Multiplication of rational numbers:

If $\frac{a}{b}$ and $\frac{c}{d}$ are any two rational numbers, then

$\frac{a}{b} \times \frac{c}{d} = \frac{a \times b}{b \times d}$

i.e. the product of two rational numbers = $\frac{\text{product of their numerators}}{\text{product of their denominators}}$ multiply:

a) $\frac{3}{4}$ by $\frac{3}{7}$ b) $\frac{-4}{7}$ by $\frac{14}{3}$ c) $\frac{13}{5}$ by $\frac{-25}{91}$ d) $\frac{-8}{25}$ by $\frac{15}{16}$

Simplify the following:

a) $\left(\frac{1}{3} \times \frac{1}{2}\right) + \left(\frac{1}{2} \times \frac{1}{4}\right)$ b) $\left(\frac{-14}{5} \times \frac{20}{21}\right) - \left(\frac{15}{3} \times \frac{-9}{2}\right)$

Distributive property:

For any three rational numbers $\frac{a}{b}$, $\frac{c}{d}$, $\frac{e}{f}$, we have

$\frac{a}{b} \times \left(\frac{c}{d} + \frac{e}{f}\right) = \left(\frac{a}{b} \times \frac{e}{f}\right)$.

1. Find each of the following products:

a) $-\frac{3}{2} \times \frac{6}{7}$ b) $\frac{-12}{15} \times \frac{20}{-3}$ c) $\frac{17}{-5} \times (-10)$

d) $\frac{7}{26} \times \left(\frac{-52}{28}\right)$ e) $\frac{-15}{13} \times \frac{39}{-25}$ f) $-8 \times \frac{-17}{24}$

2. Verify each of the following :

$\frac{2}{5} \times \left(\frac{4}{9} \times \frac{3}{1}\right) = \left(\frac{2}{5} \times \frac{4}{9}\right) \times \frac{3}{1}$

3. Use the distributive property to evaluate:

a. $\frac{9}{13} \times 3\frac{1}{5} - 2\frac{1}{5} \times \frac{9}{13}$

b. $6\frac{2}{5} \times \frac{3}{7} + \frac{4}{7} \times 6\frac{2}{5}$

Division of rational numbers:

The division is the inverse of multiplication and is defined below:

If $\frac{a}{b}$ and $\frac{c}{d}$ are two rational numbers such that $\frac{c}{d} \neq 0$ then $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c}$

1. The product of two rational numbers is $\frac{-36}{5}$. If one number is $\frac{9}{16}$, what is the other number?
2. By what number should we multiply $\frac{-5}{14}$ so that the product may be $\frac{-1}{6}$?
3. Divide the sum of $\frac{2}{7}$ and $\frac{3}{5}$ by their product.
4. By what number should we divide $\frac{-63}{15}$ to get -3?
5. By what number should $\frac{-4}{35}$ be multiplied to get $\frac{8}{105}$?
6. By what number should $\frac{5}{7}$ by divided to get $\frac{-15}{56}$?
7. Divide the sum of $\frac{3}{11}$ and $\frac{2}{5}$ by their product.
8. Divide the sum of $\frac{78}{12}$ and $\frac{8}{3}$ by their difference.
9. By what number should we divide $\frac{4}{5}$ to get $\frac{8}{125}$?
10. The area of a rectangular field is $75\frac{3}{4}$ sq.m. if its breadth is $12\frac{5}{8}$m, find its length.