \cancel{23}} \times$	$\frac{2 \times \cancel{23}}{3 \times \cancel{19}}$	$= \frac{4}{9}$
2. $\frac{17}{69} \times \frac{23}{51} =$	$\frac{1 \times 17}{3 \times 23} \times$	$\frac{1 \times 23}{3 \times 17}$	$= \frac{1}{9}$
3. $\frac{31}{58} \times \frac{29}{62} =$	$\frac{1 \times 31}{2 \times 29} \times$	$\frac{1 \times 29}{2 \times 31}$	$= \frac{1}{4}$
4. $\frac{69}{91} \times \frac{13}{92} =$	$\frac{3 \times 23}{7 \times 13} \times$	$\frac{1 \times 13}{2 \times 2 \times 23}$	$= \frac{3}{28}$
5. $\frac{11}{51} \times \frac{34}{33} =$	$\frac{1 \times 11}{3 \times 17} \times$	$\frac{2 \times 17}{3 \times 11}$	$= \frac{2}{9}$
6. $\frac{37}{87} \times \frac{58}{74} =$	$\frac{1 \times 37}{3 \times 29} \times$	$\frac{2 \times 29}{2 \times 37}$	$= \frac{1}{3}$
7. $\frac{19}{65} \times \frac{41}{95} =$	$\frac{1 \times 19}{5 \times 13} \times$	$\frac{1 \times 41}{5 \times 19}$	$= \frac{41}{325}$
8. $\frac{22}{93} \times \frac{62}{55} =$	$\frac{2 \times 11}{3 \times 31} \times$	$\frac{2 \times 31}{5 \times 11}$	$= \frac{4}{15}$
9. $\frac{33}{68} \times \frac{34}{55} =$	$\frac{3 \times 11}{2 \times 2 \times 17} \times$	$\frac{2 \times 17}{5 \times 11}$	$= \frac{3}{10}$
10. $\frac{23}{34} \times \frac{17}{46} =$	$\frac{1 \times 23}{2 \times 17} \times$	$\frac{1 \times 17}{2 \times 23}$	$= \frac{1}{4}$

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11.	$\frac{57}{82} \times \frac{41}{95} =$	$\frac{3 \times 19}{2 \times 41} \times$	$\frac{1 \times 41}{5 \times 19}$	$= \frac{3}{10}$
12.	$\frac{38}{85} \times \frac{34}{76} =$	$\frac{2 \times 19}{5 \times 17} \times$	$\frac{2 \times 17}{2 \times 2 \times 19}$	$= \frac{1}{5}$
13.	$\frac{46}{77} \times \frac{55}{92} =$	$\frac{2 \times 23}{7 \times 11} \times$	$\frac{5 \times 11}{2 \times 2 \times 23}$	$= \frac{5}{14}$
14.	$\frac{29}{51} \times \frac{68}{87} =$	$\frac{1 \times 29}{3 \times 17} \times$	$\frac{2 \times 2 \times 17}{3 \times 29}$	$= \frac{4}{9}$
15.	$\frac{13}{22} \times \frac{77}{78} =$	$\frac{1 \times 13}{2 \times 11} \times$	$\frac{7 \times 11}{2 \times 3 \times 13}$	$= \frac{7}{12}$
16.	$\frac{33}{68} \times \frac{17}{77} =$	$\frac{3 \times 11}{2 \times 2 \times 17} \times$	$\frac{1 \times 17}{7 \times 11}$	$= \frac{3}{28}$
17.	$\frac{55}{67} \times \frac{13}{88} =$	$\frac{5 \times 11}{1 \times 67} \times$	$\frac{1 \times 13}{2 \times 2 \times 2 \times 11}$	$= \frac{65}{536}$
18.	$\frac{13}{53} \times \frac{17}{26} =$	$\frac{1 \times 13}{1 \times 53} \times$	$\frac{1 \times 17}{2 \times 13}$	$= \frac{17}{106}$
19.	$\frac{61}{99} \times \frac{55}{97} =$	$\frac{1 \times 19}{3 \times 3 \times 11} \times$	$\frac{5 \times 11}{1 \times 97}$	$= \frac{305}{873}$
20.	$\frac{76}{83} \times \frac{71}{95} =$	$\frac{2 \times 2 \times 19}{1 \times 83} \times$	$\frac{1 \times 71}{5 \times 19}$	$= \frac{284}{415}$

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21.	$\frac{79}{88} \times \frac{77}{97} =$	$\frac{1 \times 79}{2 \times 2 \times 2 \times 11} \times$	$\frac{7 \times 11}{1 \times 97}$	$= \frac{553}{776}$
22.	$\frac{67}{85} \times \frac{17}{61} =$	$\frac{1 \times 67}{5 \times 17} \times$	$\frac{1 \times 17}{1 \times 61}$	$= \frac{67}{305}$
23.	$\frac{44}{97} \times \frac{51}{55} =$	$\frac{2 \times 2 \times 11}{1 \times 97} \times$	$\frac{3 \times 17}{5 \times 11}$	$= \frac{204}{485}$
24.	$\frac{58}{83} \times \frac{31}{87} =$	$\frac{2 \times 29}{1 \times 83} \times$	$\frac{1 \times 31}{3 \times 29}$	$= \frac{62}{249}$
25.	$\frac{68}{77} \times \frac{11}{85} =$	$\frac{2 \times 2 \times 17}{7 \times 11} \times$	$\frac{1 \times 11}{5 \times 17}$	$= \frac{4}{35}$
26.	$\frac{11}{89} \times \frac{23}{88} =$	$\frac{1 \times 11}{1 \times 89} \times$	$\frac{1 \times 23}{2 \times 2 \times 2 \times 11}$	$= \frac{23}{712}$
27.	$\frac{33}{37} \times \frac{29}{88} =$	$\frac{3 \times 11}{1 \times 37} \times$	$\frac{1 \times 29}{2 \times 2 \times 2 \times 11}$	$= \frac{87}{296}$
28.	$\frac{13}{68} \times \frac{17}{39} =$	$\frac{1 \times 13}{2 \times 2 \times 17} \times$	$\frac{1 \times 17}{3 \times 13}$	$= \frac{1}{12}$
29.	$\frac{33}{41} \times \frac{83}{99} =$	$\frac{3 \times 11}{1 \times 41} \times$	$\frac{1 \times 83}{3 \times 3 \times 11}$	$= \frac{83}{123}$
30.	$\frac{38}{43} \times \frac{86}{95} =$	$\frac{2 \times 19}{1 \times 43} \times$	$\frac{2 \times 43}{5 \times 19}$	$= \frac{4}{5}$