CHAPTER: Fraction and Decimals

Grade: **7**
Board: **CBSE**
Book: **NCERT**

1.

Chapter Summary and Placement

<Read through the following to understand how this chapter is connected with the previous and next grades and also the important concepts covered in it.>

1. This chapter connects with Fractions and decimals chapters of grade 6
2. In this chapter multiplication and division of fractions and decimals are dealt with.
3. This connects to the same chapter of grade 8 and also to comparing quantities

2.

LEARNING OUTCOMES

<On completion of the chapter, students will be able to:>

1. Recall definition of Proper, improper, mixed fractions, like and unlike fractions; Rules to add and subtract fractions
2. Explore multiplication of fraction through repeated addition
3. Explore operation “of” on fractions
4. Extend multiplication of fractions to include multiplication of fraction by fraction and fraction by whole number
5. Acquire knowledge of reciprocal of a fraction
6. Explore division of fractions through repeated subtraction
7. Extend division of fractions to include division of whole number by fraction; fraction by whole number; fraction by fraction
8. Recapitulate place values of decimals; inter conversion of decimals to fractions and vice versa; addition and subtraction of decimals
9. Explore multiplication of decimal numbers by whole numbers; 10 and powers of 10; decimal number
10. Explore division of decimal numbers with whole number, decimal number, 10 and powers of 10

4. TEACHING PLAN

Follow this section for getting ideas on teaching the content covered in the chapter. The subtopic given in the first column with the matching learning outcome can be explained using instructions and resources listed subsequently

Subtopic and Learning Objective #1

Subtopic: How well you know about fraction
LO:
Recall definition of Proper, improper, mixed fractions, like and unlike fractions; Rules to add and subtract fractions
1.To make the student recall all the definitions

Teacher Activity

1. Recapitulate the definitions and rules to add or subtract fractions
2. **Resource 1 can be used for recapitulation**
3. Conduct **Activity 1 to recapitulate fractions**

Check for understanding:

a) Explain any one type of fraction with an example
b) Add/ subtract the following fractions[Fractions can be of teacher's choice]

Resources Suggested

Blackboard, pen and paper
Resource 1 for reference

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Blackboard, pen and paper
Resource 1 for reference

Activity 1

Name of the activity-Coloring blocks
Type of activity – Individual
Use it for – Practice/test/homework
Materials – Pattern blocks paper
Procedure –
Instructions to the teachers:

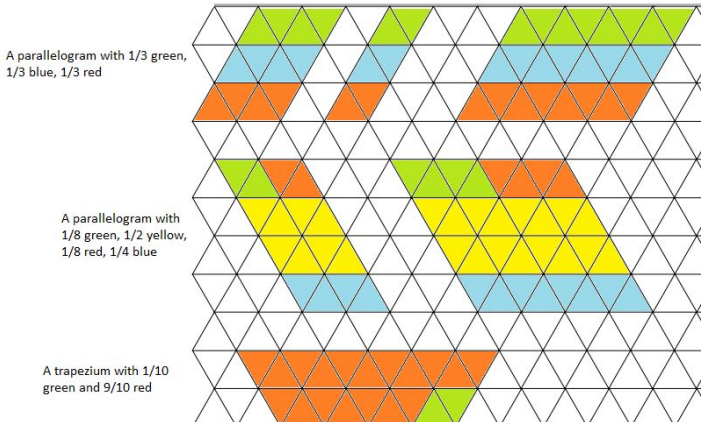
1. Make sure that patterns block paper is available with each student
2. Write the following set of instructions on the board
3. Ask the student to color according to the instructions

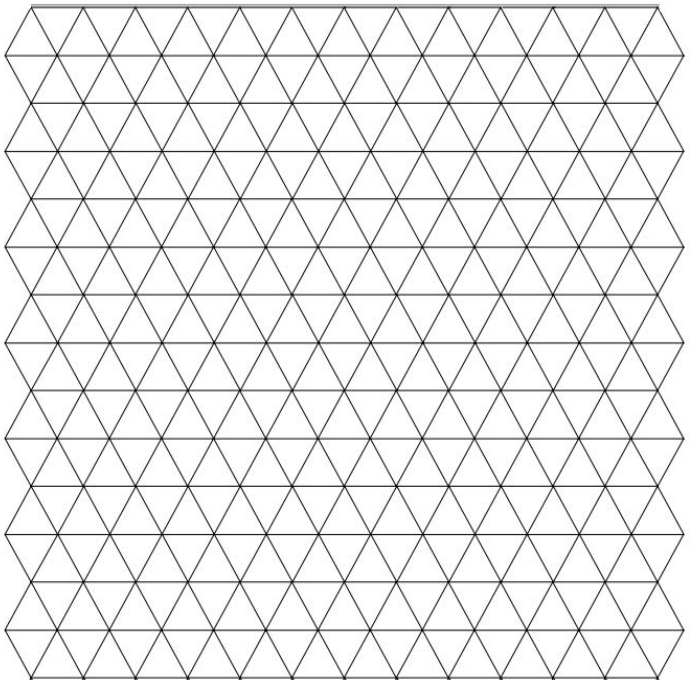
Instructions to students:
Use pattern blocks to solve each of the fraction puzzles below.
Draw each solution on pattern block paper.
Label each colour with its fraction of the whole shape.
1. Build a parallelogram with an area that is 1/ 3 green, 1/ 3 blue, and 1/ 3 red.
2. Build a parallelogram with an area that is 1/ 8 green, 1/ 2 yellow, 1 /8 red, and 1/ 4 blue.
3. Build a trapezium with an area that is 1/ 10 green and 9/ 10 red.
4. Explain why it is not possible to build a parallelogram with an area that is one-half yellow, one-third green, and one-quarter blue.

Activity 1

Solution: For teacher reference:

Shapes may vary as per students imagination. Task 4 is not possible since as we add up the fractions resultant sum is not 1





Subtopic and Learning Objective #2

Sub topic: Multiplication of fractions

LO:

Explore multiplication of fraction through repeated addition

1. To make student understand how multiplication can be done by repeated addition

LO

: Explore operation “of” on fractions

2. TO make the student understand operation “of”

LO :

Extend division of fractions to include division of whole number by fraction; fraction by whole number; fraction by fraction

3. To make the student understand how to carry out multiplication of fractions

Teachers Activity

1. Introduce multiplication of fractions as the method of repeated addition
2. Introduce how the operation “of” can be operated on fractions as given in NCERT text book
3. Introduce multiplication of fraction with whole number and with fraction

Check for understanding:

a) ***12of 36 mangoes=_____***
b) ***27of a number is 14 find the number?***
c) ***Multiply the given fractions[Fractions can be of teacher’s choice***

Resources Suggested

Blackboard, pen and paper
Resource 2 can be used for explanation

Subtopic and Learning Objective #3

Sub topic:Division of fractions

LO:

Acquire knowledge of reciprocal of a fraction

1. To make student understand reciprocal of a fraction

LO

: Explore division of fractions through repeated subtraction

2. To make the student understand how a division can be done by repeated subtraction

LO :

Extend division of fractions to include division of whole number by fraction; fraction by whole number; fraction by fraction

3. To make the student to understand how to carry out divisions of fractions

Teachers Activity

a) Introduce the concept of reciprocal of fraction
b) Introduce division of fractions as the method of repeated subtraction and also division by whole number and by fraction
c) Introduce that division of fractions is nothing but multiplying dividend with the reciprocal of divisor
d) **Resource 3 can be used for explanation**

Check for understanding:

a) Reciprocal of zero is_____
b) Find the reciprocals of the following[fractions/ numbers can be of teacher's choice]

Resources Suggested

Blackboard, pen and paper
Resource 3 can be used for explanation

Subtopic and Learning Objective #4

Subtopic: How well you know about decimal
LO:
Recapitulate place values of decimals; inter conversion of decimals to fractions and vice versa; addition and subtraction of decimals
1. To make student recall decimals and their place values

Teachers Activity

1. Recap about decimals and their place values. Interconversion of decimal numbers to decimal fractions and vice versa
2. **Resource 4 can be used for recap**

Check for understanding:

a) The immediate place of decimal after decimal point is_____
b) Place value of 2 in 345.002 is _____
c) Decimal fraction of 23.456 is_____
d) Write decimal number of 3/8

Resources Suggested

Blackboard pen and paper
Resource 4 can be used for recap

Subtopic and Learning Objective #5

Sub topic: Multiplication of decimals
LO:
Explore multiplication of decimal numbers by whole numbers; 10 and powers of 10; decimal number
1. To make student do multiplication of decimals

Teachers Activity

1. Introduce multiplication of decimal numbers by whole numbers; 10 and powers of 10; decimal number as given in NCERT text book

Check for understanding:

a) Find the product of the following[Decimals can be of teacher's choice]

Resources Suggested

Blackboard , pen and paper

Subtopic and Learning Objective #6

Sub topic:
Division of decimals

LO:
Explore division of decimal numbers with whole number, decimal number, 10 and powers of 10
1. To make student do division of decimals

Teachers Activity

1. Introduce division of decimal numbers with whole number, decimal number , 10 and powers of 10
2. Perform **Activity 2** to make the student to practice word problems

Check for understanding:

a) Do the following decimal divisions:[decimals can be of teacher's choice]

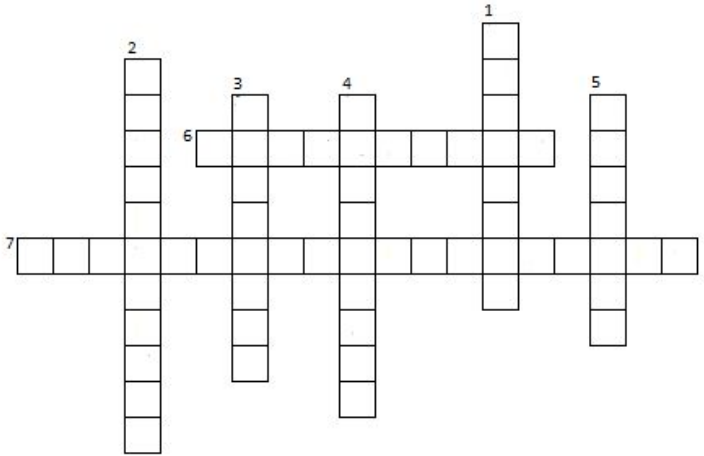
Resources Suggested

Blackboard , pen and paper

Activity 2

Name of the activity- Crossword puzzle on operations of fractions and decimals
Type of activity – Individual/ group
Use it for – Practice/test/homework
Materials – Sheet with puzzle and clues
Procedure –
Instructions to the teachers:

1. Provide puzzle sheet with clues
2. Ask student to solve the clues and fill the puzzle



Across

6. Ms. Legume wants to use one-third of her garden for lettuce and one- half for beans. What fraction of the garden does she have left for each of her carrots and her peas if they both are to get the same amount of space?

7. Ezra used 0.9 kilograms of almonds to make 2 batches of snack mix. How many kilograms of almonds[in decimal fraction], on average, were in each batch?

Down

1. The walking speed of a person is 6.9 km per hour. What is the time taken [in fraction] to walk 2.3 km?

2. Tyson cut some bagels in half and some apples into eighths. At the end of the party, there were 5 pieces of bagel and 11 slices of apple left. The number of pieces not eaten were combined and formed as fraction. If fraction of apples were divided by fraction of bagels then the resultant fraction is_____

3. Xia has 18 metres of rope. She cuts off 3 meters of the rope, what part of the rope has been cut off ?

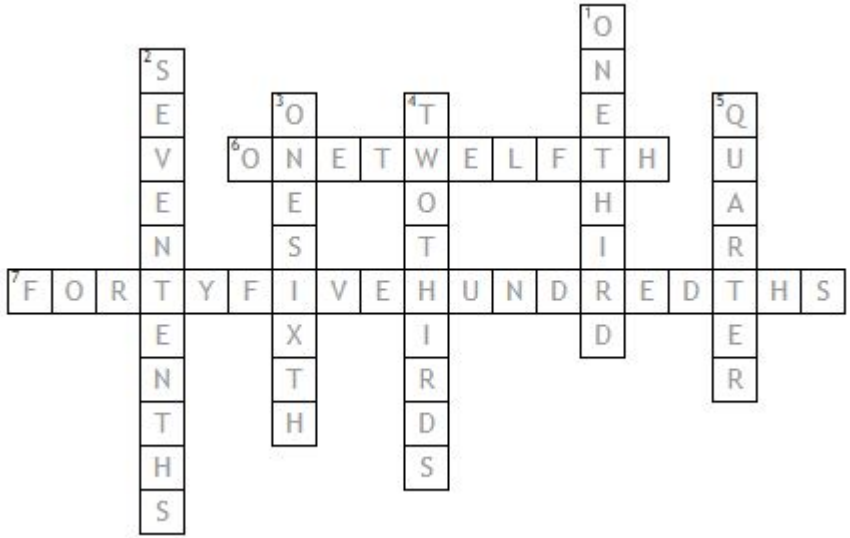
4. Sam filled 6 glasses with 4 litres of juice in each glass. How much fraction of juice is filled in each glass?

5. what fraction of forty is ten?

Activity 2

1.

Solution for teacher reference not for students:



Resource 1

1.

we can define the three types of fractions like this:

Proper Fractions: The numerator is less than the denominator Examples: 14; 35;47

Improper Fractions: The numerator is greater than (or equal to) the denominator Examples: 43;114;77

Mixed Fractions: A whole number and proper fraction together Examples:113;214;1625

Like fractions :Fractions with the same denominators (bottom numbers) are called like fractions.
For example:
2/13and35/13;1/6and5/6;2/15and 39/15 are like fractions with the same denominators
Unlike fractions:
Fractions with different denominators (bottom numbers) are called unlike fractions.
For example:
2/3and1/5 1/3;1/6and6/23; 21/5and17/19unlike fractions with different denominators

Resource 1

1.

In conversion of mixed fractions into improper fractions, we may follow the following steps:

Step Identify the whole number and the numerator (top) and denominator (bottom) of the proper fraction.
Step II:Multiply the whole number by the denominator of the proper fraction and add the result to the numerator of the proper fraction.
Step III:Write the fraction having numerator equal to the number obtained in step III and denominator same as the denominator of the fraction in step II. Thus,

$$\text{Improper Fractions} = \frac{(\text{Whole Number} \times \text{Denominator}) + \text{Numerator}}{\text{Denominator}}$$

Resource 2

1. Mr. Goode gave $\frac{1}{3}$ of a cupcake to 8 of his students. How many cupcakes did Mr. Goode give out?

8 groups of $\frac{1}{3}$ = $8 \times \frac{1}{3}$

$\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{8}{3}$



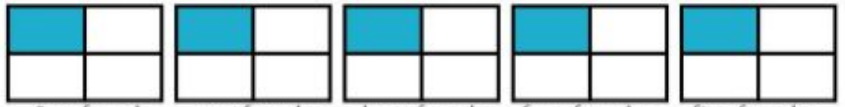
5 x ¼

1/4 +1/4 + 1/4 + 1/4 +1/4 = 5/4

Using a number line:



Using Models:



Resource 3

$2\frac{1}{4} \div \frac{1}{4} = 2\frac{1}{4} - \frac{1}{4} \xrightarrow{①} 2 - \frac{1}{4} \xrightarrow{②} 1\frac{3}{4} - \frac{1}{4} \xrightarrow{③} 1\frac{1}{2} - \frac{1}{4}$

$\xrightarrow{④} 1\frac{1}{4} - \frac{1}{4} \xrightarrow{⑤} 1 - \frac{1}{4} \xrightarrow{⑥} \frac{3}{4} - \frac{1}{4} \xrightarrow{⑦} \frac{1}{2} - \frac{1}{4} \xrightarrow{⑧} \frac{1}{4} - \frac{1}{4} \xrightarrow{⑨} 0$

$2\frac{1}{4} \div \frac{1}{4} = 9$

$2 \div \frac{1}{3} \rightarrow 2 - \frac{1}{3} = 1\frac{2}{3} \rightarrow 1\frac{2}{3} - \frac{1}{3} = 1\frac{1}{3} \rightarrow 1\frac{1}{3} - \frac{1}{3} = 1$

① ② ③

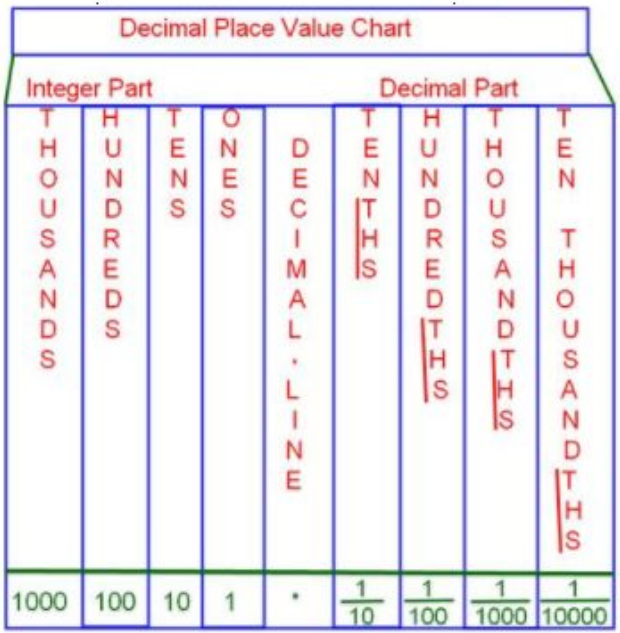
$\rightarrow 1 - \frac{1}{3} = \frac{2}{3} \rightarrow \frac{2}{3} - \frac{1}{3} = \frac{1}{3} \rightarrow \frac{1}{3} - \frac{1}{3} = 0$

④ ⑤ ⑥

$\therefore 2 \div \frac{1}{3} = 6$

Resource 4

1.



Decimal Place Value Chart									
Integer Part					Decimal Part				
THOUSANDS	HUNDREDS	TENS	ONES	DECIMAL LINE	TENTHS	HUNDREDTHS	THOUSANDTHS	TEN THOUSANDTHS	
1000	100	10	1	.	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	$\frac{1}{10000}$	

Decimal Place Value Chart													
Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones	Decimal point	Tenths	Hundredths	Thousandths	Ten-thousandths	Hundred thousandths	Millionths
			3	6	8	4	.	2	6				

5. WORKSHEETS

Print or copy the worksheet questions on the blackboard and ask the students to attempt them. They can be given as homework or a class test as well.

Worksheet 1

1) $\frac{5}{6} - \frac{2}{5} =$ 2) $\frac{5}{6} - \frac{1}{4} =$ 3) $\frac{11}{12} - \frac{5}{6} =$ 4) $\frac{5}{6} - \frac{5}{9} =$ 5) $\frac{2}{3} + \frac{1}{2} =$

6) $\frac{5}{8} - \frac{5}{8} =$ 7) $\frac{4}{5} + \frac{4}{9} =$ 8) $\frac{5}{8} + \frac{3}{10} =$ 9) $\frac{2}{3} - \frac{1}{4} =$ 10) $\frac{3}{4} + \frac{7}{12} =$

11) $8\frac{3}{8} - 5\frac{1}{9} =$ 12) $7\frac{3}{8} + 9\frac{3}{4} =$ 13) $4\frac{1}{2} - 2\frac{3}{8} =$

14) $15\frac{7}{8} - 10\frac{5}{9} =$ 15) $8\frac{7}{8} + 8\frac{8}{9} =$

Worksheet 2

Use it like: test after the chapter is complete, homework

Answer the following:

1. $2 \times \frac{5}{6} =$ _____
2. $9 \times \frac{1}{4} =$ _____
3. $\frac{3}{8}$ of $7 =$ _____
4. $\frac{2}{3}$ of $4 =$ _____
5. $\frac{1}{8}$ of $1 =$ _____
6. $\frac{2}{6}$ of $9 =$ _____
7. $\frac{3}{6} \times \frac{5}{6} =$ _____
8. $\frac{4}{8} \times \frac{7}{8} =$ _____
9. $\frac{4}{5} \times \frac{1}{5} =$ _____
10. $\frac{3}{8} \times \frac{1}{4} =$ _____
11. $\frac{4}{5} \times \frac{3}{4} =$ _____
12. $\frac{3}{8} \times \frac{5}{6} =$ _____
13. $\frac{4}{5} \times \frac{7}{8} =$ _____
14. $\frac{1}{4} \times \frac{1}{4} =$ _____
15. $\frac{3}{5} \times \frac{7}{8} =$ _____
16. $2\frac{1}{3} \times 5\frac{1}{3} =$ _____
17. $8\frac{1}{5} \times 4\frac{3}{5} =$ _____
18. $7\frac{1}{4} \times 7\frac{3}{4} =$ _____

Worksheet 3

1. $9 \div \frac{2}{3} =$ _____

2. $8 \div \frac{5}{8} =$ _____

3. $2 \div \frac{1}{6} =$ _____

4. $5 \div \frac{1}{4} =$ _____

5. $\frac{1}{6} \div \frac{1}{3} =$ _____

6. $\frac{2}{3} \div \frac{1}{8} =$ _____

7. $\frac{7}{8} \div \frac{1}{4} =$ _____

8. $\frac{1}{3} \div \frac{1}{4} =$ _____

9. $8\frac{3}{4} \div 3\frac{1}{4} =$ _____

10. $9\frac{2}{6} \div 1\frac{5}{6} =$ _____

11. $8\frac{1}{3} \div 5\frac{2}{3} =$ _____

12. $3\frac{3}{4} \div 5\frac{3}{4} =$ _____

13. $\frac{4}{6} \div 1 =$ _____

14. $\frac{4}{8} \div 5 =$ _____

15. $\frac{1}{3} \div 7 =$ _____

Worksheet 4

1. $2 \times 3.5 =$ _____
2. $4 \times 3.7 =$ _____
3. $7 \times 0.10 =$ _____
4. $6 \times 0.03 =$ _____
5. $5 \times 7.2 =$ _____
6. $8 \times 0.41 =$ _____
7. $0.5 \times 0.5 =$ _____
8. $0.7 \times 0.03 =$ _____
9. $0.3 \times 0.07 =$ _____
10. $0.2 \times 0.06 =$ _____
11) _____ $\times 5 = 0.5$
12) $3 \times$ _____ $= 0.3$
13) $0.6 \times$ _____ $= 5.4$
14) _____ $\times 0.3 = 0.6$
15) _____ $\times 0.09 = 0.072$
16) _____ $\times 0.7 = 0.014$

Worksheet 5

1. $23.5 \times 100 =$ _____
2. $1.15 \times 100 =$ _____
3. $4.97 \times 10 =$ _____
4. $69.8 \times 100 =$ _____
5. $0.02 \times 100 =$ _____
6. $0.125 \times 10 =$ _____
7. $0.330 \times 1{,}000 =$ _____
8. $5.56 \times 1{,}000 =$ _____
9) $100 \times$ _____ $= 610$
10) _____ $\times 100 = 729$
11) $54.76 \times$ _____ $= 5476$
12) $48.48 \times$ _____ $= 4848$
13) _____ $\times 100 = 822$
14) $1000 \times$ _____ $= 6182$
15) $100 \times$ _____ $= 738.5$
16) _____ $\times 10 = 65$

Worksheet 6

Answer the following:

1. 3.36 ÷ 3=
2. 23.46 ÷ 5=
3. 8 ÷ 2.5 =
4. 16 ÷ 0.05=
5. 20.3÷0.05=
6. 13.48÷0.4=
7. 1.2 ÷ 0.01 =
8. 987 ÷ 0.1 =
9. 18.63 ÷ 0.003=
10. 4.37 ÷ 10 =
11. 7.897 ÷ 100=
12. 345.567 ÷ 1000 =
13. 23.45 ÷ _____=0.2345
14. _____÷ 1000= 834.56
15. 483.56 ÷ _____= 0.48356
16. _____ ÷ 10= 123.45

6. SOLUTIONS

This section gives you sample answers for activities and questions listed above.

Worksheet 1

1. 13/30
2. 7/12
3. 1/12
4. 5/18
5. 76=116
6. 0
7. 56/45=1 11/45
8. 37/40
9. 5/12
10. 4/3=11/3
11. 3 19/72
12. 17/18
13. 2 1/8
14. 52372
15. 17 55/72
16. 423+314+2112=10 cups
17. b and c are possible. Other two statements are not possible since the sum or parts of bar eaten is not 1

Worksheet 2

1. $2 \times \frac{5}{6} = 1\frac{2}{3}$

2. $9 \times \frac{1}{4} = 2\frac{1}{4}$

3. $\frac{3}{8}$ of $7 = 2\frac{5}{8}$

4. $\frac{2}{3}$ of $4 = 2\frac{2}{3}$

5. $\frac{1}{8}$ of $1 = \frac{1}{8}$

6. $\frac{2}{6}$ of $9 = 3$

7. $\frac{3}{6} \times \frac{5}{6} = \frac{5}{12}$

8. $\frac{4}{8} \times \frac{7}{8} = \frac{7}{16}$

9. $\frac{4}{5} \times \frac{1}{5} = \frac{4}{25}$

10. $\frac{3}{8} \times \frac{1}{4} = \frac{3}{32}$

11. $\frac{4}{5} \times \frac{3}{4} = \frac{3}{5}$

12. $\frac{3}{8} \times \frac{5}{6} = \frac{5}{16}$

13. $\frac{4}{5} \times \frac{7}{8} = \frac{7}{10}$

14. $\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$

15. $\frac{3}{5} \times \frac{7}{8} = \frac{21}{40}$

16. $2\frac{1}{3} \times 5\frac{1}{3} = 12\frac{4}{9}$

17. $8\frac{1}{5} \times 4\frac{3}{5} = 37\frac{18}{25}$

18. $7\frac{1}{4} \times 7\frac{3}{4} = 56\frac{3}{16}$

Worksheet 3

1. $9 \div \frac{2}{3} = 13\frac{1}{2}$
2. $8 \div \frac{5}{8} = 12\frac{4}{5}$
3. $2 \div \frac{1}{6} = 12$
4. $5 \div \frac{1}{4} = 20$
5. $\frac{1}{6} \div \frac{1}{3} = \frac{1}{2}$
6. $\frac{2}{3} \div \frac{1}{8} = 5\frac{1}{3}$
7. $\frac{7}{8} \div \frac{1}{4} = 3\frac{1}{2}$
8. $\frac{1}{3} \div \frac{1}{4} = 1\frac{1}{3}$
9. $8\frac{3}{4} \div 3\frac{1}{4} = 2\frac{9}{13}$
10. $9\frac{2}{6} \div 1\frac{5}{6} = 5\frac{1}{11}$
11. $8\frac{1}{3} \div 5\frac{2}{3} = 1\frac{8}{17}$
12. $3\frac{3}{4} \div 5\frac{3}{4} = \frac{15}{23}$
13. $\frac{4}{6} \div 1 = \frac{2}{3}$
14. $\frac{4}{8} \div 5 = \frac{1}{10}$
15. $\frac{1}{3} \div 7 = \frac{1}{21}$

Worksheet 4

1. 23.5 × 100 = 2,350.0
2. 1.15 × 100 = 115.00
3. 4.97 × 10 = 49.70
4. 69.8 × 100 = 6,980.0
5. 0.02 × 100 = 2.00
6. 0.125 × 10 = 1.250
7. 0.330 × 1,000 = 330.000
8. 5.56 × 1,000 = 5,560.00

9) 6.1

10) 7.29

11) 100

12) 100

13) 8.22

14) 6.182

15) 7.385

16) 6.5

Worksheet 5

1. 3.36 ÷ 3= 1.12
2. 23.46 ÷ 5= 4.692
3. 8 ÷ 2.5 = 3.2
4. 16 ÷ 0.05 = 320
5. 20.3÷0.05=406
6. 13.48÷0.4= 33.7
7. 1.2 ÷ 0.01 = 120
8. 987 ÷ 0.1 =9870
9. 18.63 ÷ 0.003= 6210
10. 4.37 ÷ 10 = 0.437
11. 7.897 ÷ 100= 0.07897
12. 345.567 ÷ 1000 =0 .345567
13. 23.45 ÷ _____=0.2345 Ans 100
14. _____÷ 1000= 834.56 Ans 83560
15. 483.56 ÷ _____= 0.48356 Ans 1000
16. _____ ÷ 10= 123.45 Ans 1234.5

7. EXTRA RESOURCES

Carry out the following suggested activities/ tasks if you have the time and resources to do them

Teacher can use these videos if time and facilities permit:

1. https://www.youtube.com/watch?v=pgQ3POImeDs- Fraction multiplications overview
2. https://www.youtube.com/watch?v=ybwz9OGGzng why to flip fraction in division