

CLASS 7

MATHS

NCERT SOLUTIONS

NCERT Solutions for Class 7 Maths Chapter 8: Working with Fractions – Ganita Prakash

Complete NCERT Solutions for Class 7 Maths Chapter 8 "Working with Fractions" from the Ganita Prakash textbook, covering multiplication and division of fractions with real-world applications.

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Figure It Out (Pages 176-177): Multiplying Fractions

Q1. Tenzin drinks $\frac{1}{2}$ glass of milk daily. In a week: $7 \times \frac{1}{2} = \frac{7}{2} = 3\frac{1}{2}$ **glasses**. In January (31 days): $31 \times \frac{1}{2} = \frac{31}{2} = 15\frac{1}{2}$ **glasses**.

Q2. Workers make 1 km of canal in 8 days. In a week (5 working days): $5 \times \frac{1}{8} = \frac{5}{8}$ **km**.

Q3. Manju and 2 neighbours share 5 litres of oil weekly among 3 families. Each family gets $\frac{5}{3}$ litres/week. In 4 weeks: $4 \times \frac{5}{3} = \frac{20}{3} = 6\frac{2}{3}$ **litres**.

Q4. The Moon sets $\frac{5}{6}$ hour later each day. From Monday to Thursday is 3 days: $3 \times \frac{5}{6} = \frac{15}{6} = \frac{5}{2}$ hours = **2 hours 30 minutes later**.

Q5. Multiply and convert to mixed fractions: (a) $7 \times \frac{3}{5} = \frac{21}{5} = 4\frac{1}{5}$ (b) $4 \times \frac{1}{3} = \frac{4}{3} = 1\frac{1}{3}$ (c) $\frac{9}{7} \times 6 = \frac{54}{7} = 7\frac{5}{7}$ (d) $\frac{13}{11} \times 6 = \frac{78}{11} = 7\frac{1}{11}$

Figure It Out (Pages 180-181): Multiplying Fractions Using Area Models

Using unit-square area models to multiply fractions:

$$\frac{1}{3} \times \frac{1}{5} = \frac{1}{15}$$

$$\frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$$

$$\frac{1}{5} \times \frac{1}{2} = \frac{1}{10}$$

$$\frac{1}{6} \times \frac{1}{5} = \frac{1}{30}$$

$$\frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$$

$$\frac{1}{4} \times \frac{2}{3} = \frac{2}{12} = \frac{1}{6}$$

$$\frac{3}{5} \times \frac{1}{2} = \frac{3}{10}$$

$$\frac{4}{6} \times \frac{3}{5} = \frac{12}{30} = \frac{2}{5} \text{ (in lowest terms)}$$

General rule: to multiply two fractions, multiply the numerators together and the denominators together:
 $(a/b) \times (c/d) = (a \times c)/(b \times d)$.

Figure It Out (Pages 183-184): Fraction Word Problems

Q1. A tap fills $\frac{7}{10}$ of a tank in 1 hour. How much fills in: $\frac{1}{3}$ hour $\rightarrow \frac{1}{3} \times \frac{7}{10} = \frac{7}{30}$; $\frac{2}{3}$ hour $\rightarrow \frac{2}{3} \times \frac{7}{10} = \frac{14}{30} = \frac{7}{15}$; $\frac{3}{4}$ hour $\rightarrow \frac{3}{4} \times \frac{7}{10} = \frac{21}{40}$; $\frac{7}{10}$ hour $\rightarrow \frac{7}{10} \times \frac{7}{10} = \frac{49}{100}$. Time for a full tank: since $\frac{7}{10}$ fills in 1 hour, a full tank needs $\frac{10}{7} = 1\frac{3}{7}$ **hours**.

Q2. The government takes $\frac{1}{6}$ of Somu's land, leaving $\frac{5}{6}$. Krishna gets half of the remainder: $\frac{1}{2} \times \frac{5}{6} = \frac{5}{12}$. Bora gets a third of the remainder: $\frac{1}{3} \times \frac{5}{6} = \frac{5}{18}$. Somu keeps the rest: $1 - \frac{1}{6} - \frac{5}{12} - \frac{5}{18} = \frac{5}{36}$ of the original land.

Q3. Area of a rectangle with sides $3\frac{3}{4}$ ft and $9\frac{5}{8}$ ft: $3\frac{3}{4} = \frac{15}{4}$, $9\frac{5}{8} = \frac{48}{5}$. Area = $\frac{15}{4} \times \frac{48}{5} = \frac{720}{20} = 36$ sq ft.

Q4. Tsewang plants 4 saplings in a row, $\frac{3}{4}$ m apart (3 gaps). Distance from first to last: $3 \times \frac{3}{4} = \frac{9}{4} = 2\frac{1}{4}$ m.

Q5. Which is heavier: $\frac{12}{15}$ of 500g, or $\frac{3}{20}$ of 4 kg? $\frac{12}{15}$ of 500g = 400g. $\frac{3}{20}$ of 4000g = **600g**, which is heavier.

Understanding Products of Fractions

When is a product smaller than the numbers being multiplied? When one factor is between 0 and 1, the product is smaller than the other factor (e.g., $\frac{1}{2} \times 100 = 50$, which is less than 100). When one factor is greater than 1, the product is greater than the other factor (e.g., $1\frac{1}{2} \times \frac{1}{4} = \frac{3}{8}$, which is greater than $\frac{1}{4} = \frac{2}{8}$).

Division of Fractions

To divide by a fraction, multiply by its reciprocal (flip the fraction upside down): $\frac{1}{2} \div \frac{1}{3} = \frac{1}{2} \times \frac{3}{1} = \frac{3}{2} = 1\frac{1}{2}$ (note: the result is larger, since we're dividing by a number less than 1). Similarly, $\frac{1}{5} \div 2 = \frac{1}{5} \times \frac{1}{2} = \frac{1}{10}$. Dividing by 1 always returns the original number: $\frac{3}{5} \div 1 = \frac{3}{5}$.

The Four Fountains Problem

Four fountains fill a cistern: fountain 1 in 1 day, fountain 2 in half a day, fountain 3 in a quarter day, fountain 4 in a fifth of a day. Their per-day filling rates: fountain 1 = $1 \div 1 = 1$; fountain 2 = $1 \div (\frac{1}{2}) = 2$; fountain 3 = $1 \div (\frac{1}{4}) = 4$; fountain 4 = $1 \div (\frac{1}{5}) = 5$. Combined rate = $1+2+4+5 = 12$ cisterns per day, so together they fill one cistern in **$\frac{1}{12}$ of a day**.

A Drama-tic Donation (Ancient Indian Currency Units)

Given: 1 gold dinar = 12 silver drammās; 1 silver drama = 4 copper panas; 1 pana = 30 cowrie shells. So, 1 copper pana = $\frac{1}{12} \times \frac{1}{4} = \frac{1}{48}$ gold dinar. And 1 cowrie shell = $\frac{1}{48} \times \frac{1}{30} = \frac{1}{1440}$ gold dinar.

Figure It Out (Pages 196-198): Applying Multiplication and Division

Q2. Choosing the correct expression and solving: (a) Maria has 8m lace, uses $\frac{1}{4}$ m per bag: $8 \div \frac{1}{4} = 32$ bags. (b) $\frac{1}{2}$ m ribbon shared among 8 badges: $\frac{1}{2} \div 8 = \frac{1}{2} \times \frac{1}{8} = \frac{1}{16}$ m each. (c) A baker has 5kg flour, uses $\frac{1}{6}$ kg per loaf: $5 \div \frac{1}{6} = 30$ loaves.

Q3. If $\frac{1}{4}$ kg flour makes 12 rotis, flour for 6 rotis (half as many) = $\frac{1}{4} \div 2 = \frac{1}{8}$ kg.

Q4. Sum of $1 \div \frac{1}{6}$, $1 \div \frac{1}{10}$, $1 \div \frac{1}{13}$, $1 \div \frac{1}{9}$, and $1 \div \frac{1}{2}$: $= 6+10+13+9+2 = 40$.

Q5. Mira reads $\frac{1}{5}$ of a 400-page novel yesterday, and $\frac{3}{10}$ today: $\frac{1}{5}$ of 400=80 pages; $\frac{3}{10}$ of 400=120 pages; total read=200 pages. Remaining = $400-200 = \mathbf{200 \text{ pages}}$.

Q6. A car runs 16 km per litre of petrol. Distance on $2\frac{3}{4}$ litres: $2\frac{3}{4}=1\frac{1}{4}$; $16 \times 1\frac{1}{4} = \frac{176}{4} = \mathbf{44 \text{ km}}$.

Q7. A train takes $5\frac{1}{6}$ hours; a plane takes $\frac{1}{2}$ hour for the same trip. Time saved: $5\frac{1}{6} - \frac{1}{2} = \frac{31}{6} - \frac{3}{6} = \frac{28}{6} = \mathbf{4\frac{2}{3} \text{ hours}}$.

Q8. Mariam and cousins finish $\frac{4}{5}$ of a cake; the remaining $\frac{1}{5}$ is shared equally among 3 friends: $\frac{1}{5} \div 3 = \frac{1}{5} \times \frac{1}{3} = \mathbf{\frac{1}{15} \text{ of the cake each}}$.

Q9. For the product $(\frac{565}{465}) \times (\frac{707}{676})$: since both fractions are greater than 1, the product is **greater than 1, greater than $\frac{565}{465}$, and greater than $\frac{707}{676}$** (options a, c, e are correct).

Q10. A big square is divided into 4 identical squares; one small square ($\frac{1}{4}$ of the whole) is divided into 8 triangles, with 3 shaded: shaded fraction of the whole = $\frac{1}{4} \times \frac{3}{8} = \mathbf{\frac{3}{32}}$.

Q11. An ant colony repeatedly splits at branch points before reaching two food sources. Tracking each split as a fraction of the original group (halving/quartering at each split), the mango tree receives $\frac{29}{32}$ of the original group, and the sugarcane field receives $\frac{3}{32}$ (these sum to $\frac{32}{32} = 1$, confirming all ants are accounted for).

Q12. General pattern: $(1-\frac{1}{2}) \times (1-\frac{1}{3}) \times (1-\frac{1}{4}) \times \dots \times (1-\frac{1}{n}) = \mathbf{\frac{1}{n}}$ (this telescoping product can be verified for small n, e.g., $n=3$: $(\frac{1}{2})(\frac{2}{3})=\frac{1}{3}$; $n=4$: $(\frac{1}{2})(\frac{2}{3})(\frac{3}{4})=\frac{1}{4}$).

Extra Questions: [Class 7 Maths Chapter 8](#)

Revision Notes: [Class 7 Maths Chapter 8](#)