

Adding and Subtracting fractions with same denominators

- To add or subtract fractions with the same denominators:
 - add or subtract the numerators
 - denominator stays the same

Example:

i. $\frac{7}{8} + \frac{5}{8}$

$= \frac{7+5}{8}$ [add the numerator whereas denominator stays the same]

$= \frac{12}{8} = \frac{3}{2}$ [simplifying by dividing top (12) and bottom (8) 4]

ii. $\frac{12}{5} - \frac{2}{5}$

$= \frac{12-2}{5}$ [subtract numerators whereas denominator stays the same]

$= \frac{10}{5} = 2$ [simplifying by dividing 5 into 10 which gives 2]

Activity 4.1

1. Add these fractions and simplify your answer if possible.

a) $\frac{2}{10} + \frac{7}{10}$

b) $\frac{1}{4} + \frac{2}{4}$

c) $\frac{3}{5} + \frac{1}{5}$

d) $\frac{3}{7} + \frac{5}{7}$

e) $\frac{5}{6} + \frac{1}{6}$

2. Subtract these fractions and simplify your answer if possible.

a) $\frac{5}{8} - \frac{4}{8}$

b) $\frac{7}{9} - \frac{4}{9}$

c) $\frac{11}{8} - \frac{3}{8}$

d) $\frac{21}{10} - \frac{9}{20}$

e) $\frac{13}{10} - \frac{7}{10}$

Adding and subtracting fractions with different denominators

- To add or subtract fractions with different denominators:
 - First change them into equivalent fractions with the same denominator,
 - Then do the addition or subtraction

Example:

i. $\frac{5}{8} + \frac{3}{4}$

$= \frac{5}{8} + \frac{3}{4} = \frac{5}{8} + \frac{6}{8}$ [since $\frac{3}{4}$ is equivalent to $\frac{6}{8}$ (multiplying the numerator and denominator by 2)]

$= \frac{5+6}{8} = \frac{11}{8}$ [now, they have the same denominators so add the numerators]

$= \frac{11}{8}$ or $1 \frac{3}{8}$ [change the improper fraction into mixed number]

ii. $\frac{2}{5} - \frac{1}{10}$

$= \frac{2}{5} - \frac{1}{10} = \frac{4}{10} - \frac{1}{10}$ [since $\frac{2}{5}$ is equivalent to $\frac{4}{10}$ (multiplying the numerator and denominator by 2)]

$= \frac{4-1}{10} = \frac{3}{10}$ [now, they have the same denominators so subtract the numerators]

Activity 4.2

1. Add these fractions and simplify your answer if possible.

a) $\frac{3}{8} + \frac{1}{2}$ b) $\frac{1}{4} + \frac{1}{2}$ c) $\frac{7}{10} + \frac{2}{5}$

d) $\frac{5}{8} + \frac{3}{4}$ e) $\frac{5}{6} + \frac{1}{3}$

2. Subtract these fractions and simplify your answer if possible.

a) $\frac{7}{10} - \frac{1}{5}$ b) $\frac{3}{4} - \frac{1}{8}$ c) $\frac{5}{6} - \frac{1}{3}$

d) $\frac{11}{10} - \frac{3}{5}$ e) $\frac{15}{8} - \frac{1}{4}$

Finding the fraction when sharing

- When sharing, each person may receive a fraction of a quantity.

Example:

i. Mum has **five** children but only **four** bottles of water. How much will each child get?

- Each child gets $\frac{4}{5}$ of a bottle to drink [divide the number of bottles by the number of people]

ii. An officer has **5 packets** of biscuits to share among 3 tearooms. How much will each tearoom receive?

- Each tearoom gets $\frac{5}{3}$ packets [1 packet and $\frac{2}{3}$ packet]

Activity 4.3

1. What fraction is received when:

a. 4 sugar canes (of the same length) are shared between 7 people?

b. 2 bananas are shared between 3 people?

2. There are 5 pizzas and 4 people to share them, so Dad cuts each pizza in four.

a. How many quarters are there?

b. What fraction does each person get?

3. Mum buys 2 bags of sweets for the 7 girls at a birthday party to share equally. What fraction of a bag of sweets does each girl get?

Finding a fraction of a whole number quantity

- To find a fraction of a whole number:
 - **Divide** the whole **number** by the **denominator**,
 - Then **multiply** the answer by the **numerator**

Example:

i. Find $\frac{1}{9}$ of 45

$$\begin{aligned} \frac{1}{9} \text{ of } 45 &= \frac{1}{9} \times 45 \\ &= 45 \div 9 && \text{[whole number } \div \text{ denominator]} \\ &= 5 \\ &5 \times 1 && \text{[answer } \times \text{ numerator]} \\ &= \mathbf{5 \text{ Answer}} \end{aligned}$$

ii. Find $\frac{5}{9}$ of 45

$$\begin{aligned} \frac{5}{9} \text{ of } 45 &= \frac{5}{9} \times 45 \\ &= 45 \div 9 && \text{[whole number } \div \text{ denominator]} \\ &= 5 \\ &5 \times 5 && \text{[answer } \times \text{ numerator]} \end{aligned}$$

= 25 Answer

Activity 4.4

1. Find:

a) $\frac{1}{3}$ of 24

b) $\frac{1}{4}$ of 20

c) $\frac{1}{5}$ of 45

d) $\frac{1}{10}$ of 300

e) $\frac{2}{3}$ of 24

f) $\frac{3}{4}$ of 20

g) $\frac{4}{5}$ of 45

h) $\frac{7}{10}$ of 300

i) $\frac{3}{4}$ of 200g

j) $\frac{5}{8}$ of \$64

k) $\frac{9}{10}$ of 90L

l) $\frac{7}{8}$ of 56kg

Finding a number when a fraction is known

- To find a number when a fraction is known:
 - Divide the given quantity by the numerator then,
 - Multiply by the denominator

Example:

i. If $\frac{7}{12}$ of a quantity is 35, find the quantity

Step 1: $35 \div 7$ [quantity given \div numerator, then]
= 5

Step 2: 5×12 [multiply by the denominator]
= 60

So all the quantity is 60

ii. $\frac{5}{8} \times \underline{\quad} = 40$, meaning $\frac{5}{8}$ of a quantity is 40

Step 1: $40 \div 5$ [given quantity \div numerator]
= 8

Step 2: 8×8 [multiply by the denominator]

= 64

So all the quantity is 64

Activity 4.5

1. Find the number if:

a) $\frac{2}{5}$ of the number is 10

b) $\frac{5}{7}$ of the number is 25

c) $\frac{3}{8}$ of the number is 21

d) $\frac{9}{10}$ of the number is 45

2. Solve the following.

a) $\frac{2}{3} \times \underline{\quad} = 14$

b) $\frac{4}{5} \times \underline{\quad} = 28$

c) $\frac{5}{9} \times \underline{\quad} = 50$

d) $\frac{8}{11} \times \underline{\quad} = 24$

Finding fraction of a fraction

Example:

i. Find $\frac{3}{4}$ of \$120

Step 1: $\$120 \times 3$ [given quantity \times numerator, then]
= \$ 360

Step 2: $\$360 \div 4$ [divide by the denominator]
= \$90

ii. Find $\frac{1}{4}$ of 16L`

Step 1: $16L \times 1$ [given quantity \times numerator, then]
= 16L

Step 2: $16L \div 4$ [divide by the denominator]

= 4L

iii. $\frac{3}{4}$ of $\frac{8}{12}$

Step 1: $\frac{\frac{3}{4} \text{ of } 8}{12}$ [first calculate the upper part]

$$= \frac{(8 \times 3 \div 4)}{12}$$

Step 2: = $\frac{6}{12}$ or $\frac{1}{2}$ **Answer** [simplify to its simplest form]

iv. $\frac{4}{5}$ of $\frac{20}{25}$

Step 1: $\frac{\frac{4}{5} \text{ of } 20}{25}$ [first calculate the upper part]

$$= \frac{(20 \times 4 \div 5)}{25}$$

Step 2: $\frac{16}{25}$ **Answer**

Activity 4.6

1. Finding a fraction of these fractions.

a) $\frac{1}{2}$ of $\frac{4}{5}$

b) $\frac{1}{3}$ of $\frac{6}{10}$

c) $\frac{1}{4}$ of $\frac{8}{9}$

d) $\frac{1}{5}$ of $\frac{15}{17}$

e) $\frac{1}{8}$ of $\frac{24}{25}$

f) $\frac{1}{12}$ of $\frac{60}{72}$

g) $\frac{3}{4}$ of $\frac{12}{15}$

h) $\frac{2}{3}$ of $\frac{9}{10}$

Multiplication and Division fractions

➤ **To multiplying fractions:**

- Multiplying numerators by numerators and,
- Multiplying denominators by denominators

Example:

i. Find $\frac{2}{3}$ of $\frac{1}{2}$

Require $\frac{2}{3}$ of $\frac{1}{2}$ ['of' means multiply]

$$\frac{2}{3} \times \frac{1}{2} = \frac{2 \times 1}{3 \times 2}$$
 [multiplying numerator by numerator and denominator by denominator]

$$\frac{2}{6} \text{ or } \frac{1}{3}$$
 [simplify to its simplest form, by dividing both numerator and denominator by 2]

ii. $\frac{1}{5} \times \frac{3}{8}$

$$\frac{1}{5} \times \frac{3}{8} = \frac{1 \times 3}{5 \times 8}$$
 [multiplying numerator by numerator and denominator by denominator]

$$= \frac{3}{40}$$

➤ **To divide fractions:**

- Multiply the first by the **reciprocal** of the second fraction.
[To find the reciprocal of a fraction, turn it upside down]

Example:

i. $\frac{3}{4} \div \frac{2}{5}$

Step 1: $\frac{3}{4} \times \frac{2}{5}$ [change the division operation into multiplication]

Step 2: $\frac{3}{4} \times \frac{5}{2}$ [turn the second fraction **upside down** or it's **reciprocal**]

Step 3: $\frac{3 \times 5}{4 \times 2} = \frac{15}{8}$ [multiplying numerator by numerator and denominator by denominator]

OR $1\frac{7}{8}$ [change into mixed number]

ii. $\frac{2}{5} \div 3\frac{1}{4}$

Step 1: $\frac{2}{5} \div \frac{13}{4}$ [change mixed number into improper fraction]

Step 2: $\frac{2}{5} \times \frac{4}{13}$ [change division into multiplication]

Step 3: $\frac{2}{5} \times \frac{4}{13}$ [turn the second fraction upside down or it's reciprocal]

Step 4: $\frac{2 \times 4}{5 \times 13} = \frac{8}{65}$ [multiplying numerator by numerator and denominator by denominator]

Activity 4.7

1. Calculate the following to its simplest form.

a) $\frac{2}{5} \times \frac{1}{3}$

b) $\frac{1}{2} \times \frac{4}{3}$

c) $\frac{3}{4} \times \frac{7}{10}$

d) $\frac{5}{8} \times \frac{3}{5}$

e) $\frac{1}{3} \times \frac{12}{5}$

f) $\frac{5}{4} \times \frac{5}{6}$

2. Evaluate:

a) $\frac{3}{4} \div \frac{2}{3}$

b) $\frac{5}{7} \div 2\frac{1}{3}$

c) $3\frac{1}{12} \div \frac{12}{13}$

d) $1 \div \frac{3}{5}$

e) $2\frac{3}{4} \div 9$

f) $3\frac{3}{5} \div 2\frac{1}{4}$