

1. How to divide a whole number by a Fraction?

a. If we have to divide the **whole number with the proper or improper fraction** then we will multiply that whole number with the reciprocal of the given fraction.

Example

$$2 \div \frac{9}{5} = 2 \times \frac{5}{9} = \frac{10}{9}$$

b. If we have to divide the **whole number with the mixed fraction** then we will convert it into improper fraction then multiply it's reciprocal with the whole number.

Example

$$2 \div 1\frac{4}{5} = 2 \div \frac{9}{5} = 2 \times \frac{5}{9} = \frac{10}{9}$$

2. How to divide a Fraction with a whole number?

To divide the fraction with a whole number, we have to take the reciprocal of the whole number then divide it with the whole number as usual

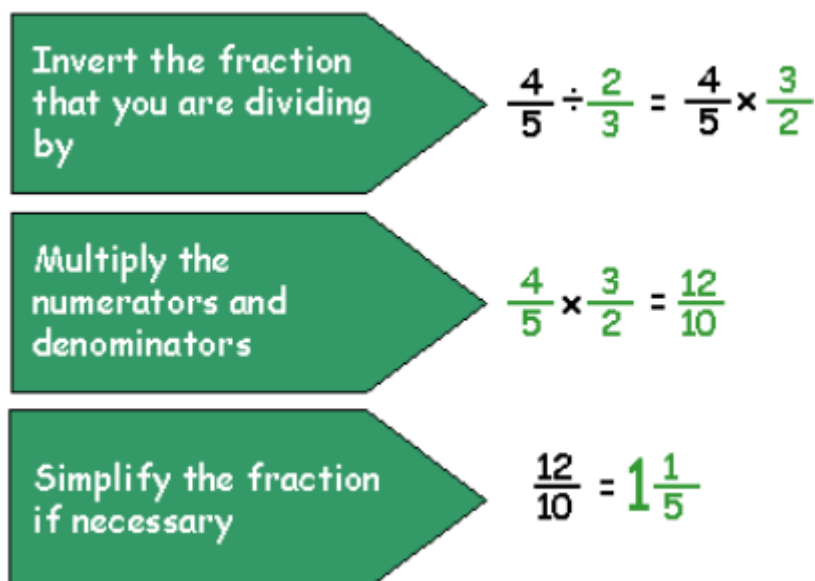
Example

$$\frac{3}{10} \div 2 = \frac{3}{10} \div \frac{2}{1} = \frac{3}{10} \times \frac{1}{2} = \frac{3}{20}$$

3. How to divide a fraction with another Fraction?

To divide a fraction with another fraction, we have to multiply the first fraction with the reciprocal of the second fraction.

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

Example

EXERCISE 2.4

1. Find:

(i) $12 \div \frac{3}{4}$

(ii) $14 \div \frac{5}{6}$

(iii) $8 \div \frac{7}{3}$

(iv) $4 \div \frac{8}{3}$

(v) $3 \div 2\frac{1}{3}$

(vi) $5 \div 3\frac{4}{7}$

Solution 1:

(i) $12 \times \frac{4}{3} = 16$

(ii) $14 \times \frac{6}{5} = \frac{84}{5} = 16\frac{4}{5}$

(iii) $8 \times \frac{3}{7} = \frac{24}{7} = 3\frac{3}{7}$

(iv) $4 \times \frac{3}{8} = \frac{3}{2} = 1\frac{1}{2}$

(v) $3 \div \frac{7}{3} = 3 \times \frac{3}{7} = \frac{9}{7} = 1\frac{2}{7}$

(vi) $5 \div \frac{25}{7} = 5 \times \frac{7}{25} = \frac{7}{5} = 1\frac{2}{5}$

2. Find the reciprocal of each of the following fractions. Classify the reciprocals as proper fractions, improper fractions and whole numbers.

(i) $\frac{3}{7}$

(ii) $\frac{5}{8}$

(iii) $\frac{9}{7}$

(iv) $\frac{6}{5}$

(v) $\frac{12}{7}$

(vi) $\frac{1}{8}$

(vii) $\frac{1}{11}$

Solution:

(i) $\frac{7}{3}$, improper fraction

(ii) $\frac{8}{5}$, improper fraction

(iii) $\frac{7}{9}$, proper fraction

(iv) $\frac{5}{6}$, proper fraction

(v) $\frac{7}{12}$, proper fraction

(vi) $\frac{8}{1}$, whole number

(vii) $\frac{11}{1}$, whole number

3. Find:

(i) $\frac{7}{3} \div 2$

(ii) $\frac{4}{9} \div 5$

(iii) $\frac{6}{13} \div 7$

(iv) $4\frac{1}{3} \div 3$

(v) $3\frac{1}{2} \div 4$

(vi) $4\frac{3}{7} \div 7$

Solution:

i) $\frac{7}{3} \div 2 = \frac{7}{3} \times \frac{1}{2} = \frac{7}{6} = 1\frac{1}{6}$

ii) $\frac{4}{9} \div 5 = \frac{4}{9} \times \frac{1}{5} = \frac{4}{45}$

iii) $\frac{6}{13} \div 7 = \frac{6}{13} \times \frac{1}{7} = \frac{6}{91}$

$$\text{iv) } 4\frac{1}{3} \div 3 = 4\frac{1}{3} \times \frac{1}{3} = \frac{13}{3} \times \frac{1}{3} = \frac{13}{9} = 1\frac{4}{9}$$

$$\text{v) } 3\frac{1}{2} \div 4 = 3\frac{1}{2} \times \frac{1}{4} = \frac{7}{2} \times \frac{1}{4} = \frac{7}{8}$$

$$\text{vi) } 4\frac{3}{7} \div 7 = 4\frac{3}{7} \times \frac{1}{7} = \frac{31}{7} \times \frac{1}{7} = \frac{31}{49}$$

4. Find:

$$\text{(i) } \frac{2}{5} \div \frac{1}{2} \quad \text{(ii) } \frac{4}{9} \div \frac{2}{3} \quad \text{(iii) } \frac{3}{7} \div \frac{8}{7} \quad \text{(iv) } 2\frac{1}{3} \div \frac{3}{5} \quad \text{(v) } 3\frac{1}{2} \div \frac{8}{3}$$

$$\text{(vi) } \frac{2}{5} \div 1\frac{1}{2} \quad \text{(vii) } 3\frac{1}{5} \div 1\frac{2}{3} \quad \text{(viii) } 2\frac{1}{5} \div 1\frac{1}{5}$$

Solution:

$$\text{i) } \frac{2}{5} \div \frac{1}{2} = \frac{2}{5} \times \frac{2}{1} = \frac{4}{5}$$

$$\text{ii) } \frac{4}{9} \div \frac{2}{3} = \frac{4}{9} \times \frac{3}{2} = \frac{2}{3}$$

$$\text{iii) } \frac{3}{7} \div \frac{8}{7} = \frac{3}{7} \times \frac{7}{8} = \frac{3}{8}$$

$$\text{iv) } 2\frac{1}{3} \div \frac{3}{5} = \frac{7}{3} \div \frac{3}{5} = \frac{7}{3} \times \frac{5}{3} = \frac{35}{9} = 3\frac{8}{9}$$

$$\text{v) } 3\frac{1}{2} \div \frac{8}{3} = \frac{7}{2} \div \frac{8}{3} = \frac{7}{2} \times \frac{3}{8} = \frac{7}{8}$$

$$\text{vi) } \frac{2}{5} \div 1\frac{1}{2} = \frac{2}{5} \div \frac{3}{2} = \frac{2}{5} \times \frac{2}{3} = \frac{4}{15}$$

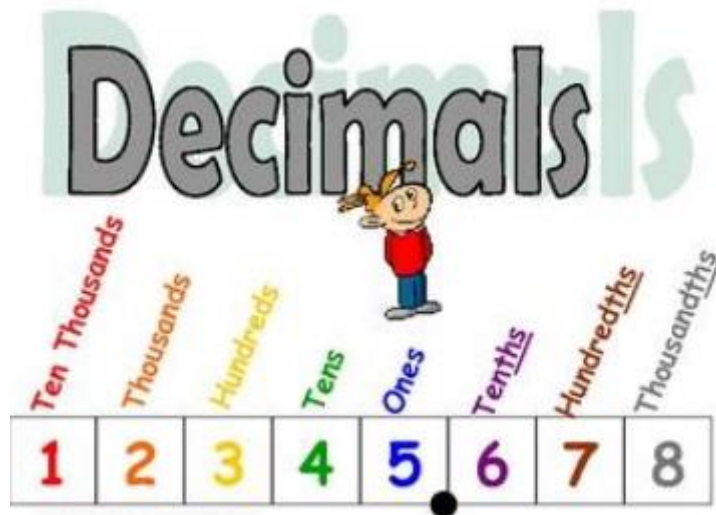
$$\text{vii) } 3\frac{1}{5} \div 1\frac{2}{3} = \frac{16}{5} \div \frac{5}{3} = \frac{16}{5} \times \frac{3}{5} = \frac{48}{25} = 1\frac{23}{25}$$

$$\text{viii) } 2\frac{1}{5} \div 1\frac{1}{5} = \frac{11}{5} \div \frac{6}{5} = \frac{11}{5} \times \frac{5}{6} = \frac{11}{6} = 1\frac{5}{6}$$

Decimal Numbers

Fractions which has denominator 10, 100, 1000 etc are called **Decimal Fractions**.

A decimal number is a number with a decimal point. Numbers left to the decimal are 10 greater and numbers to the right of the decimal are 10 smaller.



Multiplication of Decimal Numbers

1. How to multiply a decimal number with a whole number?

If we have to multiply the whole number with a decimal number then we will multiply them as normal numbers but the decimal place will remain the same as it was in the original decimal number.

Example

$$35 \times 3.45 = 120.75$$

Here we have multiplied the number 35 with 345 as normal whole numbers and we put the decimal at the same place from the right as it was in 3.45.

2. How to multiply Decimal numbers by 10,100 and 1000?

a. If we have to **multiply a decimal number by 10** then we will transfer the decimal point to the right by one place.

Example

$$5.37 \times 10 = 53.7$$

b. If we have to **multiply a decimal number by 100** then we will transfer the decimal point to the right by two places.

Example

$$5.37 \times 100 = 537$$

c. If we have to **multiply a decimal number by 1000** then we will transfer the decimal point to the right by three places.

Example

$$5.37 \times 1000 = 5370$$

3. How to multiply a decimal number by another decimal number?

To multiply a decimal number with another decimal number we have to multiply them as the normal whole numbers then put the decimal at such place so that the number of decimal place in the product is equal to the sum of the decimal places in the given decimal numbers.

Example

$$3.77 \times 2.8 = ?$$

$$\begin{array}{r} 3.77 \text{ (2 decimal places)} \\ \times 2.8 \text{ (1 decimal place)} \\ \hline 3016 \\ +754 \\ \hline 10.556 \text{ (3 decimal places)} \end{array}$$

EXERCISE 2.5

1. Which is greater?

(i) 0.5 or 0.05

(ii) 0.7 or 0.5

(iii) 7 or 0.7

(iv) 1.37 or 1.49

(v) 2.03 or 2.30

(vi) 0.8 or 0.88.

Solution1:

First we will convert these decimal numbers into equivalent fractions

(i) $0.5 = \frac{5}{10} = \frac{(5 \times 10)}{(10 \times 10)} = \frac{50}{100} = \frac{5}{100}$ & $0.05 = \frac{5}{100}$

When two fractions have same denominator then fraction with greater numerator is greater. Here, 50 is greater than 5. So, $0.5 > 0.05$.

(ii) 0.7 or 0.5

$0.7 = \frac{7}{10}$ & $0.5 = \frac{5}{10}$.

Clearly, $0.7 > 0.5$.

(iii) 7 or 0.7

$7 = \frac{(7 \times 10)}{(1 \times 10)} = \frac{70}{10}$

Also, $0.7 = 7/10$.

So, $7 > 0.7$

(iv) $1.37 = 137/100$ & $1.49 = 149/100$

So, $1.49 > 1.37$.

(v) 2.03 or 2.30

$2.03 = 203/100$ & $2.30 = 230/100$

Clearly, $2.03 < 2.30$

(vi)

$0.8 = 8/10 = [(8 \times 10)/(10 \times 10)] = 80/100$

Also, $0.88 = 88/100$.

Clearly, $0.88 > 0.8$.

2. Express as rupees using decimals:

(i) 7 paise

(ii) 7 rupees 7 paise

(iii) 77 rupees 77 paise

(iv) 50 paise

(v) 235 paise

Solution2:

In 1 rupee there are 100 paise.

(i) 7 paise = Rs. $(7/100)$ = Rs. 0.07

(ii) 7 rupees 7 paise = Rs. 7 + Rs. $7/100$ = Rs. 7.07

(iii) 77 rupees 77 paise = Rs. 77 + Rs. $77/100$ = Rs. 77.77

(iv) 50 paise = Rs. $50/100$ = Rs. 0.50

(v) 235 paise = Rs. $235/100$ = Rs. 2.35

3. (i) Express 5 cm in metre and kilometer

(ii) Express 35 mm in cm, m and km

Solution 3:

- (i) $5 \text{ cm} = (5/100) \text{ m} = 0.05 \text{ m}$
- (ii) $5 \text{ cm} = (5/100000) \text{ km} = 0.00005 \text{ km}$

4. Express in kg:

- (i) 200 g
- (ii) 3470 g
- (iii) 4 kg 8 g

Solution 4:

In 1 kg there are 1000 g.

- (i) $200 \text{ g} = (200/1000) \text{ kg} = 0.2 \text{ kg}$
- (ii) $3470 \text{ g} = (3470/1000) \text{ kg} = 3.470 \text{ kg}$
- (iii) $4 \text{ kg } 8 \text{ g} = 4 \text{ kg} + (8/1000) \text{ kg} = 4.008 \text{ kg}$

5. Write the following decimal numbers in the expanded form:

- (i) 20.03
- (ii) 2.03
- (iii) 200.03
- (iv) 2.034

Solution:

- (i) $20.03 = (2 \times 10) + (0 \times 1) + [0 \times (1/10)] + [3 \times (1/100)]$
- (ii) $2.03 = (2 \times 1) + [0 \times (1/10)] + [3 \times (1/100)]$
- (iii) $200.03 = (2 \times 100) + (0 \times 10) + (0 \times 1) + [0 \times (1/10)] + [3 \times (1/100)]$
- (iv) $2.034 = (2 \times 1) + [0 \times (1/10)] + [3 \times (1/100)] + [4 \times (1/1000)]$

6. Write the place value of 2 in the following decimal numbers:

- (i) 2.56
- (ii) 21.37
- (iii) 10.25
- (iv) 9.42
- (v) 63.352

Solution 6.

(i) Ones

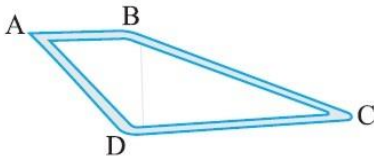
(ii) Tens

(iii) Tenths

(iv) Hundredths

(v) Thousandths

7. Dinesh went from place A to place B and from there to place C. A is 7.5 km from B and B is 12.7 km from C. Ayub went from place A to place D and from there to place C. D is 9.3 km from A and C is 11.8 km from D. Who travelled more and by how much?

**Solution 7:**

Distance traversed by Dinesh = length of path AB + length of path BC = $(7.5 + 12.7)$ km = 20.2 km

Distance traversed by Ayub = length of path AD + length of path DC = $(9.3 + 11.8)$ km = 21.1 km

Difference between distances = $21.1 - 20.2 = 0.9$ km

Clearly Ayub travelled more distance by 0.9 km.

8. Shyama bought 5 kg 300 g apples and 3 kg 250 g mangoes. Sarala bought 4 kg 800 g oranges and 4 kg 150 g bananas. Who bought more fruits?

Solution 8.

Net weight of fruits bought by Shyama = 5 kg 300 g + 3 kg 250 g = 8 kg 550 gm or 8.550 kg.

Net weight of fruits bought by Sarla = 4 kg 800 g + 4 kg 150 g = 8 kg 950 gm or 8.950 kg.

Clearly, Sarla bought more fruits.

9. How much less is 28 km than 42.6 km?

Solution 9:

We can find it by subtracting 28 km & 42.6 km.

$$42.6 - 28.0 = 14.6$$

So, 28 km is 14.6 km less than 42.6 km.

EXERCISE 2.6

1. Find:

(i) 0.2×6

(ii) 8×4.6

(iii) 2.71×5

(iv) 20.1×4

(v) 0.05×7

(vi) 211.02×4

(vii) 2×0.86

Solution:

(i) $0.2 \times 6 = (2/10) \times 6 = 12/10 = 1.2$

(ii) $8 \times 4.6 = 8 \times (46/10) = 368/10 = 36.8$

(iii) $2.71 \times 5 = (271/100) \times 5 = 1355/100 = 13.55$

(iv) $20.1 \times 4 = (201/10) \times 4 = 804/10 = 80.4$

(v) $0.05 \times 7 = (5/100) \times 7 = 35/100 = 0.35$

(vi) $211.02 \times 4 = (21102/100) \times 4 = (84408/100) = 844.08$

(vii) $2 \times 0.86 = 2 \times (86/100) = 172/100 = 1.72$

2. Find the area of rectangle whose length is 5.7cm and breadth is 3 cm.

Solution:

Given,

Length = 5.7

Breadth = 3 cm

Area of the rectangle = $5.7 \times 3 = 17.1 \text{ cm}^2$

3. Find:

(i) 1.3×10

(ii) 36.8×10

(iii) 153.7×10

(iv) 168.07×10

(v) 31.1×100

(vi) 156.1×100

(vii) 3.62×100

(viii) 43.07×100

(ix) 0.5×10

(x) 0.08×10

(xi) 0.9×100

(xii) 0.03×1000

Solution3:

(i) $1.3 \times 10 = 13$

(ii) $36.8 \times 10 = 368$

(iii) $153.7 \times 10 = 1537$

(iv) $168.07 \times 10 = 1680.7$

(v) $31.1 \times 100 = 3110$

(vi) $156.1 \times 100 = 15610$

(vii) $3.62 \times 100 = 362$

(viii) $43.07 \times 100 = 4307$

(ix) $0.5 \times 10 = 5$

(x) $0.08 \times 10 = 0.8$

(xi) $0.9 \times 100 = 90$

(xii) $0.03 \times 1000 = 30$

4. A two-wheeler covers a distance of 55.3 km in one litre of petrol. How much distance will it cover in 10 litres of petrol?

Solution 4:

Distance covered by the two-wheeler in 1 litre= 55.3

Distance covered by the two-wheeler in 10 litres = $55.3 \times 10 = 553$ km.

5. Find:

(i) 2.5×0.3

(ii) 0.1×51.7

(iii) 0.2×316.8

(iv) 1.3×3.1

(v) 0.5×0.05

(vi) 11.2×0.15

(vii) 1.07×0.02

(viii) 10.05×1.05

(ix) 101.01×0.01

(x) 100.01×1.1

Solution:

(i) $2.5 \times 0.3 = (25/10) \times (3/10) = 0.75$

(ii) $0.1 \times 51.7 = (1/10) \times (517/10) = (517/100) = 5.17$

(iii) $0.2 \times 316.8 = (2/10) \times (3168/10) = 6336/100 = 63.36$

(iv) $1.3 \times 3.1 = (13/10) \times (31/10) = 403/100 = 4.03$

(v) $0.5 \times 0.05 = (5/10) \times (5/100) = 25/1000 = 0.025$

(vi) $11.2 \times 0.15 = (112/10) \times (15/100) = (1680/10000) = 1.680$

(vii) $1.07 \times 0.02 = (107/100) \times (2/100) = 214/10000 = 0.0214$

(viii) $10.05 \times 1.05 = (1005/100) \times (105/100) = 105525/10000 = 10.5525$

(ix) $101.01 \times 0.01 = (10101/100) \times (1/100) = 10101/10000 = 1.0101$

(x) $100.01 \times 1.1 = (10001/100) \times (11/10) = 110011/1000 = 110.011$.

Division of Decimal Numbers

1. How to divide a decimal number with a whole number?

If we have to divide the whole number with a decimal number then we will divide them as whole numbers but the decimal place will remain the same as it was in the original decimal number.

Example

$$12.96 \div 4 = 3.24$$

Here we divide the number 1296 with 4 as normal whole numbers and we put the decimal at the same place from the right as it was in 12.96.

2. How to divide Decimal numbers by 10,100 and 1000?

a. If we have to **divide a decimal number by 10** then we will transfer the decimal point to the left by one place.

Example

$$5.37 \div 10 = 0.537$$

b. If we have to **divide a decimal number by 100** then we will transfer the decimal point to the left by two places.

Example

$$253.37 \times 100 = 2.5337$$

c. If we have to **divide a decimal number by 1000** then we will transfer the decimal point to the left by three places.

Example

$$255.37 \times 1000 = 0.25537$$

3. How to divide a decimal number by another decimal number?

To divide a decimal number with another decimal number

- First, we have to convert the denominator as the whole number by multiplying both the numerator and denominator by 10, 100 etc
- Now we can divide them as we had done before.

Example

$$\frac{83.48}{2.4} = \frac{83.48}{2.4} \times \frac{10}{10} = \frac{834.8}{24} = 34.75$$

Here we had converted denominator 2.4 in the whole number by multiplying by 10. Then divide it as usual.

EXERCISE 2.7

1. Find:

(i) $0.4 \div 2$

(ii) $0.35 \div 5$

(iii) $2.48 \div 4$

(iv) $65.4 \div 6$

(v) $651.2 \div 4$

(vi) $14.49 \div 7$

(vii) $3.96 \div 4$

(viii) $0.80 \div 5$

Solution1:

(i) $0.4 \div 2 = (4/10) \times (1/2) = 0.2$

(ii) $0.35 \div 5 = (35/100) \times (1/5) = 7/100 = 0.07$

(iii) $2.48 \div 4 = (248/100) \times (1/4) = 62/100 = 0.62$

(iv) $65.4 \div 6 = (654/10) \times (1/6) = 109/10 = 10.9$

(v) $651.2 \div 4 = (6512/10) \times (1/4) = (1628/10) = 162.8$

(vi) $14.49 \div 7 = (1449/100) \times (1/7) = (207/100) = 2.07$

(vii) $3.96 \div 4 = (396/100) \times (1/4) = (99/100) = 0.99$

(viii) $0.80 \div 5 = (80/100) \div 5 = (80/100) \times (1/5) = (16/100) = 0.16$

2. Find:

(i) $4.8 \div 10$

(ii) $52.5 \div 10$

(iii) $0.7 \div 10$

(iv) $33.1 \div 10$

(v) $272.23 \div 10$

(vi) $0.56 \div 10$

(vii) $3.97 \div 10$

Solution 2.

(i) $4.8 \div 10 = 0.48$

(ii) $52.5 \div 10 = 5.25$

(iii) $0.7 \div 10 = 0.07$

(iv) $33.1 \div 10 = 3.31$

(v) $272.23 \div 10 = 27.223$

(vi) $0.56 \div 10 = 0.056$

(vii) $3.97 \div 10 = 0.0397$

3. Find:

(i) $2.7 \div 100$

(ii) $0.3 \div 100$

(iii) $0.78 \div 100$

(iv) $432.6 \div 100$

(v) $23.6 \div 100$

(vi) $98.53 \div 100$

Solution 3.

(i) $2.7 \div 100 = 0.027$

(ii) $0.3 \div 100 = 0.003$

(iii) $0.78 \div 100 = 0.0078$

(iv) $432.6 \div 100 = 4.326$

(v) $23.6 \div 100 = 0.236$

(vi) $98.53 \div 100 = 0.9853$

4. Find:

(i) $7.9 \div 1000$

(ii) $26.3 \div 1000$

(iii) $38.53 \div 1000$

(iv) $128.9 \div 1000$

(v) $0.5 \div 1000$

Solution:

(i) $7.9 \div 1000 = 0.0079.$

(ii) $26.3 \div 1000 = 0.0263.$

(iii) $38.53 \div 1000 = 0.03853$.

(iv) $128.9 \div 1000 = 0.1289$.

(v) $0.5 \div 1000 = 0.0005$.

5. Find:

(i) $7 \div 3.5$

(ii) $36 \div 0.2$

(iii) $3.25 \div 0.5$

(iv) $30.94 \div 0.7$

(v) $0.5 \div 0.25$

(vi) $7.75 \div 0.25$

(vii) $76.5 \div 0.1536$

(viii) $37.8 \div 1.4$

(ix) $2.73 \div 1.3$

Solution:

(i) $7 \div 3.5 = 7 \div (35/10) = 7 \times (10/35) = 2$.

(ii) $36 \div 0.2 = 36 \div (2/10) = 36 \times (10/2) = 180$.

(iii) $3.25 \div 0.5 = (325/100) \div (5/10) = (325/100) \times (10/5) = 65/10 = 6.5$

(iv) $30.94 \div 0.7 = (3094/100) \div (7/10) = (3094/100) \times (10/7) = 442/10 = 44.2$

(v) $0.5 \div 0.25 = (5/10) \div (25/100) = (5/10) \times (100/25) = 2$

(vi) $7.75 \div 0.25 = (775/100) \div (25/100) = (775/100) \times (100/25) = 31$

(vii) $76.5 \div 0.15 = (765/10) \div (15/100) = (765/10) \times (100/15) = 510$

(viii) $37.8 \div 1.4 = (378/10) \div (14/10) = (378/10) \times (10/14) = 27$.

(ix) $2.73 \div 1.3 = (273/100) \div (13/10) = (273/100) \times (10/13) = 21/10 = 2.1$.

6. A vehicle covers a distance of 43.2 km in 2.4 litres of petrol. How much distance will it cover in one litre of petrol?

Solution 6:

Distance covered by the vehicle in 2.4 litres = 43.2km

$$\begin{aligned}\text{Distance covered by the vehicle in 1 litre} &= 43.2 \div 2.4 = (432/10) \div (24/10) \\ &= (432/10) \times (10/24) = 18\end{aligned}$$

So, the vehicle will cover 18 km in one litre of petrol.
