Edexcel GCSE

Mathematics

Foundation/Higher Tier

Number: Fractions

Information for students

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 47 questions in this selection.

Advice for students

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

Information for teachers

The questions in this document are taken from the 2009 GCSE Exam Wizard and include questions from examinations set between January 2003 and June 2009 from specifications 1387, 1388, 2540, 2544, 1380 and 2381.

Questions are those tagged as assessing “Fractions” though they might assess other areas of the specification as well. Questions are those tagged as “Foundation/Higher” so could have (though not necessarily) appeared on either a Foundation, Intermediate or Higher tier paper.

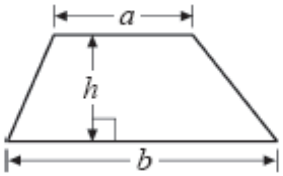
GCSE Mathematics

Formulae: Foundation Tier

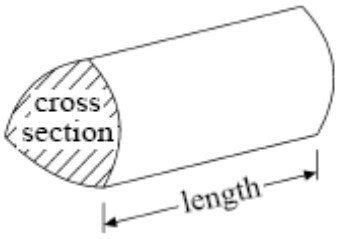
You must not write on this formulae page.

Anything you write on this formulae page will gain NO credit.

Area of trapezium = $(a + b)h$



Volume of prism = area of cross section × length



1. Simon spent $\frac{1}{3}$ of his pocket money on a computer game.

He spent $\frac{1}{4}$ of his pocket money on a ticket for a football match.

Work out the fraction of his pocket money that he had left.

.....

(Total 3 marks)

2. In 2002, Shorebridge Chess Club's total income came from a council grant and members' fees.

Council grant	£50
Members' fees	240 at £5 each.

(a) (i) Work out the total income of the club for the year 2002.

£ .....

(ii) Find the council grant as a fraction of the club's total income for the year 2002.
Give your answer in its simplest form.

.....

(3)

In 2001, the club's total income was £1000.
The club spent 60% of its total income on a hall.
It spent a further £250 on prizes.

(b) Work out the ratio

The amount spent on the hall : the amount spent on prizes.

Give your answer in its simplest form.

.....

(3)
(Total 6 marks)

3. (a) Work out $\frac{2}{5}+\frac{3}{8}$

……

(2)

(b) Work out $5\frac{2}{3}-2\frac{3}{4}$

……

(3)
(Total 5 marks)

4. Work out $5\frac{2}{3} - 2\frac{3}{4}$

.....

(Total 3 marks)

5. (a) Work out $1 - \left(\frac{1}{2} + \frac{1}{6}\right)$

.....

(3)

(b) Work out $12\frac{1}{2} \div \frac{5}{8}$

.....

(3)
(Total 6 marks)

6. Work out $12\frac{1}{2} \div \frac{5}{8}$

.....

(Total 3 marks)

7. Alistair sells books.

He sells each book for £7.60 plus VAT at 17 $\frac{1}{2}$ %.

He sells 1650 books.
Work out how much money Alistair receives.

£…….

(Total 4 marks)

8. Some students each chose one PE activity.

$\frac{1}{5}$ of the students chose swimming.

$\frac{3}{8}$ of the students chose tennis.

All the rest of these students chose cricket.

What fraction of the students chose cricket?

.....

(Total 3 marks)

9. Work out $\frac{2}{3}+\frac{1}{5}$

(Total 2 marks)

10. (a) Work out $\frac{1}{3}+\frac{3}{5}$

.....

(2)

(b) Work out $2\frac{1}{4} \div \frac{3}{5}$

.....

(3)

(Total 5 marks)

11. Work out $3\frac{2}{5} - 1\frac{3}{4}$

.....

(Total 3 marks)

12. A full glass of water holds $\frac{1}{6}$ of a bottle of water.

How many glasses of water can be filled from $2\frac{1}{2}$ bottles of water?

.....

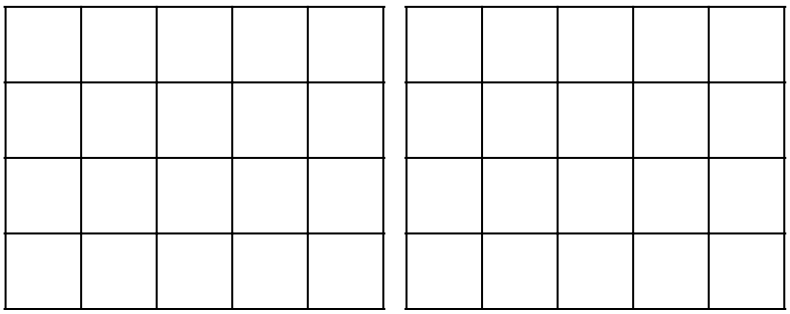
(Total 3 marks)

13. Here are two fractions $\frac{3}{4}$ and $\frac{4}{5}$

Which is the larger fraction?

You must show your working to explain your answer.

You may use the grids to help with your explanation.



..... is the larger fraction

(Total 3 marks)

14. (a) Use your calculator to work out $\frac{4.7}{9.4 - 3.5}$

Write down all the figures on your calculator display.

.....

(2)

(b) Write these numbers in order of size.
Start with the smallest number.

0.82 $\frac{4}{5}$ 85% $\frac{2}{3}$ $\frac{7}{8}$

.....

(2)
(Total 4 marks)

15. Plain tiles cost 28p each.
Patterned tiles cost £9.51 each.

Julie buys 450 plain tiles and 15 patterned tiles.

(a) Work out the total cost of the tiles.

£ ……...

(3)

(b) Express 15 as a fraction of 450
Give your answer in its simplest form.

……...

(2)

Fred lays the tiles.
He charges £360 plus VAT at 17.5%.

(c) Work out the total amount that Fred charges.

£ ……...

(3)
(Total 8marks)

16. (a) Write these fractions in order of size.
Start with the smallest fraction.

$\frac{3}{4}$ $\frac{5}{6}$ $\frac{2}{3}$ $\frac{7}{12}$

.....

(2)

(b) Work out $\frac{3}{4}+\frac{1}{6}$

.....

(2)

(c) (i) Which of these fractions can be written as a recurring decimal?

$\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{5}$

.....

(ii) Explain your answer.

.....

.....

.....

(2)
(Total 6 marks)

17. In April 2004, the population of the European Community was 376 million.

In April 2005, the population of the European Community was 451 million.

(a) Work out the percentage increase in population.

Give your answer correct to 1 decimal place.

.....%

(3)

In April 2004, the area of the European Community was 3.2 million km^2.

In April 2005, the area of the European Community increased by $\frac{3}{8}$

(b) Work out the area of the European Community in April 2005.

..... million km^2

(2)

(Total 5 marks)

(b) Express 15 as a fraction of 450
Give your answer in its simplest form.

……...

(2)

Fred lays the tiles.
He charges £360 plus VAT at 17.5%.

(c) Work out the total amount that Fred charges.

£ ……...

(3)
(Total 8marks)

18. (a) Work out $2\frac{3}{4}+3\frac{2}{3}$

Give your answer as a fraction in its simplest form.

.....

(3)

(b) (i) Which of these fractions can be written as a recurring decimal?

$\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{5}$

.....

(ii) Explain your answer.

.....

.....

.....

(2)
(Total 5 marks)

19. (a) Work out $\frac{1}{3}+\frac{1}{12}$

.....

(2)

(b) Work out $\frac{3}{4}\times\frac{1}{5}$

.....

(1)
(Total 3 marks)

20. (a) Write down the reciprocal of 4

.....

(1)

(b) Work out the value of $2\frac{4}{5} - 1\frac{3}{4}$

Give your answer as a fraction in its simplest form.

.....

(3)

(c) Sundas says that $4\frac{1}{3}$ is equal to 4.3

Sundas is **wrong**.
Explain why.

.....

.....

(1)
(Total 5 marks)

21. Work out $\frac{2}{5}+\frac{1}{7}$

.....

(Total 2 marks)

22. Work out

$$3\frac{3}{4} \times 2\frac{2}{3}$$

……

(Total 3 marks)

23. Work out $2\frac{2}{3} \times 3\frac{1}{2}$

Give your answer as a mixed number in its simplest form.

.....

(Total 3 marks)

24. Asif, Barbara and Curtly share some money.

Asif receives $\frac{3}{8}$ of the money.

Barbara receives $\frac{1}{3}$ of the money.

What fraction of the money does Curtly receive?

……

(Total 3 marks)

25. Calculate the reciprocal of 0.8

.....

(Total 1 mark)

26. Work out the value of $\frac{2}{3} \times \frac{3}{4}$

Give your answer as a fraction in its simplest form.

……

(Total 2 marks)

27. Work out the value of $1\frac{2}{3} + 2\frac{3}{4}$

Give your answer as a fraction in its simplest form.

……

(Total 3 marks)

28. Work out $4\frac{1}{2} + 1\frac{2}{5}$

.....

(Total 3 marks)

29. $\frac{1}{3}$ $\frac{2}{5}$ $\frac{5}{8}$ $\frac{6}{10}$ $\frac{7}{12}$ $\frac{9}{15}$

Maria correctly converted each of these fractions to decimals.

Put a ring around each fraction which gave a recurring decimal.

(Total 2 marks)

30. Write down the reciprocal of 4

.....

(Total 1 mark)

31. (a) Linda gets 24 out of 40 in a science test.

Write 24 out of 40 as a percentage.

.....%

(2)

(b) Work out $\frac{2}{3}+\frac{1}{5}$

.....

(2)

(Total 4 marks)

32. There are 21 questions in a science test.
Each question is on biology or on chemistry or on physics.

The numbers of questions on biology, chemistry and physics are in the ratios 4 : 2 : 1

(i) What fraction of the questions are on chemistry?

.....

(ii) Work out the number of questions that are on biology.

.....

(Total 5 marks)

33. Lewis wants to buy a new pair of trainers.

There are 3 shops that sell the trainers he wants.

Sports '4' All	**Edexcel Sports**	**Keef's Sports**
Trainers	**Trainers**	**Trainers**
£5	$\frac{1}{5}$ off	**£50**
plus	usual price of	plus
10 payments of £4.50	**£65**	VAT at $17\frac{1}{2}$%

(a) Work out the cost of a pair of the trainers in Sports '4' All.

£…….

(2)

(b) Work out the cost of a pair of the trainers in Edexcel Sports.

£…….

(2)

(Total 4 marks)

34.

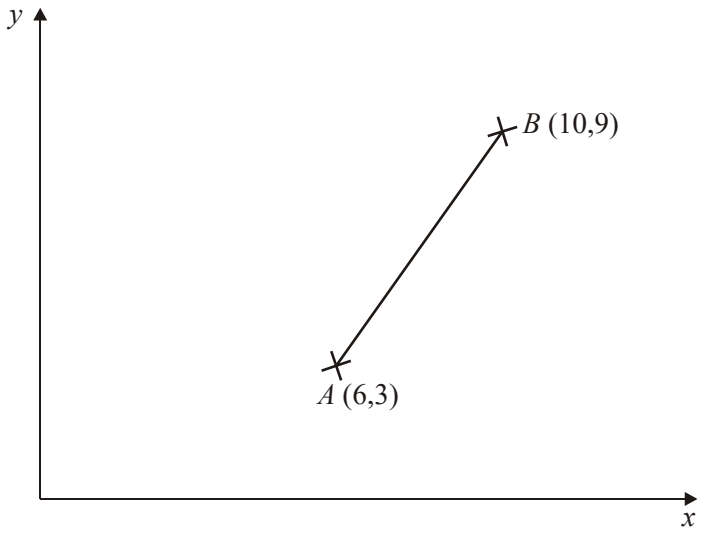


Diagram **NOT** accurately drawn

A is the point with coordinates (6, 3).
B is the point with coordinates (10, 9).

M is the midpoint of the line AB

Work out the coordinates of the point M.

(....., ...)
(Total 2 marks)

35. Work out $\frac{2}{3}+\frac{1}{5}$

…….
(Total 2 marks)

36. Work out

$$1\frac{3}{4}+2\frac{2}{3}$$

$4\frac{5}{12}$	$3\frac{5}{7}$	$3\frac{6}{12}$	$3\frac{5}{12}$	$4\frac{5}{7}$
[ ]	[ ]	[ ]	[ ]	[ ]
A	**B**	**C**	**D**	**E**

(Total 1 mark)

37.

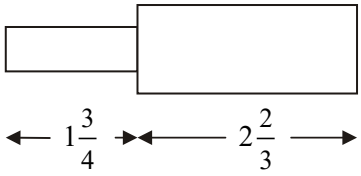


Diagram **NOT** accurately drawn

A machine tool is made from two parts.

One part has a length of $1\frac{3}{4}$ inches.

The other part has a length of $2\frac{2}{3}$ inches.

What is the total length, in inches, of the machine tool?

$3\frac{5}{7}$	$4\frac{5}{12}$	$4\frac{2}{3}$	$\frac{15}{7}$	$3\frac{5}{12}$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

38. What is $1\frac{3}{4}+\frac{2}{3}$ written as a mixed number?

$1\frac{17}{12}$	$1\frac{5}{7}$	$1\frac{5}{12}$	$2\frac{5}{12}$	$\frac{29}{12}$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

39. (a) Write 24 as a fraction of 36
Give your answer in its simplest form.

.....

(2)

(b) Change $\frac{3}{5}$ into a decimal.

.....

(2)
(Total 4 marks)

40. (a) Change $\frac{5}{8}$ to a decimal.

.....

(2)

(b) Work out $\frac{2}{5}+\frac{1}{7}$

.....

(2)

(c) Work out $2\frac{1}{2}\times 1\frac{3}{5}$

.....

(3)
(Total 7 marks)

41. What is $\frac{1}{8}$ when written as a decimal?

0.18	0.1	0.12	1.8	0.125
A	**B**	**C**	**D**	**E**

(Total 1 mark)

42. Work out $\frac{2}{3} \div \frac{5}{6}$

$\frac{4}{5}$	$\frac{7}{9}$	$\frac{10}{18}$	$\frac{15}{12}$	$\frac{18}{10}$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

43. $\frac{2}{3} + \frac{1}{5} =$

$\frac{3}{8}$	$\frac{2}{15}$	$\frac{13}{15}$	$\frac{3}{15}$	$\frac{11}{15}$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

44. Which is the smallest fraction?

$\frac{6}{8}$	$\frac{2}{3}$	$\frac{5}{6}$	$\frac{17}{24}$	$\frac{1}{2}$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

45. Work out $\frac{1}{8}+\frac{3}{4}$

.....

(Total 2 marks)

46. Work out $\frac{3}{5}\times\frac{1}{4}$

.....

(Total 2 marks)

47. Alan bought 20 melons for £15

$\frac{1}{5}$ of the melons were bad so he threw them away.

He sold the remaining melons for £1.50 each.

Work out Alan's profit.

£ .....

(Total 4 marks)

01. $\frac{5}{12}$

$\frac{1}{3} + \frac{1}{4} = \frac{4}{12} + \frac{3}{12} = \frac{7}{12}$

$1 - \frac{7}{12} = \frac{5}{12}$

M1 for $\frac{4}{12}$ ***and*** $\frac{3}{12}$ *oe*

A2 for $\frac{5}{12}$ *oe*

(A1 for $\frac{7}{12}$*)*

B1 for $1-''\left(\frac{1}{3}+\frac{1}{4}\right)''$ *correctly evaluated*

$\frac{5}{12}$

$1-\frac{1}{3}=\frac{2}{3}$, $1-\frac{1}{4}=\frac{3}{4}$

$\frac{8}{12}-\frac{3}{12}=\frac{5}{12}$ or $\frac{9}{12}-\frac{4}{12}=\frac{5}{12}$

B1 for $\frac{2}{3}$ *or* $\frac{3}{4}$ *seen*

M1 for $\frac{8}{12}-\frac{3}{12}=\frac{5}{12}$ *or* $\frac{9}{12}-\frac{4}{12}=\frac{5}{12}$

A1 for $\frac{5}{12}$ *oe*

$\frac{5}{12}$

M1 for 0.25 and 0.33 or better
A1 for 0.58 or better
A1 for 0.416 or recurring

[3]

02. (a) (i) 1250 3

$240 \times 5 = 1200$

B1 cao 1250

(ii) $\frac{1}{25}$

$\frac{50}{\text{'1250'}}$

M1 cao $\frac{50}{\text{'1250'}}$

A1 for $\frac{1}{25}$ *in its simplest form*

(b) 12:5 3

$\frac{60}{100} \times 1000 = 600$

M1 for $\frac{60}{100} \times 1000$ *oe*
A1 for 600
A1 cao

[6]

03. (a) $\frac{31}{40}$ 2

$\frac{16}{40} + \frac{15}{40}$

M1 for $\frac{16}{40} + \frac{15}{40}$ *correctly writing both fractions to a common denominator.*

A1 for $\frac{31}{40}$ *oe*

(b) $2\frac{11}{12}$ 3

$\frac{17}{3} - \frac{11}{4}$

Or 5-2 & $\frac{2}{3} - \frac{3}{4}$ oe

$\frac{68}{12} - \frac{33}{12}$ or $\frac{8}{12} - \frac{9}{12}$ oe

M1 for correctly decomposing into non mixed numbers
M1 ft for correct method to write all fractions to a common denominator
A1 for $\frac{35}{12}$ *oe single fraction or mixed number*
SC: B3 for 2.916
(B1 for 5.6 – 2.75 oe decimals)

[5]

04. $2\frac{11}{12}$ 3

$\frac{17}{3}-\frac{11}{4}$ or $5-2$ & $\frac{2}{3}-\frac{3}{4}$ oe

$\frac{68}{12}-\frac{33}{12}$ or $\frac{8}{12}-\frac{9}{12}$ oe

M1 for correctly decomposing into non mixed numbers
M1ft for correct method to write all fractions to a common denominator
A1 for $\frac{35}{12}$ *oe single fraction or mixed number*
SC: B3 for 2.916
(B1 for 5.6 – 2.75 oe decimals)

[3]

05. (a) $\frac{1}{3}$ 3

$\frac{1}{2}+\frac{1}{6}=\frac{4}{6}$

$1-\frac{4}{6}$

M1 for correctly writing both fractions to a common denominator
A1 for $\frac{2}{3}$ *oe*
B1 ft for $1-\frac{"2"}{3}$

(b) 20 3

$12\frac{1}{2}\div\frac{5}{8}$

$\frac{25}{2}\times\frac{8}{5}$

M1 for $12\frac{1}{2}$ *correctly written as an improper fraction*
M1 (indep) for $\times\ \frac{8}{5}$
A1 for 20 oe

[6]

06. 20 3

$12\frac{1}{2} - \frac{5}{8}$

$\frac{25}{2} \times \frac{8}{5}$

M1 for $12\frac{1}{2}$ *correctly written as an improper fraction*

M1 (indep) for $\times \frac{8}{5}$

A1 for 20 oe

[3]

07. £14 734.50 4

$7.60 \times \frac{17.5}{100} = 1.33$

$7.60 + 1.33 = 8.93$

$1650 \times$ "8.93"

M1 for $7.60 \times \frac{17.5}{100}$ *or 1.33 seen or 7.60 × 1.175 (oe)*

(Award M1 for 10%, 5% and 2½% correctly calculated)

A1 for 8.93 or 893

M1 for 1650 x "8.93" or digits 147345 seen

A1 cao Accept 14734.5

Alternative

M1 for 1650 × 7.6(0) or 12540 seen

M1 for "12540" × $\frac{17.5}{100}$ *or 2194.5 seen or "12540"× 1.175 (oe)*

(Award M1 for 10%, 5% and 2½% correctly calculated)

M1 for "12540" + "2194.5" (dep on both previous method marks) or digits 147345 seen

A1 cao accept 14 734.5

[4]

08. $\frac{1}{5}+\frac{3}{8}=\frac{8}{40}+\frac{15}{40}=\frac{23}{40}$

$\frac{17}{40}$ 3

M1 for attempting to convert to fractions with common denominators eg two fractions with denominator of 40 oe

A1 for getting $\frac{23}{40}$ *oe*

A1 for $\frac{17}{40}$ *oe*

(B1 for getting 1 – "$\frac{1}{5}+\frac{3}{8}$*" correctly evaluated)*

OR attempts to convert to decimals: must use at least 2 dp for 3/8
M1 0.2 + 0.37 or 0.2 + 0.38 or 0.2 + 0.375
A1 for 0.43 or 0.42 or 0.425

[3]

09. $\frac{10}{15}+\frac{3}{15}$

$\frac{13}{15}$ oe 2

M1 for suitable common denominator (multiple of 15), at least one of two fractions correct.

A1 for $\frac{13}{15}$ *oe*

[2]

10. (a) $\frac{5}{15}+\frac{9}{15}$ 2

$\frac{14}{15}$

M1 for suitable common denominator (multiple of 15), at least one of two fractions correct

A1 for $\frac{14}{15}$ *oe*

or
Attempt to use decimals, must use at least 2 dp
M1 for 0.33 + 0.6
A1 for 0.93 (recurring)

(b) $\frac{9}{4}+\frac{3}{5}$ 3

$\frac{9}{4}\times\frac{5}{3}$

$= 3\frac{3}{4}$

M1 for correctly decomposing $2\frac{1}{4}$ *into non mixed number*

M1 for "$\frac{9}{4}$*"*$\times \frac{5}{3}$

A1 for $\frac{45}{12}$ *oe single fraction or mixed number*

or
M1 for 2.25 ÷ 0.6
M1 for sight of decimal division method
A1 for 3.75

[5]

11. $\frac{17}{5}-\frac{7}{4}$ or 3 – 1 and $\frac{2}{5}-\frac{3}{4}$ oe 3

$\frac{68}{20}-\frac{35}{20}$ or $\frac{8}{20}-\frac{15}{20}$ or $2\frac{29}{20}-\frac{15}{20}$

$= 1\frac{13}{20}$

M1 for correctly decomposing into non mixed numbers
M1 for correct method to write all fractions to a common denominator

A1 for $\frac{33}{20}$ *oe single fraction or mixed number*

ALT:
B1 for 3.4 and 1.75
M1 for attempt to subtract 2 decimal (condone one error)
A1 for 1.65 cao

[3]

12. $6 + 6 + 3$ or $2\frac{1}{2} \times 6$

$= 15$ 3

M1 for realizing 6 glasses in one bottle
M1 for realizing 3 glasses in 1/2 a bottle
A1 cao

(M2 for attempt to find $2\frac{1}{2} \times 6$) oe

[3]

13. 15 and 16 parts shaded

$= \frac{4}{5}$ + reason 3

M1 for correctly shading 15 parts for 3/4
M1 for correctly shading 16 parts for 4/5
A1 (dependent on M2) for selection of 4/5

Alternative 1

$\frac{3}{4} = 0.75$, $\frac{4}{5} = 0.8$

M1 for $\frac{3}{4} = 0.75$

M1 for $\frac{4}{5} = 0.8$

A1 (dep on M2) for selection of 0.8
or $\frac{4}{5}$ or $\frac{16}{20}$

Alternative 2

$\frac{3}{4} = \frac{15}{20}$, $\frac{4}{5} = \frac{16}{20}$

M1 for $= \frac{3}{4} = \frac{15}{20}$

M1 for $= \frac{4}{5} = \frac{16}{20}$

A1(dep on M2) for selection of $\frac{4}{5}$ or $\frac{16}{20}$

[3]

14. (a) $4.7 \div 5.9 = 0.796610169$
$= 0.7966..$ 2

B2 for 0.7966 or better

(B1 for 0.8, 0.80, 0.79, 0.796, 0.797 or digits 59 seen)

(b) 0.82, 0.8, 0.85, 0.66, 0.875
0.66, 0.8, 0.82, 0.85, 0.875
2/3, 4/5, 0.82, 85%, 7/8
2/3, 4/5, 0.82, 85%, 7/8 2

B2 correct order (oe decimals in order)

(B1 correct order reversed, or one error in ordered listing) with or without decimal equivalents.

NB Accept 0.67 or 0.66

[4]

15. (a) $450 \times 28 = 12600p = £126$
$15 \times 9.51 = £142.65$
$£142.65 + £126$
$= 268.65$ 3

M1 for 450×28 or 0.28×450 or digits 126 seen

M1 for 15×9.51 or 951×15 or digits14265 seen

A1 cao

(b) $\frac{15}{450} = \frac{1}{30}$

$\frac{1}{30}$ 2

M1 for $\frac{15}{450}$

A1 for $\frac{1}{30}$

SC B1 for 0.03(…….) or 3.33(…….)%

(c) 360×1.175 or

$360 \times \frac{17.5}{100} = 63$

$360 + 63$

= £423 3

M2 for 360×1.175 oe
A1 cao
or
M1 for $360 \times \frac{17.5}{100}$ (= 63)
or attempt at 10%, +5%, +2.5% eg digits 36 + 18 + 9
M1 (dep) 350 + "63"
A1 cao

[8]

16. (a) $\frac{3}{4} = \frac{9}{12}, \frac{5}{6} = \frac{10}{12},$

$\frac{2}{3} = \frac{8}{12}, \frac{7}{12} = \frac{7}{12}$

$= \frac{7}{12}, \frac{2}{3}, \frac{3}{4}, \frac{5}{6}$ 2

M1 for attempting to use a common denominator or attempting to convert fractions to decimals, rounded or truncated to 1 dp
A1 for correct order
Special case: B2 for fully correct order
(B1 for 3 correctly ordered fractions or largest first and in order)

(b) $\frac{9}{12}+\frac{2}{12}=\frac{11}{12}$

$=\frac{11}{12}$ 2

M1 for using a suitable common denominator, at least one of two fractions correct

A1 for $\frac{11}{12}$ *oe*

or

Attempt to use decimals, must use at least 2dp

M1 for 0.75 + 0.16 (or 0.17)

A1 for 0.916 (recurring)

(c) (i) $\frac{1}{2}=0.5, \frac{1}{3}0.\dot{3}, \frac{1}{4}=0.25,$

(ii) $\frac{1}{5}=0.2$

$=\frac{1}{3}$ 2

B1 for 1/3 or equivalent

B1 (dep) for valid reason e.g. it does not terminate,

$\frac{1}{3}=0.\dot{3}$*, 3 doesn't divide into 1 exactly 3*

[6]

17. (a) $\frac{451-376}{376}\times 100$ 3

= 19.9%

M1 $\frac{451-376}{376} = \frac{75}{376} = 0.199$

M1 (dep) $\frac{'451-376'}{376}\times 100$

A1 19.9 – 19.95%

Alternative:

M2 $\frac{451}{376}\times 100 - 100$

A1 19.9 – 19.95%

SC: B1 for 119.9 – 119.95 or $\frac{'451-376'}{451}\times 100$ *oe*

(b) 3.2 ÷ 8 × 3 = 1.2

= 4.4 2

NB: ignore 0s for the purpose of awarding the method marks.

M1 digits 32 with either ÷8 or ×3 or 4 seen or 1.2 seen or digits 96 seen

A1 cao

[5]

18. (a) $\frac{9}{12}+\frac{8}{12}=\frac{17}{12}=1\frac{5}{12}$ 3

$= 6\frac{5}{12}$

M1 for using a common denominator

M1 for either 9/12 or 8/12 or 33/12 or 44/12 or 17/12 oe

A1 for $\frac{77}{12}$ *or* $6\frac{5}{12}$

Alternative

M1 for converting 3/4 and 2/3 to decimals

M1 for 0.75 + 0.66 or better

A1 for $6.41\dot{6}$ *oe*

(b) $\frac{1}{2} = 0.5, \frac{1}{3} = 0.\dot{3}, \frac{1}{4} = 0.25, \frac{1}{5} = 0.2$ 2

$= \frac{1}{3}$

B1 for 1/3 oe
B1 (dep) for valid reason e.g. it does not terminate, 1/3 = 0.333(3...), 3 does not divide exactly into 1

[5]

19. (a) $\frac{4}{12} + \frac{1}{12}$

$\frac{5}{12}$ 2

M1 for $\frac{4}{12}$ or for attempting to use a suitable common denominator other than 12, at least one of the two fractions correct.

A1 for $\frac{5}{12}$ oe

OR

Attempt to use decimals, must use at least 2 d.p.
M1 for 0.33(33...) + 0.08(33...)
A1 for 0.416 recurring

(b) $\frac{3 \times 1}{4 \times 5}$

$\frac{3}{20}$ 1

B1 for $\frac{3}{20}$ oe

[3]

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

B1 for $\frac{1}{4}$ or 0.25 or 4^{-1}

(b) $(2-1)+\left(\frac{4}{5}-\frac{3}{4}\right)=1+\left(\frac{16}{20}-\frac{15}{20}\right)$

or

$\frac{14}{5}-\frac{7}{4}=\frac{56}{20}-\frac{35}{20}=\frac{21}{20}$

or

2.8 – 1.75

$1\frac{1}{20}$ 3

M1 for attempt to convert to fractions with common denominator, e.g. two fractions denominator 20

A1 correct conversion: $\frac{16}{20}$ *and* $\frac{15}{20}$ *oe, or* $\frac{56}{20}$ *or* $\frac{35}{20}$ *oe*

A1 for or $\frac{21}{20}$ *or* $1\frac{1}{20}$

OR

M1 for 0.8 – 0.75 (or 2.8 – 1.75)
A2 for 1.05
(A1 for 0.05)

(c) Reason 1

B1 for correct reason, e.g. '1/3 = 0.3 recurring (accept 0.33)' or '0.3 = 3/10'

[5]

21. $\frac{14}{35}+\frac{5}{35}$

Alternative
0.4 + 0.143

$\frac{19}{35}$ oe 2

M1 for correct common denominator of two fractions with at least one numerator correct

A1 for $\frac{19}{35}$ *oe (for example* $\frac{38}{70}$*)*

Alternative
M1 for 0.4 and 0.14(2857…) (correct to 2dp.)
A1 for 0.54 or better

[2]

22. 10 3

$\frac{15}{4} \times \frac{8}{3} = \frac{5}{1} \times \frac{2}{1}$

M1 for either $\frac{15}{4}$ *or* $\frac{8}{3}$ *oe seen*

M1 for $\frac{15}{4} \times \frac{8}{3}$ *oe*

A1 for 10 or $\frac{10}{1}$

[3]

23. $\frac{56}{6}$ 3

$\frac{8}{3} \times \frac{7}{2} = \frac{56}{6}$

M1 for either $\frac{8}{3}$ *or* $\frac{7}{2}$ *(or equivalent improper fraction)*

M1 for $\frac{8}{3} \times \frac{7}{2}$ *(or equivalent improper fractions)*

A1 for $\frac{56}{6}$ *oe*

[3]

24. $\frac{7}{24}$ 3

$\frac{3}{8} + \frac{1}{3} = \frac{9}{24} + \frac{8}{24} = \frac{17}{24}$

$1 - \frac{17}{24}$

OR

$1 - \frac{3}{8} = \frac{5}{8}$, $1 - \frac{1}{3} = \frac{2}{3}$

$\frac{15}{24} - \frac{8}{24} = \frac{7}{24}$ or

$\frac{16}{24} - \frac{9}{24} = \frac{7}{24}$

M1 for $\frac{9}{24}$ *and* $\frac{8}{24}$ *oe*

M1 A1 for $\frac{7}{24}$

(M1 A0 for $\frac{17}{24}$*)*

(M1 M0 A0 for 1 –"$\frac{3}{8} + \frac{1}{3}$ *"correctly evaluated)*

OR

M1 for $\frac{5}{8}$ *or* $\frac{2}{3}$ *seen*

M1 for $\frac{15}{24} - \frac{8}{24}$ *or* $\frac{16}{24} - \frac{9}{24}$

A1 for $\frac{7}{24}$ *oe*

OR
M1 for 0.375 and 0.33 or better
M1 for 0.705 or better
A1 for 0.2916 recurring

[3]

25. $\frac{5}{4}$ oe 1

$\frac{1}{0.8}$

B1 for $\frac{5}{4}$ *or 1.25 or* $\frac{1}{0.8}$ *oe*

[1]

26. $\frac{1}{2}$ 2

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

M1 for $\frac{6}{12}$ *or* $\frac{3}{6}$ *or* $\frac{2 \times 3}{3 \times 4}$
A1 accept 0.5

[2]

27. $4\frac{5}{12}$ 3

$1 + 2 + \frac{8}{12} + \frac{9}{12}$

M1 for attempt to convert to fractions with common denominator e.g two fractions, denominator of 12
A1 correct conversion : $\frac{8}{12}$ *and* $\frac{9}{12}$,
or $\frac{20}{12}$ *and* $\frac{33}{12}$ *seen (oe)*
A1 cao for $4\frac{5}{12}$
OR
attempts to convert to decimals: must use at least 2dp
M1 0.66 + 0.75 (or 1.66 + 2.75)
A1 4.41, 4.417, 4.416
A1 $4.41\dot{6}$

[3]

28. $4\frac{1}{2}+1\frac{2}{5}$ 3

$= 5\frac{1}{2}+\frac{2}{5}$

$= 5\frac{5}{10}+\frac{4}{10}$

$5\frac{9}{10}$

M1 for adding and collecting whole numbers

M1 for $\frac{5}{10}+\frac{4}{10}$ *oe*

A1 for $5\frac{9}{10}$ *oe (e.g. 5.9,* $\frac{59}{10}$*)*

[3]

29. $\frac{1}{3}, \frac{7}{12}$ 2

B2 for both fractions
(B1 for one correct fraction)
−1 for each incorrect answer over 2

[2]

30. $\frac{1}{4}$ 1

B1 for 0.25 or $\frac{1}{4}$

[1]

31. (a) $\frac{24}{40}\times 100$

60% 2

M1 for $\frac{24}{40}\times 100$ *oe*

A1 cao

(b) $\frac{10}{15}+\frac{3}{15}$

$\frac{13}{15}$ oe or 0.86(7) 2

M1 for converting to fractions with a common denominator with at least one correct numerator or 0.66(7) + 0.2 (both decimals correct)

A1 for $\frac{13}{15}$ oe or 0.86(7)

[4]

32. (i) $\frac{2}{(4+2+1)}$

$\frac{2}{7}$ oe 5

M1 for $\frac{n}{(4+2+1)}$ where n = 1, 2 or 4

A1 for $\frac{2}{7}$ oe

(ii) $\frac{21}{"4+2+1"}$

4× "3"

12

M1 for $\frac{21}{"7"}$

M1 for "3" × 4 or "3" × 2 or "3" × 1 (if stated)

A1 cao

[5]

33. (a) 5 + 10 × 4.50

50 2

M1 for 10 × 4.50 or 45 seen

A1 for 50

(b) $65 - \frac{65}{5}$

52 2

M1 for 65 ÷5 oe, or 13 seen
A1 for 52

[4]

34. $\frac{10+6}{2}$ $\frac{9+3}{2}$

(8, 6) 2

M1 for $\frac{10+6}{2}$ *or* $\frac{9+3}{2}$ *o.e.*
A1 cao
[SC: B1 for (6, 8)]

[2]

35. $\frac{10}{15} + \frac{3}{15}$

$\frac{13}{15}$ oe 2

M1 for suitable common denominator (multiple of 15), at least one of two fractions correct.
A1 oe

[2]

36. A

[1]

37. B

[1]

38. D

[1]

39. (a) $\frac{24}{36}$ 2

$\frac{2}{3}$

B2 for 2/3 cao
(B1 for sight of 24/36 or 12/18 or 8/12 or 4/6 or 6/9)
SC : B1 for 2 : 3

(b) $\frac{0.6}{5\overline{)3.0}}$ 2

0.6

M1 for 3 ÷ 5 oe or $\frac{6}{10}$ *oe seen or o.2 × 3*

A1 for 0.6(0)

[4]

40. (a) 5.000 ÷ 8 2

0.625

M1 for 5 ÷ 8 or 1÷ 8 × 5A1 cao

(b) $\frac{14}{35} + \frac{5}{35}$ 2

$\frac{19}{35}$ 0e

M1 for correct common denominator of two fractions with at least one numerator correct

A1 for $\frac{19}{35}$ *oe (for example* $\frac{38}{70}$*)*

Alternative

0.4 + 0.143

Alternative

M1 for 0.4 and 0.14(2857…) (correct to 2dp.)
A1 for 0.54 or better

(c) $\frac{5}{2} \times \frac{8}{5} = \frac{40}{10}$ 3

4

M1 for $\frac{5}{2}$ *or* $\frac{8}{5}$ *oe M1 for* $\frac{5}{2} \times \frac{8}{5}$

A1 for 4 oe (accept 1040)

Alternative

2.5 × 1.6

Alternative
M1 For 2.5 and 1.6
M1 For 4 with any number of 0s with or without a decimal point A1 4

[7]

41. E

[1]

42. A

[1]

43. C

[1]

44. E

[1]

45. $\frac{1}{8}+\frac{6}{8}$

$\frac{7}{8}$ 2

M1 for $\frac{6}{8}$ *OR correct attempt to make fractions have a common denominator with at least one fraction correct OR for 0.125 and 0.75 seen*

A1 for $\frac{7}{8}$ *oe or 0.875*

[2]

46. $\frac{3}{20}$ 2

M1 for clear attempt to multiply numerators and multiply denominators e.g $\frac{3\times1}{5\times4}$ *or* $\frac{12\times5}{20\times20}$

A1 for $\frac{3}{20}$ *oe*

[2]

47. 20 ÷ 5 (= 4)
20 – "4" (= 16)
"16" × 1.50 (= 24)
= 9 4

M1 for 20 ÷ 5
M1 for 20 – "4" where 0 < "4" < 20
M1 for "16" × 1.50 where 0 < "16" < 20
A1 cao

[4]