



Mathematics Enhancement Programme

# Primary Demonstration Project

## 4B Fractions

### Help Booklet



Support for Primary Teachers  
in Mathematics

Primary Project  
funded by  
Pricewaterhouse  
Coopers

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**ESSO**

CIMT  
School of Education  
University of Exeter

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*Mathematics Enhancement Programme*

**Help Module 4**

# **FRACTIONS**

## **Part B**

### **Contents of Part B**

Preface  
Activities  
Tests  
Answers

### **Contents of Part A**

Preface  
Introductory Notes  
Worked Examples and Exercises  
Answers

# PREFACE

This is one of a series of *Help Modules* designed to help you gain confidence in mathematics. It has been developed particularly for primary teachers (or student teachers) but it might also be helpful for non-specialists who teach mathematics in the lower secondary years. It is based on material which is already being used in the *Mathematics Enhancement Programme: Secondary Demonstration Project*.

The complete module list comprises:

- |              |                       |
|--------------|-----------------------|
| 1. ALGEBRA   | 6. HANDLING DATA      |
| 2. DECIMALS  | 7. MENSURATION        |
| 3. EQUATIONS | 8. NUMBERS IN CONTEXT |
| 4. FRACTIONS | 9. PERCENTAGES        |
| 5. GEOMETRY  | 10. PROBABILITY       |

Notes for overall guidance:

- Each of the 10 modules listed above is divided into 2 parts. This is simply to help in the downloading and handling of the material.
- Though referred to as 'modules' it may not be necessary to study (or print out) each one in its entirety. As with any self-study material you must be aware of your own needs and assess each section to see whether it is relevant to those needs.
- The difficulty of the material in **Part A** varies quite widely: if you have problems with a particular section do try the one following, and then the next, as the content is not necessarily arranged in order of difficulty. Learning is not a simple linear process, and later studies can often illuminate and make clear something which seemed impenetrable at an earlier attempt.
- In **Part B**, **Activities** are offered as backup, reinforcement and extension to the work covered in Part A. **Tests** are also provided, and you are strongly urged to take these (at the end of your studies) as a check on your understanding of the topic.
- The marking scheme for the revision test includes B, M and A marks.

Note that:

- |                |   |
|----------------|---|
| <b>M</b> marks | are for method;   |
| <b>A</b> marks | are for accuracy (awarded only following a correct M mark); |
| <b>B</b> marks | are independent, stand-alone marks.                         |

We hope that you find this module helpful. Comments should be sent to:

Professor D. N. Burghes  
CIMT, School of Education  
University of Exeter  
EXETER EX1 2LU

The full range of Help Modules can be found at

[www.ex.ac.uk/cimt/help/menu.htm](http://www.ex.ac.uk/cimt/help/menu.htm)

## ACTIVITIES

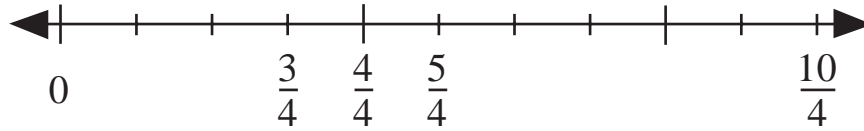
- Activity 4.1 Fraction Number Lines
  - Activity 4.2 Equivalent Fractions 1
  - Activity 4.3 Equivalent Fractions 2
  - Activity 4.4 Adding and Subtracting Fractions
- Notes for Solutions

# ACTIVITY 4.1

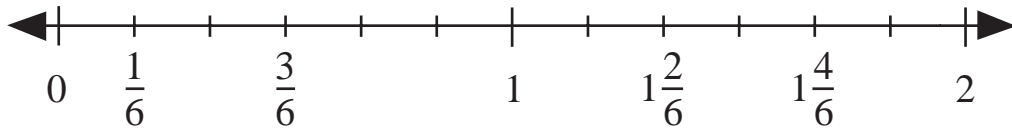
## *Fraction Number Lines*

Fill in each mark with the correct number.

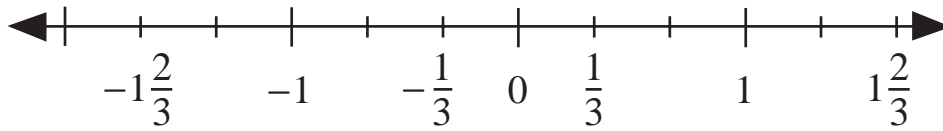
(a)



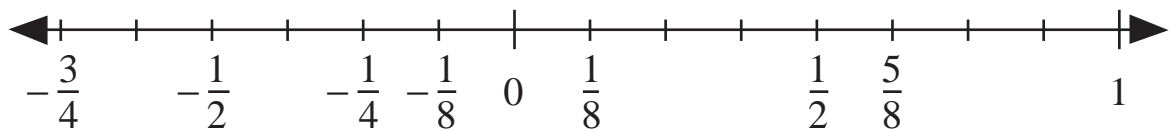
(b)



(c)



(d)



# ACTIVITY 4.2.1

## *Equivalent Fractions 1*

*Fraction Chart*

$\frac{0}{1}$												$\frac{1}{1}$					
$\frac{0}{2}$					$\frac{1}{2}$							$\frac{2}{2}$					
$\frac{0}{3}$			$\frac{1}{3}$				$\frac{2}{3}$					$\frac{3}{3}$					
$\frac{0}{4}$		$\frac{1}{4}$		$\frac{2}{4}$		$\frac{3}{4}$						$\frac{4}{4}$					
$\frac{0}{5}$		$\frac{1}{5}$		$\frac{2}{5}$		$\frac{3}{5}$		$\frac{4}{5}$				$\frac{5}{5}$					
$\frac{0}{6}$	$\frac{1}{6}$		$\frac{2}{6}$		$\frac{3}{6}$		$\frac{4}{6}$		$\frac{5}{6}$			$\frac{6}{6}$					
$\frac{0}{7}$	$\frac{1}{7}$		$\frac{2}{7}$		$\frac{3}{7}$		$\frac{4}{7}$		$\frac{5}{7}$		$\frac{6}{7}$	$\frac{7}{7}$					
$\frac{0}{8}$	$\frac{1}{8}$	$\frac{2}{8}$		$\frac{3}{8}$		$\frac{4}{8}$		$\frac{5}{8}$		$\frac{6}{8}$		$\frac{7}{8}$	$\frac{8}{8}$				
$\frac{0}{9}$	$\frac{1}{9}$	$\frac{2}{9}$		$\frac{3}{9}$		$\frac{4}{9}$		$\frac{5}{9}$		$\frac{6}{9}$		$\frac{7}{9}$	$\frac{8}{9}$	$\frac{9}{9}$			
$\frac{0}{10}$	$\frac{1}{10}$	$\frac{2}{10}$		$\frac{3}{10}$		$\frac{4}{10}$		$\frac{5}{10}$		$\frac{6}{10}$		$\frac{7}{10}$	$\frac{8}{10}$	$\frac{9}{10}$	$\frac{10}{10}$		
$\frac{0}{11}$	$\frac{1}{11}$	$\frac{2}{11}$		$\frac{3}{11}$		$\frac{4}{11}$		$\frac{5}{11}$		$\frac{6}{11}$		$\frac{7}{11}$	$\frac{8}{11}$	$\frac{9}{11}$	$\frac{10}{11}$	$\frac{11}{11}$	
$\frac{0}{12}$	$\frac{1}{12}$	$\frac{2}{12}$		$\frac{3}{12}$		$\frac{4}{12}$		$\frac{5}{12}$		$\frac{6}{12}$		$\frac{7}{12}$	$\frac{8}{12}$	$\frac{9}{12}$	$\frac{10}{12}$	$\frac{11}{12}$	$\frac{12}{12}$

**ACTIVITY 4.2.2***Equivalent Fractions 1*

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Look carefully at the **fraction chart** on Activity 4.2.1.

To find an equivalent fraction of  $\frac{3}{5}$ , place a ruler vertically at  $\frac{3}{5}$ .

You will find that  $\frac{6}{10}$  lies on the same line.

So  $\frac{3}{5}$  and  $\frac{6}{10}$  are equivalent fractions.

Using a ruler, find all the equivalent fractions of each of the following from the chart.

(a)  $\frac{1}{2} =$

(b)  $\frac{2}{3} =$

(c)  $\frac{2}{6} =$

(d)  $\frac{1}{5} =$

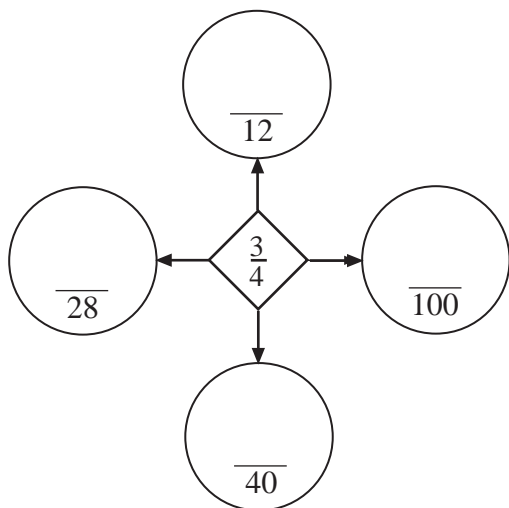
(e)  $\frac{3}{4} =$

# ACTIVITY 4.3

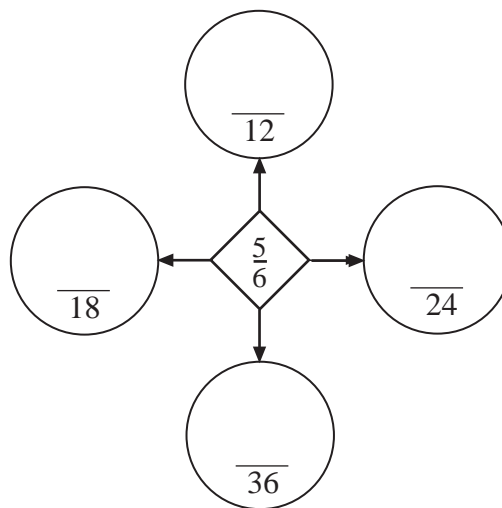
## Equivalent Fractions 2

Complete each of the following so that the fractions in  $\bigcirc$  are equivalent to those in  $\diamond$ .

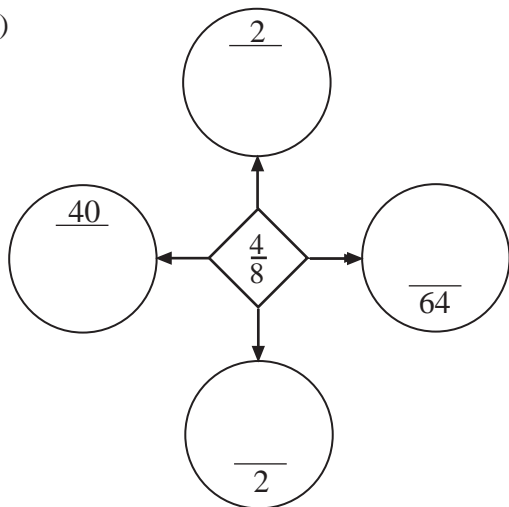
(a)



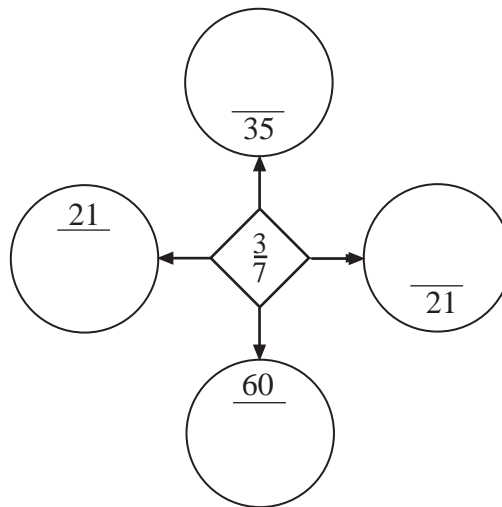
(b)



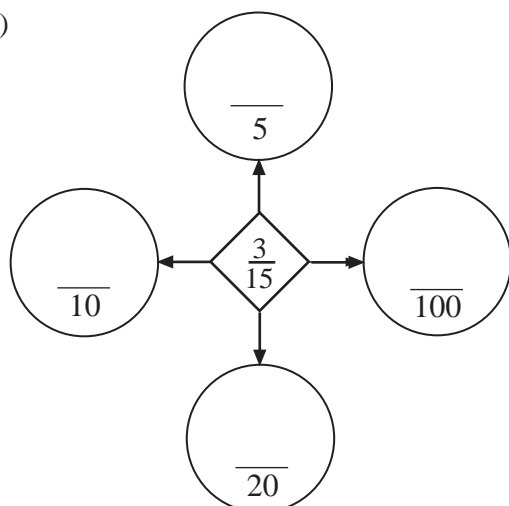
(c)



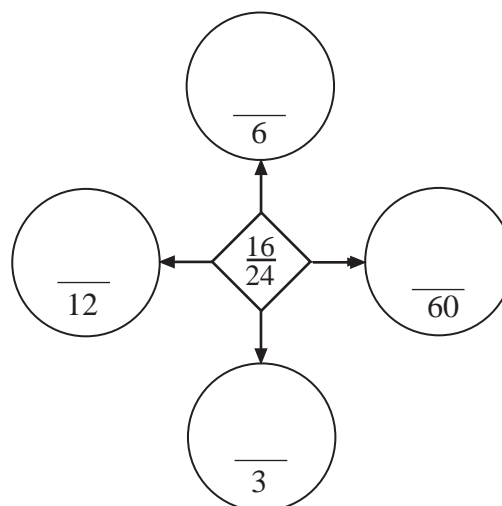
(d)



(e)



(f)

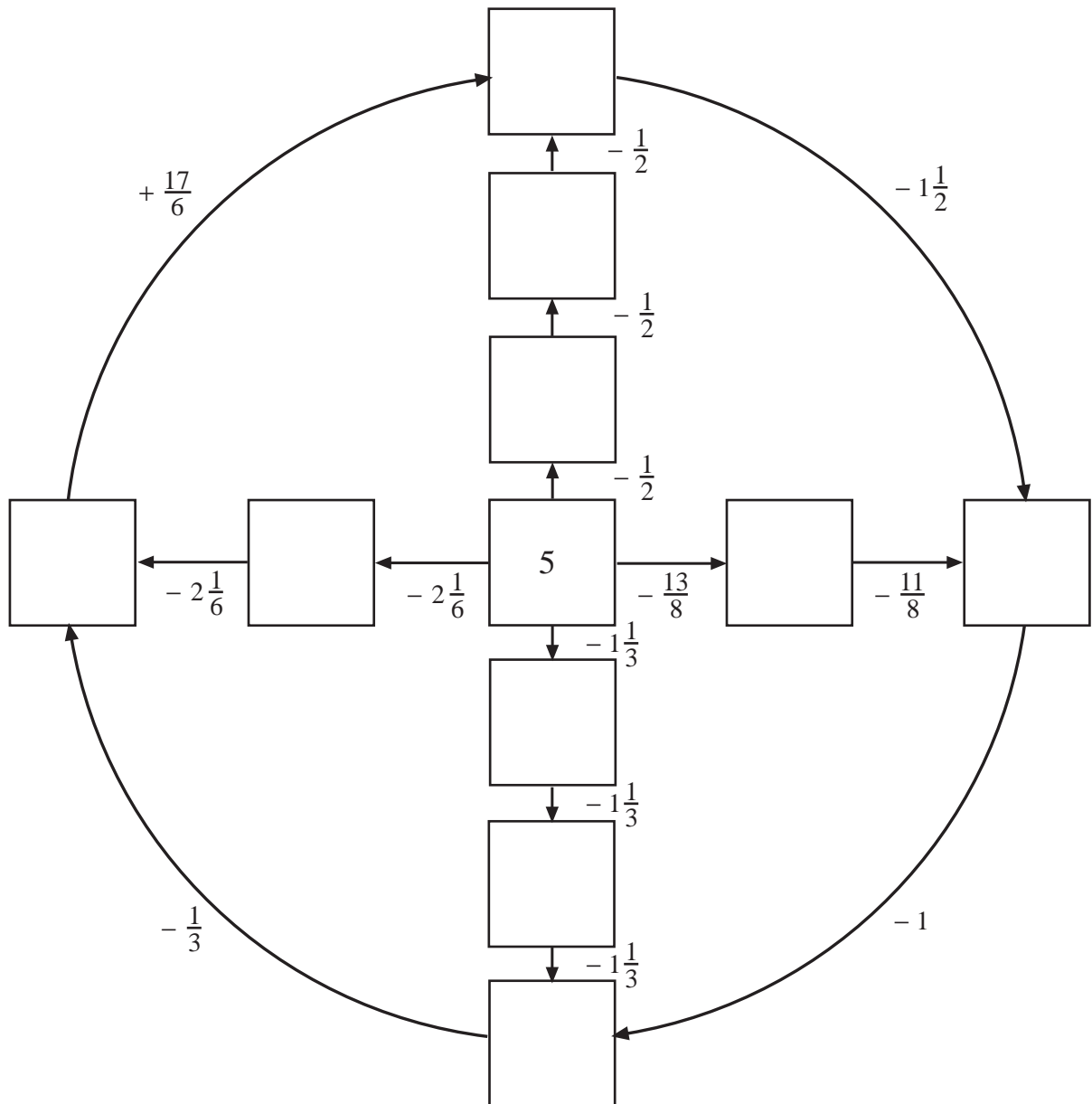




# ACTIVITY 4.4

## *Adding and Subtracting Fractions*

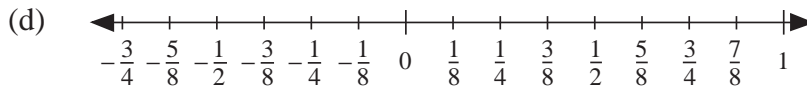
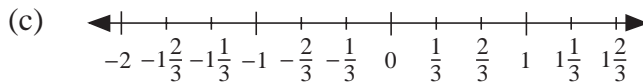
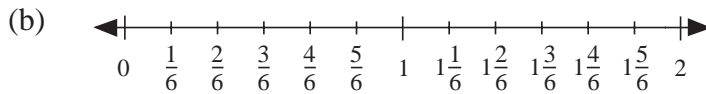
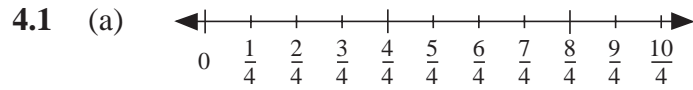
Using the information given, fill in each gap with the correct number.



# ACTIVITIES 4.1 - 4.3

# Notes for Solutions

Notes and solutions are only given where appropriate.

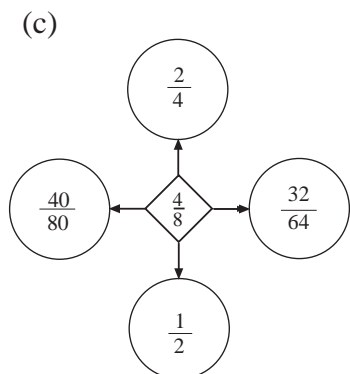
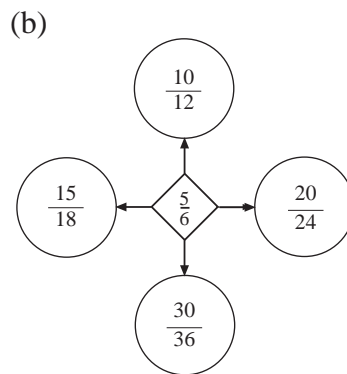
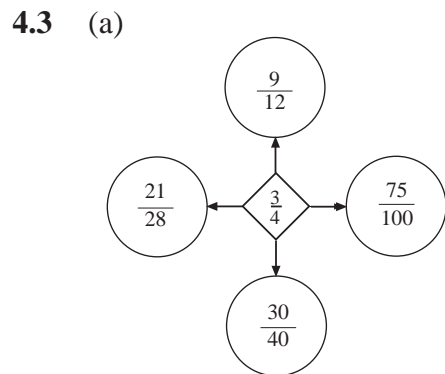


4.2 (a)  $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12}$

(b)  $\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12}$

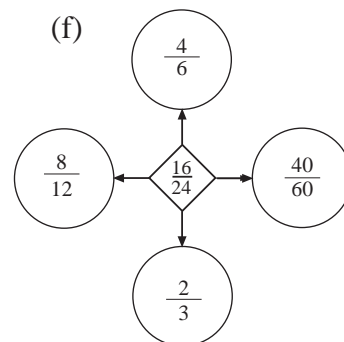
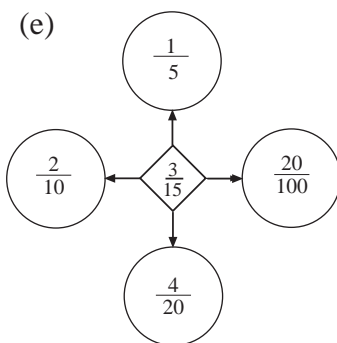
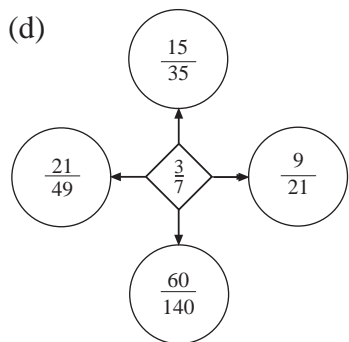
(c)  $\frac{1}{5} = \frac{2}{10}$

(d)  $\frac{3}{4} = \frac{6}{8} = \frac{9}{12}$

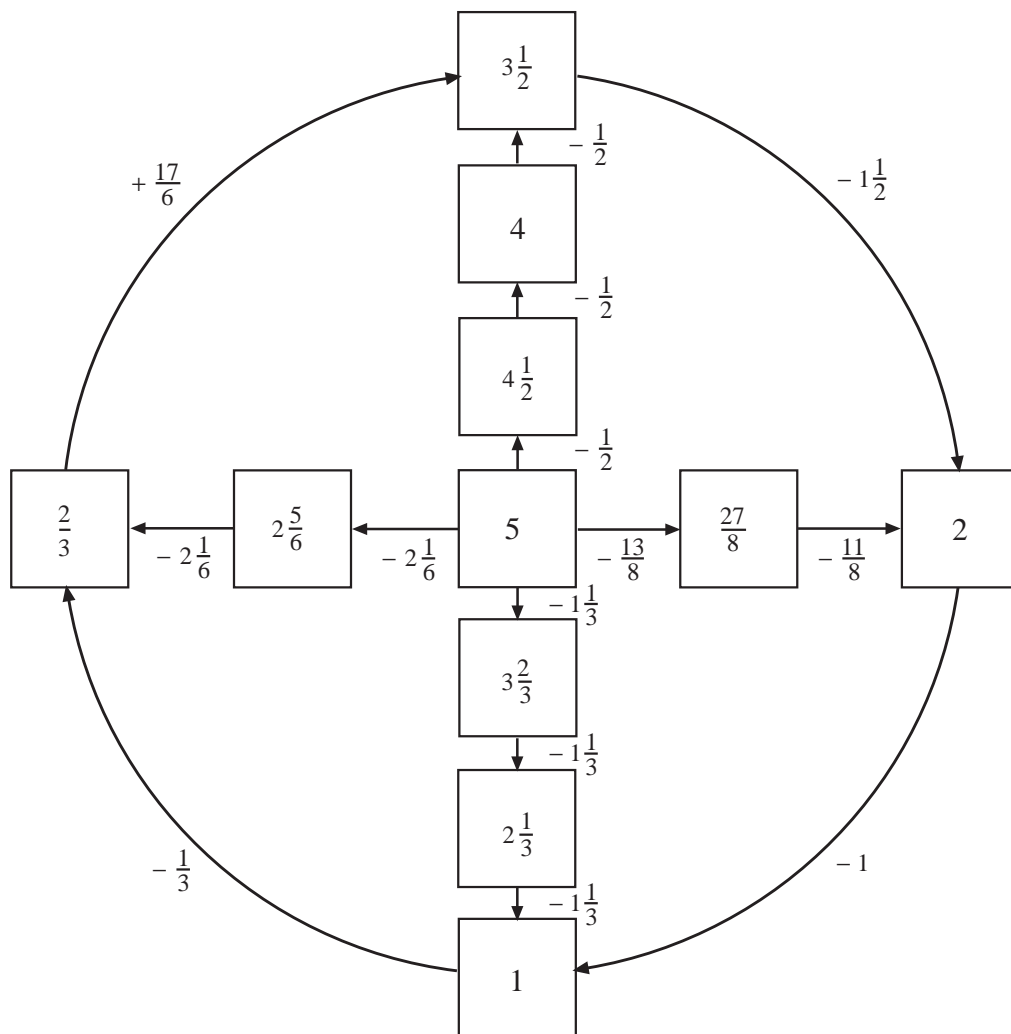


# ACTIVITIES 4.3 - 4.4

# Notes for Solutions



4.4



# TESTS

4.1 Mental Practice

4.2 Mental Practice

4.3 Revision

Answers

**Test 4.1****Mental Practice**

---

*Answer these questions as quickly as you can, but without the use of a calculator.*

1. Write 40% as a fraction in its simplest form.

2. Convert 0.3 to a fraction.

3. What is  $\frac{3}{4}$  as a decimal?

4. What is  $\frac{1}{8}$  as a percentage?

5. What is  $\frac{1}{5}$  of 40 km?

6. What is  $\frac{3}{8}$  of 24 m?

7. Calculate (a)  $\frac{1}{2} + \frac{3}{8}$

(b)  $\frac{1}{4} - \frac{1}{8}$

(c)  $\frac{3}{7} \div \frac{4}{15}$

(d)  $\frac{12}{5} \div \frac{4}{15}$

**Test 4.2****Mental Practice**

---

*Answer these questions as quickly as you can, but without the use of a calculator.*

1. Write 25% as a fraction in its simplest form.

2. Convert 0.35 to a fraction.

3. What is  $\frac{3}{5}$  as a decimal?

4. What is  $\frac{7}{10}$  as a percentage?

5. What is  $\frac{1}{8}$  of 32 cm?

6. What is  $\frac{3}{7}$  of 28 kg?

7. Calculate (a)  $\frac{2}{5} + \frac{1}{3}$

(b)  $\frac{1}{2} - \frac{1}{8}$

(c)  $\frac{9}{11} \times \frac{44}{27}$

(d)  $\frac{15}{4} \div \frac{25}{2}$

**Test 4.3****Revision**

*40 minutes are allowed*

1. Calculate

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

2. Find

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

(b)  $\frac{3}{8}$  of £24

(c)  $\frac{4}{7}$  of 35 kg      (3 marks)

3. Write each fraction in its lowest terms.

(a)  $\frac{12}{40}$       (b)  $\frac{10}{25}$       (c)  $\frac{14}{56}$       (3 marks)

4. Calculate

(a)  $\frac{1}{4} - \frac{1}{8}$       (b)  $\frac{3}{10} - \frac{1}{5}$       (c)  $\frac{5}{8} - \frac{2}{5}$       (3 marks)

5. Calculate

(a)  $\frac{2}{5}$  of £15 plus  $\frac{4}{7}$  of £28

(b)  $\frac{3}{8}$  of £32 take away  $\frac{1}{6}$  of £24.      (6 marks)

6. Three lengths, each 200 mm long, are cut from a bar of length 900 mm.

- (a) What fraction of the bar is each length?
- (b) What fraction of the bar is left after the three lengths have been cut?      (4 marks)

7. Contracts totalling £120 000 were awarded to three companies. One company received half of the total amount and another a third.

How much did the third company receive?      (3 marks)

**Test 4.3 Revision**

8. A girl received £24 for part-time work. She spent £3.60 on travelling and £2.40 on lunch.  
What fraction of her total wage was left? (3 marks)
9. If  $\frac{3}{20}$  of a batch of 600 electrical components were found to be faulty, how many were not faulty? (3 marks)
10. Calculate
- (a)  $\frac{1}{2} \times \frac{3}{4}$                       (b)  $\frac{3}{10} \times \frac{4}{5}$                       (c)  $\frac{7}{9} \times \frac{3}{28}$  (4 marks)
11. A businessman is paid  $20\frac{1}{2}$ p for every kilometre he travels by car.  
How much does he receive for a journey of  $12\frac{1}{2}$  km? (2 marks)
12. A trawler travelled for  $3\frac{1}{2}$  hours at  $5\frac{1}{2}$  knots, and then for  $7\frac{1}{2}$  hours at  $6\frac{1}{2}$  knots.  
How many nautical miles were covered in total? (1 knot = 1 nautical mile per hour.) (4 marks)
13. What is the area of a floor of length  $7\frac{1}{4}$  m and width  $5\frac{3}{4}$  m? (3 marks)
14. Calculate
- (a)  $\frac{3}{8} \div \frac{1}{4}$                       (b)  $\frac{4}{9} \div \frac{2}{3}$                       (c)  $\frac{15}{28} \div \frac{3}{7}$  (3 marks)
15. In his will, a man left half his money to his wife and the rest in equal proportions to his three children.  
If he left £240 000, how much did each child receive? (3 marks)



**Tests 4.1 and 4.2****Answers**

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**Test 4.1**

1.  $\frac{2}{5}$
2.  $\frac{3}{10}$
3. 0.75
4.  $12\frac{1}{2}\%$
5. 8 km
6. 9 m
7. (a)  $\frac{7}{8}$   
(b)  $\frac{1}{8}$   
(c)  $\frac{4}{5}$   
(d) 9

**Test 4.2**

1.  $\frac{1}{4}$
2.  $\frac{35}{100} = \frac{7}{20}$
3. 0.6
4. 70%
5. 4 cm
6. 12 kg
7. (a)  $\frac{11}{15}$   
(b)  $\frac{3}{8}$   
(c)  $\frac{4}{3}$   
(d)  $\frac{3}{10}$

## Test 4.3

## Answers

1. (a)  $\frac{3}{4}$  (b)  $\frac{5}{6}$  (c)  $\frac{21}{40}$  B1 B1 B1 (3 marks)
2. (a) 5 m (b) £12 (c) 20 kg B1 B1 B1 (3 marks)
3. (a)  $\frac{3}{10}$  (b)  $\frac{2}{5}$  (c)  $\frac{1}{4}$  B1 B1 B1 (3 marks)
4. (a)  $\frac{1}{8}$  (b)  $\frac{1}{10}$  (c)  $\frac{9}{40}$  B1 B1 B1 (3 marks)
5. (a) £6 + £16 = £22 B1 B1 B1  
 (b) £12 - 4 = £8 B1 B1 B1 (6 marks)
6. (a)  $\frac{2}{9}$  B2  
 (b)  $\frac{1}{9}$  B2 (4 marks)
7.  $1 = \left(\frac{1}{2} + \frac{1}{3}\right) = \frac{1}{6}$  M1 A1  
 $\frac{1}{6}$  of £120 000 = £20 000 B1 (3 marks)
8. £3.60 + 2.40 = £6.00 B1  
 fraction left =  $\frac{24 - 6}{24} = \frac{18}{24} = \frac{3}{4}$  M1 A1 (3 marks)
9.  $\frac{3}{20} \times 600 = 90$  faulty M1 A1  
 600 - 90 = 519 not faulty A1 (3 marks)
10. (a)  $\frac{3}{8}$  (b)  $\frac{6}{25}$  (c)  $\frac{1}{12}$  B1 B1 B2 (4 marks)
11.  $20\frac{1}{2} \times 12\frac{1}{2} = 256.25\text{p}$  M1 A1 (2 marks)  
 (or £2.56 to the nearest p)
12.  $\left(\frac{7}{2} \times \frac{11}{2}\right) + \left(\frac{15}{2} \times \frac{13}{2}\right) = \frac{77}{4} + \frac{195}{4}$  M1 A1 A1  
 = 68 nautical miles B1 (4 marks)

**Test 4.3 Answers**

13.  $\frac{29}{4} \times \frac{23}{4} = \frac{667}{16}$  M1 A1  
 $= 41\frac{11}{16}$  (or 41.6875) A1 (3 marks)

14. (a)  $\frac{3}{2}$  (b)  $\frac{2}{3}$  (c)  $\frac{5}{4}$  B1 B1 B1 (3 marks)

15. Each child received  $\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$  of total B1  
 $\frac{1}{6} \times \text{£}240\,000 = \text{£}40\,000$  M1 A1 (3 marks)

**(TOTAL MARKS 50)**