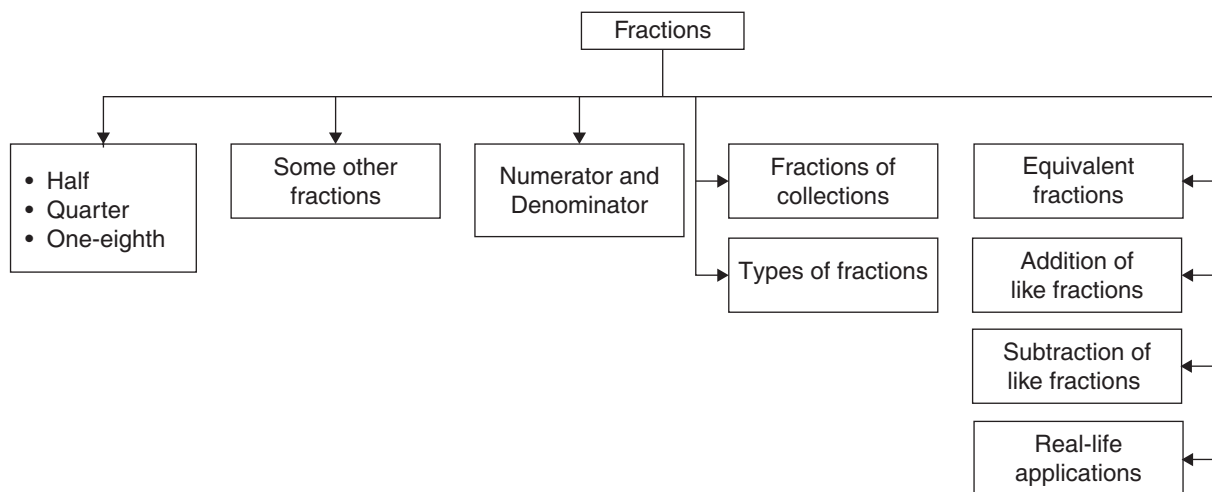# FRACTIONS

Learning objectives

Students will be able:

- To represent a part of a whole or a collection as a fraction.
- To write fractions in the standard form by using symbols.
- To show equivalence of fractions.
- To add and subtract like fractions.

Prior knowledge

- 2D shapes
- halves, thirds, quarters
- addition
- subtraction

Guidelines to teach

Warm Up:
- Use the Warm Up and do the Activity to revise the meaning of the term fraction.

Half:
- Review the concept of half by cutting an apple/a sheet of paper/a paper ribbon/a bar of chocolate into two equal halves.
- Ask students: What part of the whole is each part? (*a half*)
- Tell students to write a half as $\frac{1}{2}$ and to read it as 'one by two'.
- Ask students what $\frac{1}{2}$ is. (*1 part out of 2 equal parts*)
- Ask students to complete the Tryout on half.

Quarter:
- Use the Activity in the course book to review the concept of quarter or one-fourth.
- Cut each half of the apple/the sheet of paper/the paper ribbon/the bar of chocolate into four equal parts to show one-fourth.

- Ask students: What part of the whole is each part? (*a quarter or one-fourth*)

- Tell students to write a quarter or one-fourth as $\frac{1}{4}$ and to read it as 'one by four'.

- Ask students what $\frac{1}{4}$ is. (*1 part out of 4 equal parts*)

- Tell students that 2 parts out of 4 equal parts is $\frac{2}{4}$ or two-fourths and 3 parts of 4 equal parts is $\frac{3}{4}$ or three-fourths.

One eighth:

- Use the course book to introduce and reinforce the concept of one-eighth.

- Cut each quarter of the apple/the sheet of paper/the paper ribbon/the bar of chocolate into equal parts to show one-eighth.

- Ask students: What part of the whole is each part? (*one-eighth*)

- Tell students to write one eighth as $\frac{1}{8}$ and to read it as 'one by eight'.

- Ask students what $\frac{1}{8}$ is. (*1 part out of 8 equal parts*)

- Show students how to read and write $\frac{2}{8}, \frac{3}{8}, \frac{4}{8}$ and so on.

- Ask students to complete the Tryout on half, one-fourth and one-eighth.

Some other fractions:

- Use the course book to explain fractions like one-third, one-fifth and one-sixth.

- Draw different wholes on the board and shade a few parts.

- Ask students to name the fraction represented by the shaded parts.

- Tell students that a whole can be divided into innumerable parts.

Numerator and denominator:

- Use the course book to explain the terms numerator and denominator.

- Ask students to complete the Try out on other fractions.

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1. **Extension activity for numerator and denominator:**

   - Ask students to draw 5–10 blank fractions like this $\frac{\Box}{\Box}$ in their notebooks.

   - Tell students to fill in the blank boxes correctly as you give rapid instructions like: In the first fraction, 5 is the numerator and 7 is the denominator. In the second fraction, 12 is the denominator and 5 is the numerator.

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2. **Extension activity to show that as the denominator increases, the fraction becomes smaller**

   - Give each student 5 strips of the same length. Give them the following instructions:

     - Cut one strip into two equal parts. Write $\frac{1}{2}$ on each part. Cut another strip into three equal parts. Write $\frac{1}{3}$ on each part. Similarly, cut the three remaining strips into 4 parts, 5 parts and 6 parts respectively.

     - Write $\frac{1}{4}$ on each part of the strip that you cut into 4 parts.

     - Say what you will write on each part of the strips that you cut into 5 parts and 6 parts respectively. ($\frac{1}{5}$ *and* $\frac{1}{6}$). Write the fractions correctly.

     - Now you have many small strips instead of 5 long strips. Count the strips of each kind. (*2 strips with* $\frac{1}{2}$ *written on them, 3 strips with* $\frac{1}{3}$, *4 strips with* $\frac{1}{4}$, *5 strips with* $\frac{1}{5}$ *and 6 strips with* $\frac{1}{6}$)

     - Take only one strip of each kind and place them side by side on your desk. Keep the remaining strips aside.

     - Compare the lengths of the strips on your desk. Which is the biggest strip? (*the one with* $\frac{1}{2}$)

       Which is the smallest strip? (*the one with* $\frac{1}{6}$)

     - Arrange the strips in the descending order of their lengths—starting from the biggest strip to the smallest strip. ($\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{5}$ $\frac{1}{6}$).

     - Observe that as the denominator increases, the size of the strip (the fraction) becomes smaller.

3. **Extension activity to show that when the denominator is the same, the higher the numerator, the greater the fraction.**

   - Take four rectangular sheets of notebook paper.

   - Divide each rectangle into six equal parts. Colour one part in the first rectangle, two parts in the second rectangle, three parts in the third rectangle and four parts in the fourth rectangle.

   - Ask students to imagine that each rectangle is a bar of chocolate and tell them the following story: 'Four girls get a bar of chocolate each. Each chocolate has six pieces. The first girl eats one piece of her chocolate, the second girl eats 2 pieces, the third girl eats three pieces and the fourth girl eats four pieces.'

- Ask students: What fraction of their chocolate do the girls eat respectively? ($\frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6}$). Write the fractions on the board as the students say them.

- Ask students: What do you observe about the denominators in the fractions? (*They have the same denominators.*) Are their numerators same too? (*No.*)

- Which fraction among these has the highest numerator? ($\frac{4}{6}$) Which fraction among these has the lowest numerator? ($\frac{1}{6}$)

- Which fraction represents more chocolate and which fraction represents less chocolate?
($\frac{4}{6}$ *and* $\frac{1}{6}$ respectively)

Fractions of collections:

- Use the Activity in the course book to explain fractions of collections.

- Explain the solved examples in the Guided Learning section before the students attempt the Tryout.

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4. Extension activity for fractions of collections:

(This can be a pair activity.)

- Ask each pair to make a collection of 12 notebooks/12 crayons/12 pencils/12 colour pencils.

- Give the pairs the following instructions:

  - Remove $\frac{1}{2}$ of the things in your collection. How many things have you removed? *(6)*

  - Remove $\frac{1}{3}$ of the things in your collection. How many things have you removed? *(4)*

  - Remove $\frac{1}{4}$ of the things in your collection. How many things have you removed? *(3)*

  - Remove $\frac{1}{6}$ of the things in your collection. How many things have you removed? *(2)*

(Note: Every time students say the answers, instruct them to put the things they have removed back into the collection.)

Types of fractions:

- Explain the terms like fractions, unlike fractions and unit fractions using the illustration in the course book.

Equivalent fractions:

- Help students do the Activity that introduces the concept of equivalent fractions

- Instruct them to complete the Tryout on equivalent fractions.

Addition of like fractions:

- Use the Activity in the course book to explain addition of fractions. Use the solved examples in the Guided Learning section and pictorial representations to reinforce the concept.

- Ask students to complete the Tryout on the addition of like fractions.

Subtraction of like fractions:

- Use the Activity in the course book to explain subtraction of fractions. Use solved examples in the Guided Learning section to reinforce the concept.

- Ask students to complete the Tryout on the subtraction of like fractions.

- Ask students to work out the Tryout on the real-life applications of addition and subtraction of fractions.

More suggestions for extension activities:

3. Activity (*Numerator and denominator*):

- Divide the class into convenient groups.

- Distribute a pair of dice to each group.

- Instruct players take turns to roll the dice.

- Tell them to make fractions using the numbers got by rolling the dice. (The smaller number should be the numerator and the bigger number, the denominator.)

- Ask them to draw the fractions in their notebooks.

4. Activity (*Representing fractions*):

Divide the class into convenient groups. Distribute four blank cards to each student. Give each group the following instructions:

- Think of two fractions and write them on two cards — one on each card. Draw pictures to represent these fractions— one on each of the two remaining cards. You may draw the fraction as a part of a whole or as part of a collection.

- Put all your cards together and shuffle them. Spread the cards on your desk face down.

- Take turns to pick two cards. Keep the cards if they match (one card should be the fraction and other its picture.)
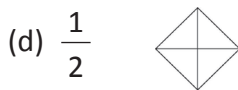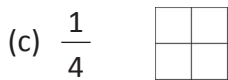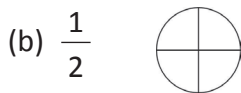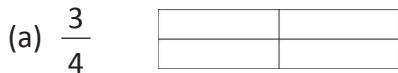
- If the cards do not match, put them back in their respective places and allow the next student to pick the cards.

- Continue the game till all cards have been picked up.
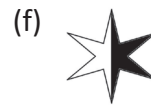
Question Bank

Answer the given questions.

(I) WHOLES AND FRACTIONS; HALFS; THIRDS; FOURTHS

(1) Colour to show $\frac{1}{2}$ in yellow and $\frac{1}{4}$ in blue and $\frac{3}{4}$ in green.

(a) $\frac{3}{4}$

(b) $\frac{1}{2}$

(c) $\frac{1}{4}$

(d) $\frac{1}{2}$

(e) $\frac{3}{4}$

(f) $\frac{1}{4}$

(II) SOME OTHER FRACTIONS

(2) Write the fraction for the shaded portion and identify the equivalent fractions.

(a)

(b)

(c)

(d)

(e)

(f)

(III) NUMERATOR AND DENOMINATOR

(3) Write the fractions.

(a) Numerator = 5, denominator = 13

(b) Numerator = 4, denominator = 24

(c) Numerator = 9, denominator = 36

(d) Number of eggs broken = 3, total number of eggs = 19

(e) Number of students absent = 7, Total number of students = 40

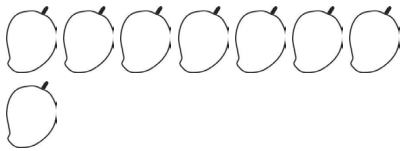(f) Number of apples eaten = 2, Total number of apples = 15

(IV) FINDING FRACTIONS OF A COLLECTION

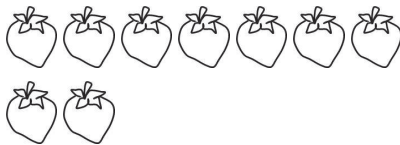(4) Colour the correct number of fruits.
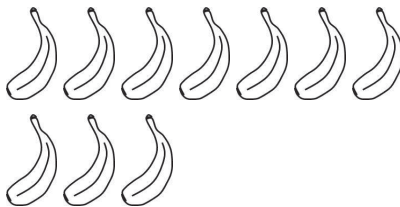
(a) $\frac{1}{4}$ of 12

(b) $\frac{1}{2}$ of 8
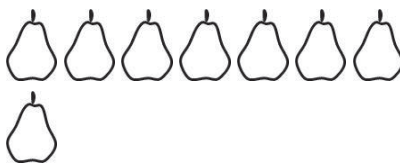
(c) $\frac{1}{3}$ of 9

(d) $\frac{1}{2}$ of 10

(e) $\frac{1}{3}$ of 6

(f) $\frac{1}{4}$ of 8

(5) Find.

(a) $\frac{1}{4}$ of 20

(b) $\frac{1}{4}$ of 36

(c) $\frac{1}{5}$ of 25

(d) $\frac{1}{2}$ of 22

(e) $\frac{1}{4}$ of 24

(e) $\frac{1}{8}$ of 16

(V) ADDITION AND SUBTRACTION OF LIKE FRACTIONS

(6) (a) $\frac{4}{9} + \frac{2}{9}$

(b) $\frac{1}{3} + \frac{2}{3}$

(c) $\frac{5}{6} - \frac{4}{6}$

(d) $\frac{3}{8} + \frac{3}{8}$

(e) $\frac{5}{7} - \frac{1}{7}$

(f) $\frac{1}{4} - \frac{1}{4}$

(VI) STORY SUMS

(7) Solve the story sums.

(a) Out of 6 pieces of a pizza, Mamta ate 2 pieces. What fraction of the pizza did she eat?

(b) Rajeev ate $\frac{4}{8}$ of a cake and Mohit ate $\frac{1}{8}$ of the same cake. Who ate less cake?

(c) Radha uses $\frac{4}{9}$ of the water in the bucket. How much water is left in the bucket?

(d) The cost of 1 litre of milk is ₹40. What is the cost of $\frac{1}{4}$ litre?

(e) Anita has summer vacation for 2 months. She spends $\frac{1}{4}$ of her vacation with her grandmother.

How many days does she spend with her grandmother?

(Hint: 1 month = 30 days).

(f) There are 20 balloons in a packet, out of which 5 balloons are yellow and the rest are green. What fraction of the balloons is yellow and what fraction of the balloons is green?

Answer Key to the Question Bank

(II) (2) (a) $\dfrac{1}{5}$ (b) $\dfrac{1}{10}$ (c) $\dfrac{1}{2}$ (d) $\dfrac{1}{6}$ (e) $\dfrac{1}{6}$ (f) $\dfrac{1}{2}$

(c) and (f) are equivalent fractions   (d) and (e) are equivalent fractions

(III) (3) (a) $\dfrac{5}{13}$ (b) $\dfrac{4}{24}$ or $\dfrac{1}{6}$ (c) $\dfrac{9}{36}$ or $\dfrac{1}{4}$ (d) $\dfrac{3}{19}$ (e) $\dfrac{7}{40}$ (f) $\dfrac{2}{15}$

(IV) (4) (a) Colour 3 apples   (b) Colour 4 mangoes   (c) Colour 3 strawberries

(d) Colour 5 bananas   (e) Colour 2 pineapples   (f) Colour 2 pears

(5) (a) 5   (b) 9   (c) 5   (d) 11   (e) 6   (f) 2

(V) (6) (a) $\dfrac{6}{9}$ (b) $\dfrac{3}{3}$ (c) $\dfrac{1}{6}$ (d) $\dfrac{6}{8}$ (e) $\dfrac{4}{7}$ (f) 0

(VI) (7) (a) $\dfrac{2}{6}$ or $\dfrac{1}{3}$ (b) Mohit   (c) $\dfrac{5}{9}$ (d) ₹10   (e) 15 days   (f) $\dfrac{1}{4}$ yellow; $\dfrac{3}{4}$ green
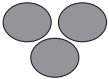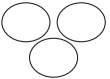
Answer Key—Fractions   Worksheet 1

A. 1. d. $\dfrac{3}{4}$ 2. $\dfrac{4}{10}$ **B.** 1. $\dfrac{2}{6}$ 2. $\dfrac{5}{6}$ 3. Colour 9 ovals   4. Colour 2 keys   **C.** $\dfrac{3}{8}$

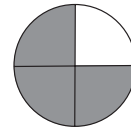## Answer Key—Fractions   Worksheet 2

A. 1. $\dfrac{7}{7}$ 2. $\dfrac{2}{7}$ **B.** 1. $\dfrac{3}{7}$ 2. $\dfrac{5}{8}$

C. 1. 10   2. 9   3. 18   **D.** $\dfrac{3}{10}$

A.   Choose the correct answers.

1.   The fraction of the shaded part is _____ .

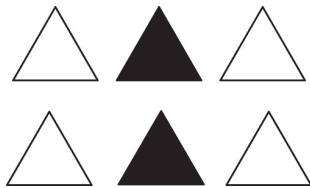a. $\dfrac{1}{4}$ b. $\dfrac{1}{3}$ c. $\dfrac{1}{2}$ d. $\dfrac{3}{4}$

2. $\dfrac{2}{5}$ is the same as _____ .

a. $\dfrac{1}{10}$ b. $\dfrac{5}{5}$ c. $\dfrac{4}{10}$ d. $\dfrac{4}{5}$

B.   Answer the questions.

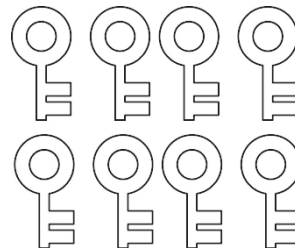1.   Write the fraction of the shaded portion.

2.   Write the fraction for the shaded portion.

3.   Colour to show the fraction $\dfrac{9}{10}$.

4.   Colour the number which shows $\dfrac{1}{4}$ of 8.

C.   Solve.

Akshay divided a pizza into 8 parts and ate 3 parts of it. What fraction of the pizza did he eat?
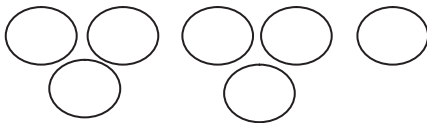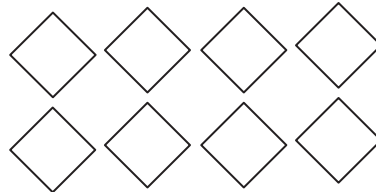
A.

1. $\dfrac{3}{7} + \dfrac{4}{7}$

2. $\dfrac{7}{7} - \dfrac{5}{7}$

B.   **Colour to show the fraction.**

1. $\dfrac{3}{7}$ 2. $\dfrac{5}{8}$

C.   **Solve.**

1. $\dfrac{2}{5}$ of $25 =$ ☐

2. $\dfrac{3}{7}$ of $21 =$ ☐

3. $\dfrac{2}{9}$ of $81 =$ ☐

D.   **Solve.**

Harry chose 3 magic wands from a collection of 10 wands. What fraction of the wands did he choose? Draw the magic wands and colour the fraction.