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Headbanger

Y7 Headbanger Sample Resources

from the

Y7 Teachers' Resource and Assessment Pack

The topic **“Fractions, Decimals, Percentages and Ratios”** can be downloaded from the website www.mathsisjugglers.com

You have permission to print this topic for use with your students.

This pack contains the **Teachers' Resources and Assessments** for the topic **“Fractions, Decimals, Percentages and Ratios”** in the Headbanger Guide.

You have permission to print these for use with your students.

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Headbanger

THE HEADBANGER GUIDE

There are ten topics in the text – seven long ones and three short ones to facilitate scheduling.
For each of the long topics, there is a revision sheet and an assessment
in the Teachers' Resource and Assessment Pack.

Topic 1:	Working with Numbers should be FUN!	(13 sections)	07 – 62	
Topic 2:	Areas and Other Measures	(12 sections)	63 – 112	
Topic 3:	Symmetry, Transformations and Polygons	(10 sections)	113 – 144	
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Topic 5:	Fractions, Decimals, Percentages and Ratio	(12 sections)	163 – 210	SAMPLE
Topic 6:	Introduction to Algebra	(11 sections)	211 – 248	
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Topic 8:	Lines, Angles and Shapes	(12 sections)	267 – 308	
Topic 9:	Handling Data	(11 sections)	309 – 346	
Topic 10:	Number Patterns	(6 sections)	347 – 368	
	ANSWERS		369 – 384	

96 sections/lessons altogether (+ 7 possible assessments)

Scheduling note : When there is time available at the end of some of the topics, students could go back and do any Star Challenges that they have missed or work on High Level Challenges.

THE HEADBANGER GUIDE

Each topic is delivered in one-lesson sections
with Star Challenges for faster students and/or for homeworks.
Any techniques which are mental/oral starters,
or those which need teaching, are at the beginning of the section.

At the end of each topic is a section of
HIGH LEVEL CHALLENGES.

Able students are expected to tackle these Challenges when they have finished a section (rather than moving onto the next section).

They can also do them in their own time.

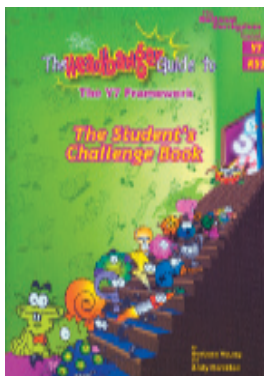
Some of these challenges have section labels.
These indicate which section should have been completed before that challenge should be attempted.

At the end of the book is a section of
MISCELLANEOUS HIGH LEVEL CHALLENGES.

They are not linked to any topics in the book and can be done at any times and in any order.
They range from short problems to fairly lengthy problems, to linked sets of problems.

THE HEADBANGER GUIDE

The Student's Challenge Book



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- This is intended for use at home.
- Homeworks may be set from it.
- It includes many of the **Star Challenges** from the ends of sections. This extends the use of this text as a homework book to a much wider range of students.
- It also contains ALL of the **200 HIGH LEVEL CHALLENGES**, so students can work on these puzzles and problems whenever they wish.



The **High Level Challenges** were first used in the highly successful predecessor to *Headbanger*, the *Big Edd Guide*.

At Tarporley High School, students in our two top sets loved them. Almost all top set students did every High Level Challenge. Many completed all 152 of them before the end of the year, and came back and asked for more. (So there are now 200 in *Headbanger*.)

But, unexpectedly, many of the students in our two second sets tackled a lot of these problems with great enthusiasm. These students had successes with puzzles and problems that we had thought well beyond them. Confidence and motivation soared and, later, so did exam results.

Other schools using this material report similar reactions.

The Mental Arithmetic Course

At the beginning of each topic is a list of mental/oral techniques to be taught/reviewed alongside the topic.

The techniques taught/reviewed should be repeated regularly over the weeks following their introduction.

Regular mental arithmetic practice makes a very positive start to the lesson – and builds up self-confidence quickly.

Order a **half price** copy of Y7 *Headbanger* using the **Special Offer form** which can be downloaded from the website
www.mathsisjugglers.co.uk

How does the Star Challenge system work ?

The number of stars is a measure of the difficulty of the Challenge.

So, one star denotes a basic fairly easy challenge.

However, students should not be discouraged from attempting any Challenges.

For example, students may earn fewer stars from many two or three star challenges, with partially correct answers.

Students of lower ability can amaze you with what they can achieve, if they really want to tackle problems that you might think beyond them.

A true cautionary tale

Three very low ability students were working together. They had to. Mark was severely dyslexic - he could not read at all. Jason could read very well, but could make no sense of what he was reading. Matthew was very slow at everything. Between them, they could tackle problems.

Jason would read the question. Mark would explain what it was all about. Together the three of them would work out how to solve the problem.

One day they had done all the one star problems. They asked me if they could try the three star problem - The Chest of Drawers. It contained a mixture of fractions and decimals and both cm and mm. My first reaction was to tell them that it was too difficult for them - but I said they could try it, provided they accepted that they might not be able to do it.

About ten minutes later, they brought me the correct answer. I couldn't believe that they had solved such a complex problem. I changed the data (marked below in blue). They were back a few minutes later with the correct answer. Then I made a big mistake. I asked them to tell me how they had worked it out. I couldn't follow their explanation at all !!

From then on I never restricted the choice of Star Challenges of even the least able students.

Star Challenge

The chest of drawers

A chest of drawers 84 cm high has a 42.5 mm top and a 90 mm base. Four identical drawers fit in between, with 22.5 mm between each drawer.

Work out the height of each drawer in cm.

If the 22.5 mm gaps were reduced to 12.5 mm each, what would be the height of each drawer then?

84 cm

$4\frac{1}{4}$ cm

$2\frac{1}{4}$ cm

9 cm

What do schools do with the stars students earn for Star Challenges ?

One school:

- gives a house point for each star.
- has a commendation system and awards a commendation for so many stars. They also award stars for effort when the books are taken in each fortnight.
- gives a smiley face for 5 stars
- gives a Mars Bar for 10 stars
- gives a copy of one of a group of Chaos posters for 20 stars (very popular with low attainers)
-

It doesn't matter what you do. It is the sense of achievement that is most important.

However, a system that awards something for so many stars, then starts them collecting the next set of stars, means that students keep track of how many stars they have and how many more they need towards the next 'prize' – instead of (possibly invidious) comparisons of the total number of stars each student has.

Topic 5: Fractions, Decimals, Percentages and Ratio

Printing List	Page in text	Pack page
*Ch 1 and 2: Equivalent fraction search	167	101
*Ch 8 : Fraction searches	172	102

Any techniques which are mental/oral starters, or those WHICH NEED TEACHING, are at the beginning of the section.

Mental arithmetic techniques

Each lesson should start with a brief mental/oral session. As well as developing mental arithmetic expertise and agility, it provides a very positive start for the lesson.

SUGGESTED MENTAL/ORAL TOPICS

The better students should not need to do the easier exercises. For these students, a brief resumé of a technique, done as an oral starter, is all that is required.

Below is a list of mental techniques met in this topic.

For more able students, it should be sufficient just to do orally questions like those in the exercise or questions from the exercise.

For less able students, it is suggested that you start orally with questions like those in the exercise, then set the students to do the questions in the exercise.

1. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5} \dots$ of amounts (whole number answers only)
2. Make simple equivalent fractions.
3. Simplify fractions mentally and by simple cancelling
4. One number as a fraction of another [as D4.2]
5. Convert between mixed numbers and improper fractions and simple decimal mixed numbers [as D5.1, 5.2, 5.3]
6. Change decimals to fractions in simplest form [as D6.3]
7. Add and subtract common fractions [as D7.1]
8. $1 - \frac{4}{5}$ etc.
9. Add and subtract fractions with a common denominator [as D7.2]
10. $\frac{1}{3} + \frac{1}{6}$ [as D7.3]
11. $\frac{2}{3}, \frac{3}{4}, \frac{4}{5} \dots$ of amounts (whole number answers only : as in Section 9)
12. Equivalent fractions, decimals and percentages (as in Section 9)
11. $1\frac{1}{2}$ x amounts (as in D9.3)
12. Decimals and percentages of amounts (as in Section 9)
13. 10 % of ... 5% of... 15% of, 2.5% of ... (as in Section 10)

Also continue to practice techniques developed in the previous topic.

Mental arithmetic techniques should be repeated regularly over the weeks following their review/introduction.

Direct teaching points

Section 1: Fraction review

The material in this section is a review of ideas met in KS2. It should not need teaching.

1-1

Equivalent fraction search

35 correct = 2 stars
30-34 correct = 1 star

Task 1: Halves have lines through them (student needs to find 10 out of the 12)

$\frac{1}{2}$ $\frac{2}{6}$ $\frac{8}{24}$ $\frac{15}{45}$ $\frac{48}{96}$ $\frac{6}{12}$ $\frac{9}{12}$ $\frac{100}{200}$ ~~$\frac{15}{75}$~~ $\frac{19}{57}$ $\frac{43}{55}$
 $\frac{12}{16}$ $\frac{2}{4}$ $\frac{6}{8}$ $\frac{47}{94}$ $\frac{5}{20}$ $\frac{1}{4}$ ~~$\frac{50}{250}$~~ $\frac{7}{21}$ $\frac{8}{16}$ $\frac{3}{9}$ $\frac{2}{3}$
 $\frac{150}{450}$ $\frac{6}{10}$ $\frac{3}{7}$ $\frac{17}{51}$ $\frac{23}{92}$ $\frac{7}{14}$ ~~$\frac{10}{50}$~~ $\frac{6}{14}$ $\frac{15}{35}$ ~~$\frac{5}{25}$~~ $\frac{3}{4}$
 $\frac{2}{8}$ $\frac{6}{18}$ $\frac{123}{492}$ $\frac{4}{12}$ $\frac{10}{40}$ $\frac{30}{40}$ $\frac{10}{30}$ $\frac{1}{3}$ $\frac{3}{12}$ ~~$\frac{7}{35}$~~ $\frac{5}{8}$
 $\frac{13}{26}$ $\frac{50}{200}$ $\frac{11}{22}$ $\frac{3}{8}$ $\frac{4}{16}$ $\frac{17}{68}$ $\frac{4}{8}$ $\frac{31}{124}$ $\frac{5}{10}$ $\frac{20}{80}$ $\frac{13}{21}$

Task 2: Thirds have loops round them (student needs to find 10 out of the 12)

Task 3: Quarters have rectangles round them (student needs to find 10 out of the 12)

Task 4: Fifths have crosses on them (student needs to find all 5)

ERRATUM Task 1 in **Equivalent fraction search** should have instruction.
“Put a triangle round each one.” added to it.

Note that the worksheet does have this instruction.

2

Equivalent fraction challenge

All correct = 1 star

$\frac{9}{12}$ $\frac{6}{8}$ $\frac{3}{4}$ $\frac{30}{40}$ $\frac{12}{16}$

3-3

Name these shapes

15 correct = 2 stars
13-14 correct = 1 star

1. D 2. J 3. I 4. A & O
 5. M 6. Q 7. G & L 8. B C F K N P

4-4-4

Quartering the square

12 ways = 3 stars
10-11 ways = 2 stars
7-9 ways = 1 star

- Check : • each square is 4 x 4
 • all lines are straight
 • all lines must join corners of squares

Reflections are allowed. Rotations are NOT allowed.

Section 2: Equivalent fraction techniques

You will need to teach the ideas covered by :

D2.1: How to make equivalent fractions

5

What do you multiply by ?

All correct = 1 star

$a = 12$ $b = 7$ $c = 11$ $d = 7$ $e = 9$ $f = 5$ $g = 6$ $h = 2$

6-6

Without the loops

16 correct = 2 stars
14-15 correct = 1 star

- | | | | |
|---------------------------------------|---------------------------------------|---|---|
| 1. $\frac{3}{5} = \frac{33}{55}$ | 2. $\frac{4}{7} = \frac{48}{84}$ | 3. $\frac{3}{11} = \frac{33}{121}$ | 4. $\frac{5}{8} = \frac{40}{64}$ |
| 5. $\frac{2}{9} = \frac{10}{45}$ | 6. $\frac{13}{15} = \frac{65}{75}$ | 7. $\frac{11}{14} = \frac{44}{56}$ | 8. $\frac{21}{35} = \frac{105}{175}$ |
| 9. $\frac{13}{17} = \frac{65}{85}$ | 10. $\frac{37}{73} = \frac{259}{511}$ | 11. $\frac{113}{131} = \frac{565}{655}$ | 12. $\frac{29}{41} = \frac{87}{123}$ |
| 13. $\frac{27}{34} = \frac{216}{272}$ | 14. $\frac{32}{49} = \frac{192}{294}$ | 15. $\frac{53}{67} = \frac{371}{469}$ | 16. $\frac{223}{315} = \frac{2097}{2835}$ |

7-7

Shelob

All correct = 2 stars

SCRUMPTIOUS

(We needed a word that wasn't obvious after the first few letters)

8-...

Fraction searches

1 star for each target achieved

ANSWERS ARE ON THE NEXT PAGE. Do not despair— you do not need to check each one – a rapid look tells you whether the student has the basic idea and, since they have already counted how many they think they have, just look for wrong ones circled and deduct them from their total.

1 Possible 40
2 Target 37

1 Possible 23
4 Target 21

3 Possible 12
4 Target 11

1 Possible 23
3 Target 21

2 Possible 16
3 Target 14

Section 3: Simplest form

You will need to teach the ideas covered by :

D3.1: Simplifying fractions

9

Task 1: (a) $\frac{3}{7}$ (b) $\frac{3}{8}$ (c) $\frac{3}{7}$ (d) $\frac{11}{12}$ (e) $\frac{5}{7}$ (f) $\frac{3}{8}$

All correct = 1 star

Task 2: $\frac{6}{14} = \frac{9}{21}$ and $\frac{6}{16} = \frac{15}{40}$

10-10

1. $\frac{3}{4}$ 2. $\frac{1}{4}$ 3. $\frac{1}{4}$ 4. $\frac{2}{5}$ 5. $\frac{7}{9}$ 6. $\frac{3}{7}$

6 correct = 2 stars
4-5 correct = 1 star

Section 4: Fraction applications

You will need to teach the ideas covered by :

D4.1: Some mental division techniques

D4.2: One number as a fraction of another

11-11

Equivalent fractions of turns

14 correct = 2 stars
11-13 correct = 1 star

1. W 2. NE 3. a quarter turn 4. an eighth of a turn
5. Direction you would face E S W E S W S
6. $\frac{2}{4}$ and $\frac{4}{8}$ 7. $\frac{1}{4}$

Fraction searches : see previous page for targets

Why not highlight each set of answers in a different colour ?

FRACTION SEARCH – This sheet contains fractions equivalent to one half, one quarter, three quarters, one third and two thirds. Put a loop around each of the equivalent fractions that you find.

ANSWERS FOR 1/3

Name:
Fraction I am searching for:

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FRACTION SEARCH – This sheet contains fractions equivalent to one half, one quarter, three quarters, one third and two thirds. Put a loop around each of the equivalent fractions that you find.

ANSWERS FOR 2/3 & 3/4

Name:
Fraction I am searching for:

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FRACTION SEARCH – This sheet contains fractions equivalent to one half, one quarter, three quarters, one third and two thirds. Put a loop around each of the equivalent fractions that you find.

ANSWERS FOR 1/2

Name:
Fraction I am searching for:

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FRACTION SEARCH – This sheet contains fractions equivalent to one half, one quarter, three quarters, one third and two thirds. Put a loop around each of the equivalent fractions that you find.

ANSWERS FOR 1/4

Name:
Fraction I am searching for:

© The Maths Is... Jugglers

Section 5: Mixed numbers

You will need to review the ideas covered by :

D5.1: Mixed numbers and decimals

D5.2: How many ... ?

D5.3: From mixed numbers to improper fractions

D5.4: Working in reverse

AFTER THIS LESSON, THESE TECHNIQUES SHOULD BE INCLUDED IN THE ONGOING MENTAL PROGRAMME.

12	1. $\frac{5}{4}$ 2. $\frac{17}{6}$ 3. $\frac{11}{3}$ 4. $\frac{11}{5}$ 5. $\frac{7}{4}$ 6. $\frac{7}{2}$ 7. $\frac{57}{10}$ 8. $\frac{22}{9}$ 9. $\frac{9}{7}$ 10. $\frac{36}{11}$ 11. 4 12. 10	11-12 correct = 1 star			
13 13	1. $9\frac{2}{5}$ 2. $6\frac{1}{2}$ 3. $8\frac{1}{3}$ 4. $1\frac{4}{13}$ 5. $3\frac{4}{13}$ 6. $11\frac{1}{9}$ 7. $8\frac{3}{4}$ 8. $15\frac{2}{3}$ 9. $6\frac{4}{5}$ 10. $8\frac{1}{7}$	10 correct = 2 stars 8-9 correct = 1 star			
14 14	The ice-breaker task <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> Blurbl & Taz & Gorbag Idea & Apul Lubbly & Cringo Mishrak & Plok Zuk & Pow </td> <td style="width: 50%; border: none;"> Dwork & Chyps & Do-med Frizzbang & Hoblin & Yusu Al Optymistic & Pesymistic & Icee Qwerk & Yerwat & Meedy Oker Modesto & Sludge </td> </tr> </table>		Blurbl & Taz & Gorbag Idea & Apul Lubbly & Cringo Mishrak & Plok Zuk & Pow	Dwork & Chyps & Do-med Frizzbang & Hoblin & Yusu Al Optymistic & Pesymistic & Icee Qwerk & Yerwat & Meedy Oker Modesto & Sludge	10 correct = 2 stars 7-9 correct = 1 star
Blurbl & Taz & Gorbag Idea & Apul Lubbly & Cringo Mishrak & Plok Zuk & Pow	Dwork & Chyps & Do-med Frizzbang & Hoblin & Yusu Al Optymistic & Pesymistic & Icee Qwerk & Yerwat & Meedy Oker Modesto & Sludge				

Section 6: Equivalent decimals and fractions

For some students, you may need to review the ideas covered by :

D6.1: Decimals and fractions

The rest of the exercises have sufficient explanation in the text.

15	The Pan-Galactic Explorers' Dance Competition		All correct = 1 star																																				
	Sludge & Cringo Fission & Chyps Apul & Crumbl	Dwork & Taz Qwerk & Zuk Crutch & Hoblin	Mishrak & Gorbag Lubbly & Plok Yerwat & Frizzbang																																				
16	Fraction-decimal challenge		13-14 correct = 1 star																																				
	1. T 2. F 3. T 4. T 5. T 6. F 7. T 8. T 9. F 10. T 11. T 12. T 13. $\frac{73}{100}$ 14. $0.04 = \frac{4}{100}$																																						
17	1. $\frac{3}{50}$ 2. $\frac{2}{25}$ 3. $\frac{101}{250}$ 4. $\frac{13}{25}$ 5. $\frac{8}{25}$ 6. $\frac{16}{25}$		All correct = 1 star																																				
18	Locker numbers		All correct = 1 star																																				
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>0.5</td><td>0.25</td><td>0.1</td><td>0.4</td><td>0.09</td><td>0.04</td></tr> <tr> <td>$\frac{1}{2}$</td><td>$\frac{1}{4}$</td><td>$\frac{1}{10}$</td><td>$\frac{4}{10}$</td><td>$\frac{9}{100}$</td><td>$\frac{4}{100}$</td></tr> <tr> <td>Plok</td><td>Fission</td><td>Chyps</td><td>Crumbl</td><td>Dwork</td><td>Taz</td></tr> <tr> <td>0.75</td><td>0.9</td><td>0.01</td><td>0.12</td><td>0.19</td><td>0.003</td></tr> <tr> <td>$\frac{3}{4}$</td><td>$\frac{9}{10}$</td><td>$\frac{1}{100}$</td><td>$\frac{12}{100}$</td><td>$\frac{19}{100}$</td><td>$\frac{3}{1000}$</td></tr> <tr> <td>Apul</td><td>Zuk</td><td>Lubbly</td><td>Qwerk</td><td>Cringo</td><td>Yerwat</td></tr> </table>			0.5	0.25	0.1	0.4	0.09	0.04	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{10}$	$\frac{4}{10}$	$\frac{9}{100}$	$\frac{4}{100}$	Plok	Fission	Chyps	Crumbl	Dwork	Taz	0.75	0.9	0.01	0.12	0.19	0.003	$\frac{3}{4}$	$\frac{9}{10}$	$\frac{1}{100}$	$\frac{12}{100}$	$\frac{19}{100}$	$\frac{3}{1000}$	Apul	Zuk	Lubbly	Qwerk	Cringo	Yerwat
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Apul	Zuk	Lubbly	Qwerk	Cringo	Yerwat																																		

Section 7: Combining fractions

You will need to teach the ideas covered by :

D7.1: Adding and subtracting common fractions

D7.2: Fractions with the same denominator

D7.3: Simple related fractions

19 ♦ 19

Halves, thirds and sixths

12 correct = 2 stars
9-11 correct = 1 star

The missing fractions are

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

Section 8: Percentages

You will need to teach the ideas covered by :

D8.1: Connecting fractions and percentages

20

More test marks

All correct = 1 star

Task 1: Sludge got 25% Gizmo got 100% Ruff got 80% Crumbl got 9%

Task 2: Meedy Oker got 15 marks Letmewin got 50 marks
Cringo got 40 marks Youslas got 14 marks

21 ♦ 21

Related percentages

14-15 correct = 2 stars
11-13 correct = 1 star

- | | | | | | |
|--------------|-----------|-----------|-----------|-----------|------------|
| 1. (a) 30% | (b) 70% | (c) 50% | (d) 110% | | |
| 2. (a) 5% | (b) 15% | (c) 2.5% | (d) 7.5% | (e) 17.5% | |
| 3. (a) 12.5% | (b) 37.5% | (c) 62.5% | (d) 87.5% | (e) 6.25% | (f) 18.75% |

Section 9: Equivalent fractions, decimals and percentages

You will need to teach the ideas covered by :

D9.1: Review of division techniques

D9.2: Finding fractions of amounts mentally

Simple fractions of amounts should/must have been covered in the mental programme earlier in this topic.

D9.3: More mental fractions

D9.4: Equivalentents you need to know and use

22 ♦ 22

Quarters and eighths

12 correct = 2 stars
9-11 correct = 1 star

- | | | | | | |
|-------|-------|-------|--------|--------|--------|
| 1. 8 | 2. 4 | 3. 12 | 4. 20 | 5. 28 | 6. 24 |
| 7. 10 | 8. 30 | 9. 25 | 10. 25 | 11. 15 | 12. 35 |

23 ♦ 23

- | | | | | | |
|--------------|------------|--------|---------|---------|--------|
| 1. 10 m | 2. 6 cm | 3. £20 | 4. 5 cm | 5. 4 kg | 6. £21 |
| 7. 10 tonnes | 8. 2 miles | 9. £6 | | | |

9 correct = 2 stars
7-8 correct = 1 star

24 - 248 correct = 2 stars
6-7 correct = 1 star

1. 210 down, 90 left 2. 10 3. 400 4. £60 5. 15
6. 28 7. 18 red, 9 blue 8. 3 left

Section 10: Percentage calculations

You will need to teach the ideas covered by :

D10.1: Multiples of tenths are easy**D10.2: Some useful written techniques****25 - 25**14-15 marks = 2 stars
11-13 marks = 1 star**Percentage problems**

1. 57% [1 mark] 2. (a) accept 75-85% (b) accept 60-70% [2 marks]
3. (a) 250g (b) 50g [2 marks] 4. 103.2 g [2 marks] 5. 38% [2 marks]
6. (a)20 (b)30 (c) 50 (d) 60% (e) 90% (f) 88% [6 marks]

Section 11: Ratio and proportion

For some students, you may need to review the ideas covered by :

D11.1: ... in every ... and ... for every ...**26**

All correct = 1 star

Ratio and proportion problems

1. (a)

1	3	4
2	6	8
4	12	16
5	15	20

 (b) $\frac{1}{4}$ (c) $\frac{3}{4}$
2. (a)

£1	£4	£5
£2	£8	£10
£5	£20	£25
£10	£40	£50
£20	£80	£100

 (b) $\frac{1}{5}$ (c) $k = 4$ (d) 4 : 1

Section 12: More ratios and percentages

You will need to teach the ideas covered by :

D12.1: Calculator percentages**D10.2: Sharing in ratio****27 - 27**8 correct = 2 stars
6-7 correct = 1 star**Ratio problems**

1. 10 cm 2. 60 3. (a) $\frac{3}{8}$ (b) 50 cm 4. $\frac{5}{9}$ 5. 4 : 3
6. (a) 4 buckets of cement 14 buckets of aggregate
(b) 25 buckets of sand 35 buckets of aggregate

28

All correct = 1 star

VAT is not included in the basic price

1. £124.87 2. 1304.87 euros 3. £276.71 4. 376.74 euros

HIGH LEVEL CHALLENGES FOR TOPIC 5

Ch 1: Rectangle fractions

All correct = 1 star

1. 15 squares 2. $\frac{1}{15}$ 3. $\frac{4}{15}$ 4. A 5. B 6. B
 7. $\frac{4}{32}$ or $\frac{1}{8}$ 8. $\frac{8}{32}$ or $\frac{1}{4}$ 9. $\frac{10}{32}$ or $\frac{5}{16}$ 10. $\frac{10}{32}$ or $\frac{5}{16}$

Ch 2: Dotty problems

4 correct diagrams = 2 stars
 3 correct diagrams = 1 star

- Problem 1:** Each group must contain 4 dots
Problem 2: Groups should contain 2, 4, 1, 3, 6 dots

Ch 3: Wheel of fortune

All correct = 1 star

1. (a) $\frac{1}{8}$ (b) $\frac{4}{8}$ or $\frac{1}{2}$ (c) $\frac{3}{8}$ 2. (a) C (b) A

Ch 4: The magic cake conundrum

All correct = 1 star

1. Two vertical cuts to make quarters and then a horizontal cut to make eighths.
 2. 4 vertical cuts to get eighths and then 3 horizontal cuts to give 32 equal pieces.
There are other possible answers to this.

Ch 5: Achilles and the tortoise

All correct = 1 star

It should be a dead heat.

Ch 6: Replacing the labels

10-12 correct = 1 star

1. & 2.

$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
---------------	---------------	---------------	---------------	---------------	---------------

 3.

$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$
----------------	---------------	----------------	---------------	----------------	---------------	----------------	---------------

Ch 7: Have you spotted the pattern ?

All correct = 1 star

1. $\frac{4}{5}$ 2. $\frac{4}{9} = \frac{12}{27}$ 3. $\frac{15}{25} = \frac{6}{10} = \frac{3}{5}$ 4. $\frac{7}{14} = \frac{1}{2} = \frac{6}{12}$
 5. $\frac{3}{5} = \frac{60}{100}$ 6. $\frac{3}{12} = \frac{1}{4}$ 7. $\frac{2}{3} = \frac{78}{117}$

Ch 8: Sets of equivalent fractions

All 22 correct = 2 stars
 18-20 correct = 1 star

- | | | | | | | |
|-----------------|-----------------|-----------------|---------------|-----------------|----------------|---------------|
| $\frac{27}{36}$ | $\frac{45}{60}$ | $\frac{60}{80}$ | $\frac{3}{4}$ | $\frac{36}{48}$ | $\frac{9}{12}$ | $\frac{6}{8}$ |
|-----------------|-----------------|-----------------|---------------|-----------------|----------------|---------------|
- | | | | | | | |
|-----------------|---------------|---------------|-----------------|----------------|---------------|-----------------|
| $\frac{26}{39}$ | $\frac{4}{6}$ | $\frac{6}{9}$ | $\frac{30}{45}$ | $\frac{8}{12}$ | $\frac{2}{3}$ | $\frac{40}{60}$ |
|-----------------|---------------|---------------|-----------------|----------------|---------------|-----------------|
- | | | | | | | | |
|-----------------|-----------------|----------------|---------------|-----------------|------------------|----------------|-----------------|
| $\frac{12}{20}$ | $\frac{36}{60}$ | $\frac{6}{10}$ | $\frac{3}{5}$ | $\frac{30}{50}$ | $\frac{60}{100}$ | $\frac{9}{15}$ | $\frac{15}{25}$ |
|-----------------|-----------------|----------------|---------------|-----------------|------------------|----------------|-----------------|

Ch 9: Give it a swirl

All correct = 1 star

1. Blue or yellow 2. Green or blue 3. Purple or white
 4. $1\frac{1}{2}$ right angles or $2\frac{1}{2}$ right angles 5. Purple 6. White

Ch 10: Toy clocks

16 correct = 2 stars
 14-15 correct = 1 star

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

Ch 11: Following turning instructions

8 correct = 2 stars
 6-7 correct = 1 star

1. NE 2. N 3. E 4. SE 5. NW 6. SW 7. SE 8. E

Ch 12: Equivalent turns

All correct = 1 star

1. (a) 5 (b) $\frac{5}{12}$ 2. (a) 3 (b) $\frac{7}{12}$ 3. (a) 3 (b) $\frac{1}{12}$ 4. (a) 3 (b) $\frac{1}{6}$

Ch 13: Three digit fractions6 correct = 2 stars
5 correct = 1 star

1. $\frac{5}{10}$ $\frac{6}{12}$ $\frac{7}{14}$ $\frac{9}{18}$ (and of course $\frac{8}{16}$)
 2. $\frac{4}{12}$ $\frac{5}{15}$ $\frac{6}{18}$ $\frac{7}{21}$ $\frac{8}{24}$ $\frac{9}{27}$
 3. $\frac{12}{8}$ 4. $\frac{10}{4}$ $\frac{15}{6}$ $\frac{20}{8}$ 5. $\frac{13}{4}$ $\frac{26}{8}$ 6. $\frac{10}{6}$ $\frac{15}{9}$

9-10 correct = 1 star

Ch 14: Related fraction challenge

1. $\frac{3}{4}$ 2. $\frac{1}{2}$ 3. $\frac{5}{6}$ 4. $\frac{5}{6}$ 5. $\frac{1}{3}$ 6. $\frac{1}{2}$ 7. $\frac{7}{8}$ 8. $\frac{5}{8}$ 9. $\frac{3}{8}$ 10. $\frac{7}{8}$

15-16 correct = 2 stars
13-14 correct = 1 star**Ch 15: Addition and subtraction challenge**

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

10 correct = 3 stars
8-9 correct = 2 stars
6-7 correct = 1 star**Ch 16: Halfway fractions**

1. $\frac{3}{8}$ 2. $\frac{5}{12}$ 3. $\frac{5}{8}$ 4. $\frac{7}{8}$ 5. $\frac{3}{16}$ 6. $\frac{5}{16}$ 7. $\frac{7}{12}$ 8. $\frac{11}{12}$ 9. $\frac{4}{15}$ 10. $\frac{1}{4}$

23-24 correct = 2 stars
20-22 correct = 1 star**Ch 17: Challenging fractions of ...**

1. £8 2. 12cm 3. 30l 4. 6p 5. £8
 6. 21p 7. 12km 8. 6p 9. £16 10. 15p
 11. 12sweets 12. 12mm 13. 25p 14. £25 15. 22p
 16. £40 17. £198 18. £2613 19. £2583 20. £20
 21. £112 22. £2697 23. £1126 24. £1484

18 correct = 3 stars
14-17 correct = 2 stars
10-13s correct = 1 star**Ch 18: Fractions of fractions**

1. 2 2. 4 3. 3 4. 6 5. 3 6. 3 7. 4 8. 36 9. 36
 10. 50 11. 12 12. 72 13. 45 14. 160 15. 24 16. 20 17. 6 18. 70

25-26 correct = 2 stars
21-24 correct = 1 star**Ch 19: Fractions, decimals and percentages**

1. 10 kg 2. 20p 3. 1.5m 4. 10kg 5. 36 l 6. 40p
 7. 10m 8. 10p 9. 33mm 10. £4 11. 11p 12. 10km
 13. 2.33m 14. 1.25 l 15. 4.5kg 16. £2.83 17. £1.50 18. £1.20
 19. £3.50 20. 1.2 cm 21. 2.1 l 22. £5.85 23. £1.88 24. 26 m
 25.

Green	Blue	Orange	Red	Black	Yellow
5	8	4	15	2	6

 26. 15%

All correct = 1 star

Ch 20: What percentage ?

1. 64% 2. 62.5% 3. 90% 4. 87.5% 5. 80%
 6. percentage in favour = 53.6% so no strike

13-15 marks = 2 stars
10-12 marks = 1 star**Ch 21: 10% questions**

1. 1980 (2 marks) 2. £154 per week, £682 per month, £8140 per year (6 marks)
 3. Wages clerk (2 marks)
 4. It is 10% of the £300 that is added on not 10% of £250. (2 marks)
 5. Cut = 10% of £100, rise is 10% of £90 (1 mark) 11.11...% or 11.1% (2 marks)

Ch 22: Percentages in action23-24 marks = 2 stars
18-22 marks = 1 star

1. Red 50%, Black 25%, Silver 12.5%, White & Blue 6.25% (5 marks)
2. (a) 90° (b) 18° (c) 10% (d) 30% (e) 72° (f) 10% (6 marks)
3. (a)

25%	10%	45%	15%	5%
90°	36°	162°	54°	18°

 (5 marks) (b) In the Liverpool - Manchester area (1 mark)
4. (a) 10 (b) 6 (c) 25 (d) 40% (e) 20% (f) 4% (g) 16% (7 marks)

Ch 23: Percentages to 2 d.p.

14-15 correct = 1 star

1. £16.77 2. 1.56 cm 3. £7.63 4. 0.63 tonnes 5. 0.29 m
6. £3.36 7. 0.41 l 8. £11.52 9. £5.76 10. £49.66
11. £1.45 12. 0.13 cm 13. 5.50 kg 14. 3.78 l 15. 449.35 km

Ch 24: Prices to the nearest penny15-16 correct = 2 stars
13-14 correct = 1 star

1. (a) £4.98 (b) £1.24 (c) £7 (d) £2.61
2. (a) £10 (b) £15 (c) £15.63 (d) £9.83
3. (a) 53p (b) £3.15 (c) £1.52 (d) £6.83 (e) £2.42 (f) £3.51
4. £96.57 & £98.67

Ch 25: A proper headscratcher

All correct = 1 star

New rates of pay are : £528.40, £594, £588 Second job will be best paid.

Star Challenge 1

24 correct = 2 stars
20-23 correct = 1 star

Equivalent fraction search

Task 1 $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \dots$ The denominator is twice the numerator.

In the box, there are 12 fractions equivalent to $\frac{1}{2}$ (including itself).
Find 10 of them. Put \triangle round each one.

1	2	8	15	48	6	9	100	15	19	43
2	6	24	45	96	12	12	200	75	57	55
12	2	6	47	5	1	50	7	8	3	2
16	4	8	94	20	4	250	21	16	9	3
150	6	3	17	23	7	10	6	15	5	3
450	10	7	51	92	14	50	14	35	25	4
2	6	123	4	10	30	10	1	3	7	5
8	18	492	12	40	40	30	3	12	35	8
13	50	11	3	4	17	4	31	5	20	13
26	200	22	8	16	68	8	124	10	80	21

Task 2 $\frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \dots$ The denominator is three times the numerator.

There are 12 fractions equivalent to $\frac{1}{3}$ (including itself).
Put \bigcirc round 10 of them.

Task 3 $\frac{1}{4} = \frac{2}{8} = \frac{3}{12} = \dots$ The denominator is four times the numerator.

There are 12 fractions equivalent to $\frac{1}{4}$ (including itself).
Put \square round 10 of them.

Task 4

There are 5 fractions equivalent to $\frac{1}{5}$
Put \times on all of them.

• Your teacher has the answers to these.

Star Challenge 2

All correct = 1 star

Equivalent fraction challenge

In the box, there are 5 fractions equivalent to $\frac{3}{4}$
Put \surd on all of them.

• Your teacher has the answers to this.

Y7 Headbanger page 167

Star Challenge 1

24 correct = 2 stars
20-23 correct = 1 star

Equivalent fraction search

Task 1 $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \dots$ The denominator is twice the numerator.

In the box, there are 12 fractions equivalent to $\frac{1}{2}$ (including itself).
Find 10 of them. Put \triangle round each one.

1	2	8	15	48	6	9	100	15	19	43
2	6	24	45	96	12	12	200	75	57	55
12	2	6	47	5	1	50	7	8	3	2
16	4	8	94	20	4	250	21	16	9	3
150	6	3	17	23	7	10	6	15	5	3
450	10	7	51	92	14	50	14	35	25	4
2	6	123	4	10	30	10	1	3	7	5
8	18	492	12	40	40	30	3	12	35	8
13	50	11	3	4	17	4	31	5	20	13
26	200	22	8	16	68	8	124	10	80	21

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There are 12 fractions equivalent to $\frac{1}{3}$ (including itself).
Put \bigcirc round 10 of them.

Task 3 $\frac{1}{4} = \frac{2}{8} = \frac{3}{12} = \dots$ The denominator is four times the numerator.

There are 12 fractions equivalent to $\frac{1}{4}$ (including itself).
Put \square round 10 of them.

Task 4

There are 5 fractions equivalent to $\frac{1}{5}$
Put \times on all of them.

• Your teacher has the answers to these.

Star Challenge 2

All correct = 1 star

Equivalent fraction challenge

In the box, there are 5 fractions equivalent to $\frac{3}{4}$
Put \surd on all of them.

• Your teacher has the answers to this.

Y7 Headbanger page 167

Fractions, Decimals, Percentages & Ratio

Revision

Name :

Attempt all questions.

WRITE THE ANSWERS ON THIS SHEET.

Section 1

1.

- Name 4 shapes that have $\frac{1}{2}$ shaded.
- Name 2 shapes that have $\frac{1}{4}$ shaded.
- Name 1 shape that has $\frac{3}{10}$ shaded.
- Name 1 shape that has $\frac{2}{3}$ shaded.
- Name 1 shape that has $\frac{3}{5}$ shaded.

2.

$\frac{7}{21}$	$\frac{24}{48}$	$\frac{5}{12}$	$\frac{10}{40}$	$\frac{5}{15}$	$\frac{7}{18}$	$\frac{10}{20}$	$\frac{15}{25}$	$\frac{4}{12}$	$\frac{3}{6}$	$\frac{2}{8}$	$\frac{5}{20}$
----------------	-----------------	----------------	-----------------	----------------	----------------	-----------------	-----------------	----------------	---------------	---------------	----------------

(a) There are three fractions here equivalent to $\frac{1}{3}$. Put a ring round each one.

$\frac{7}{21}$	$\frac{24}{48}$	$\frac{5}{12}$	$\frac{10}{40}$	$\frac{5}{15}$	$\frac{7}{18}$	$\frac{10}{20}$	$\frac{15}{25}$	$\frac{4}{12}$	$\frac{3}{6}$	$\frac{2}{8}$	$\frac{5}{20}$
----------------	-----------------	----------------	-----------------	----------------	----------------	-----------------	-----------------	----------------	---------------	---------------	----------------

(b) There are three fractions here equivalent to $\frac{1}{4}$. Put a ring round each one.

$\frac{7}{21}$	$\frac{24}{48}$	$\frac{5}{12}$	$\frac{10}{40}$	$\frac{5}{15}$	$\frac{7}{18}$	$\frac{10}{20}$	$\frac{15}{25}$	$\frac{4}{12}$	$\frac{3}{6}$	$\frac{2}{8}$	$\frac{5}{20}$
----------------	-----------------	----------------	-----------------	----------------	----------------	-----------------	-----------------	----------------	---------------	---------------	----------------

(c) There are three fractions here equivalent to $\frac{1}{3}$. Put a ring round each one.

Section 2

3. Complete each pair of equivalent fractions:

$\frac{2}{5} = \frac{6}{\quad}$	$\frac{3}{4} = \frac{12}{\quad}$	$\frac{2}{7} = \frac{21}{\quad}$	$\frac{5}{6} = \frac{20}{\quad}$	$\frac{7}{8} = \frac{14}{\quad}$
---------------------------------	----------------------------------	----------------------------------	----------------------------------	----------------------------------

Section 3

4. Find the simplest form of each fraction:

$$\frac{2}{10} = \frac{\quad}{\quad}$$

$$\frac{8}{12} = \frac{\quad}{\quad}$$

$$\frac{5}{15} = \frac{\quad}{\quad}$$

$$\frac{20}{24} = \frac{\quad}{\quad}$$

$$\frac{25}{35} = \frac{\quad}{\quad}$$

5. Simplify this fraction by cancelling. Show your cancelling clearly. $\frac{120}{840}$

Section 4

- What fraction of one hour is 20 minutes?
- What fraction of 25 cm is 5 cm?

Section 5

7. Write as decimals:

$$(a) \frac{3}{10} = \dots\dots\dots (b) \frac{34}{100} = \dots\dots\dots (c) 7\frac{1}{2} = \dots\dots\dots$$

$$(d) 4\frac{7}{10} = \dots\dots\dots (e) \frac{6}{1000} = \dots\dots\dots (f) 1\frac{1}{4} = \dots\dots\dots$$

8. Write as mixed numbers:

$$\frac{5}{2} = \dots\dots\dots$$

$$\frac{7}{3} = \dots\dots\dots$$

$$\frac{9}{2} = \dots\dots\dots$$

$$\frac{10}{3} = \dots\dots\dots$$

$$\frac{25}{7} = \dots\dots\dots$$

9. Write as improper fractions:

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

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

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

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

$$2\frac{3}{5} = \frac{\quad}{\quad}$$

10. Work these out. Give the answers as whole numbers or mixed numbers.

$$5 \times \frac{1}{4} = \dots\dots\dots$$

$$6 \times \frac{1}{3} = \dots\dots\dots$$

$$2 \times \frac{3}{5} = \dots\dots\dots$$

$$6 \times \frac{2}{5} = \dots\dots\dots$$

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

Section 6

11. Write as fractions:

$$(a) 0.7 = \dots\dots\dots$$

$$(b) 0.37 = \dots\dots\dots$$

$$(c) 0.03 = \dots\dots\dots$$

12. Write as fractions in simplest form:

$$(a) 0.25 = \dots\dots\dots$$

$$(b) 0.4 = \dots\dots\dots$$

$$(c) 0.16 = \dots\dots\dots$$

Section 7

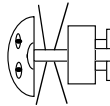
13. Evaluate, giving answers in simplest form.

Improper fractions should be changed to mixed numbers.

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

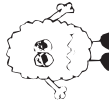
Section 8

14. Do-med got $\frac{1}{4}$ of the test right.



Do-med

What percentage mark did Do-med get?



Blurbl

15. Blurbl got 15 answers right out of 20.

What fraction of the test did Blurbl get right?

What percentage of the test did Blurbl get right?

16. In a maths test, Ernest scored $\frac{36}{50}$

What percentage mark did he get?

Section 9

17. (a) $\frac{1}{5}$ of £10 = (b) $\frac{1}{3}$ of £36 = (c) $\frac{2}{3}$ of £21 =
 (d) $\frac{2}{5}$ of 20p = (e) $\frac{3}{4}$ of 12 sweets = (f) $1\frac{1}{2}$ of 50p =

18. Write each percentage as a fraction in simplest form:

(a) 25% = (b) 90% = (c) $66\frac{2}{3}\%$ =

19. (a) 75% of £20 = (b) $33\frac{1}{3}\%$ of £24 =

20. What is the sale price of the shears?

SALE
Garden shears ~~£15~~
Prices slashed by 10%

Section 10

21. 10% of £20 = 20% of £20 =
 5% of £20 = 12% of £500 =

Section 11

22. A box contains red and blue balloons. There are 3 red balloons for every 2 blue balloons. There are 21 red balloons.

(a) How many blue balloons are there?

(b) What proportion of the balloons are blue?

23. Write in simplest form 15 : 20 =

Section 12

24. Share £15 in the ratio 2 : 3

ANSWERS

1. (a) A (b) H (c) I (d) F (e) J (f) C (g) G (h) E
2. (a) $\frac{3}{6}$ (b) $\frac{24}{48}$ (c) $\frac{10}{20}$ (d) $\frac{5}{20}$ (e) $\frac{10}{40}$ (f) $\frac{2}{8}$ (g) $\frac{7}{21}$ (h) $\frac{4}{12}$ (i) $\frac{5}{15}$
3. $\frac{6}{15}$ $\frac{9}{12}$ $\frac{6}{21}$ $\frac{20}{24}$ $\frac{14}{16}$
4. $\frac{1}{5}$ $\frac{2}{3}$ $\frac{1}{3}$ $\frac{5}{6}$ $\frac{5}{7}$
5. $\frac{1}{7}$
6. (a) $\frac{1}{3}$ (b) $\frac{1}{5}$
7. (a) 0.3 (b) 0.34 (c) 7.5 (d) 4.7 (e) 0.006 (f) 1.25
8. $2\frac{1}{2}$ $2\frac{1}{3}$ $4\frac{1}{2}$ $3\frac{1}{3}$ $3\frac{4}{7}$
9. $\frac{3}{2}$ $\frac{11}{3}$ $1\frac{1}{2}$ $\frac{4}{3}$ $\frac{13}{5}$
10. $1\frac{1}{4}$ 2 $1\frac{1}{5}$ $2\frac{2}{5}$ $2\frac{1}{4}$
11. $\frac{7}{10}$ $\frac{37}{100}$ $\frac{3}{1000}$
12. $\frac{1}{4}$ $\frac{2}{5}$ $\frac{4}{25}$
13. (a) $\frac{4}{5}$ (b) $1\frac{3}{8}$ (c) $\frac{1}{2}$ (d) $\frac{1}{10}$
14. 25%
15. $\frac{3}{4}$ 75%
16. 72%
17. (a) £2 (b) £12 (c) £14 (d) 8p (e) 9 sweets (f) 75p
18. (a) $\frac{1}{4}$ (b) $\frac{9}{10}$ (c) $\frac{2}{3}$
19. (a) £15 (b) £8
20. £13.50
21. £2 £4 £1 £60
22. (a) 14 (b) $\frac{2}{5}$
23. 3 : 4
24. £6 : £9

Fractions, Decimals, % and Ratio

Name :

ASSESSMENT

Attempt all questions.

WRITE THE ANSWERS ON THIS SHEET.

Foundation Section: Basic Techniques

7 marks

3	$\frac{\square}{10}$	6	$\frac{\square}{14}$	2	$\frac{\square}{40}$
1	$\frac{\square}{8}$	1	$\frac{\square}{20}$	5	$\frac{\square}{44}$
2	$\frac{11}{\square}$	1	$\frac{\square}{12}$	4	$\frac{\square}{24}$

1. Make each fraction equivalent to $\frac{1}{2}$ 2. Make each fraction equivalent to $\frac{1}{4}$

9 marks

3. Is each of these statements true (T) or false (F) ?

(a) $0.7 = \frac{7}{10}$ (b) $0.43 = \frac{43}{100}$ (c) $2.25 = 2\frac{1}{4}$
 (d) $0.3 = \frac{3}{100}$ (e) $0.11 = \frac{11}{100}$ (f) $3.5 = 3\frac{1}{2}$
 (g) $0.09 = \frac{9}{100}$ (h) $0.213 = \frac{213}{100}$ (i) $1.75 = 1\frac{3}{4}$

6 marks

4. Write each of these fractions as decimals:

(a) $\frac{2}{10} =$ (b) $\frac{27}{100} =$ (c) $5\frac{1}{2} =$
 (d) $2\frac{3}{10} =$ (e) $\frac{9}{1000} =$ (f) $1\frac{1}{4} =$

3 marks

5. Which one is the equivalent mixed number ? Circle it.

$\frac{5}{3}$	$\frac{11}{4}$	$\frac{23}{5}$
$\frac{2^{3/4}}{1^{2/3}}$	$\frac{2^{3/4}}{3^{1/4}}$	$\frac{4^{1/5}}{2^{3/5}}$

3 marks

6. Which one is the equivalent top heavy fraction ? Circle it.

$\frac{13/4}{9/4}$	$2\frac{3}{10} = \frac{23/10}{6/10}$	$2\frac{2}{3} = \frac{8/3}{4/3}$
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5 marks

7. Complete each pair of equivalent fractions:

$\frac{3}{7} = \frac{9}{\square}$	$\frac{2}{3} = \frac{\square}{12}$	$\frac{5}{7} = \frac{\square}{35}$
$\frac{3}{8} = \frac{21}{\square}$	$\frac{3}{8} = \frac{21}{\square}$	$\frac{5}{9} = \frac{25}{\square}$

F: %
F+H: %

8. Find the simplest form of each fraction:

$\frac{3}{6} =$	$\frac{9}{12} =$	$\frac{5}{20} =$	$\frac{25}{30} =$	$\frac{15}{35} =$
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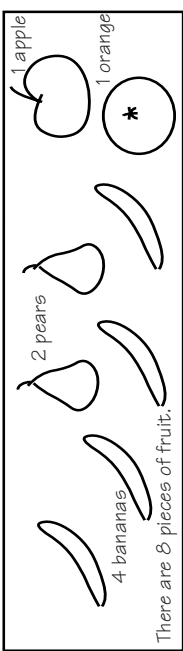
9. Simplify each fraction by cancelling. Show your cancelling clearly.

$\frac{60}{90} =$ $\frac{45}{120} =$

10. (a) What fraction of 1 cm is 1 mm ?
 (b) What fraction of one hour is 25 minutes ?

11. (a) In a test, Hukka got half of the test right.
 What was Hukka's percentage mark ?
 (b) Letmewin got $\frac{3}{4}$ of the test right.
 What was Letmewin's percentage mark ?

Hukka Letmewin

12. 

What fraction of these fruits are (a) bananas (b) pears

13. What percentage of the fruits are (a) bananas (b) pears (c) apples

14. There are 24 pupils in 7BL. In February, 25% of them caught mumps. How many had mumps ?
 35 $\frac{1}{3}$ % of them had chicken pox. How many had chicken pox ?

15. $\frac{1}{4}$ of £20 = $\frac{1}{3}$ of 12 kg = $\frac{1}{10}$ of £20 =
 $\frac{1}{5}$ of 20p = $\frac{2}{5}$ of 20p = $\frac{2}{3}$ of £21 =

16. 50% of £40 = 10% of 50p = 25% of £20 =
 33 $\frac{1}{3}$ % of £15 = 75% of £80 = 66 $\frac{2}{3}$ % of £9 =

17. Write each percentage as a fraction in its simplest form:

50% = 25% = 75% = 10% =
 7% = 20% = 33 1/3 % = 90% =

18. Work these out. Give the answers as whole numbers or mixed numbers:

$5 \times \frac{1}{3} =$ $6 \times \frac{1}{2} =$ $5 \times \frac{3}{4} =$ $2 \times \frac{3}{5} =$

19. Complete:

$\frac{1}{2} + \frac{1}{4} =$ $\frac{1}{5} + \frac{2}{5} =$ $1\frac{1}{2} - \frac{1}{4} =$
 $\frac{3}{4} + \frac{1}{2} =$ $\frac{5}{7} - \frac{4}{7} =$ $1\frac{1}{2} + 2\frac{1}{2} =$

20. Here, answers should be given in simplest form. Any improper fractions should be changed to mixed numbers.

$\frac{3}{8} + \frac{7}{8} =$ $\frac{4}{5} + \frac{2}{5} =$
 $\frac{3}{4} + \frac{3}{4} =$ $\frac{5}{9} + \frac{2}{9} + \frac{4}{9} =$

21. A perfect cup of cappuccino should contain 35% coffee, 35% steamed milk and the rest should be milk froth. What percentage of the cappuccino should be froth ?

22. In the Y7 P.E. lesson, 35% of the students played football, 30% played hockey, 25% did dance and the rest played badminton. What percentage of the students played badminton ?

23. At Hope Junior Badminton Club, 25 of the members are girls and 20 are boys.

(a) For every 5 girls there are boys.
 (b) What fraction of the members are boys ?
 Give your answer in simplest form.
 (c) The ratio of girls to boys is 25 : 20.
 Give this ratio in simplest form:

24. Share £25 in the ratio 1 : 4&.....

Foundation Section Total = /100 = %

Higher Section: More difficult questions 9 marks

25. Express Mary Rose's test scores as percentages:

Maths: $\frac{37}{74} =$ % French: $\frac{37}{50} =$ % Science: $\frac{78}{150} =$ %

26. 12 marks

There are six fractions equivalent to $\frac{2}{3}$ in this box.

Put a loop round each one.

27. Here, answers should be given in simplest form. Any improper fractions should be changed to mixed numbers.

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

28. 15 marks

A group of children were asked what they had had for dinner that day.

- (a) How many children were in the group asked ?
 (b) What fraction of the group had pizza ?
 (c) What percentage of the group had burgers ?
 (d) What percentage of the group had hot dogs ?
 (e) What percentage of the group had curry ?

Foundation and Higher Sections Total = /150 = %

Fractions, Decimals, % and Ratio

Name :

Attempt all questions.

EXTENSION TEST

WRITE THE ANSWERS ON THIS SHEET.

E1: **Task 1:** 10% of £80 = $\frac{1}{10}$ of £80 = £8

Using the given information, work out:

- (a) 5% of £80 = £..... (b) 15% of £80 = £.....
 (c) $2\frac{1}{2}$ % of £80 = £..... (d) $17\frac{1}{2}$ % of £80 = £.....

Task 2: Similarly, work out:

- (a) 10% of £48 = £..... (b) 5% of £48 = £.....
 (c) $2\frac{1}{2}$ % of £48 = £..... (d) $12\frac{1}{2}$ % of £80 = £.....

Task 3: In the U.K., VAT (Value Added Tax) is charged at 17.5% on most goods.

Work out the VAT chargeable on a TV costing £440. £.....

10 marks

8 marks

E2: Work out each fraction of the given amount.

Marks will only be given if working is shown.

- (a) $\frac{2}{3}$ of £69 = £..... (b) $\frac{3}{4}$ of £468 = £.....

- (c) $\frac{5}{7}$ of £959 = £..... (d) $\frac{5}{8}$ of £2112 = £.....

E3: Evaluate each expression:

Marks will only be given if working is shown.

- (a) $\frac{1}{2} \times [\frac{1}{4} \times 120] = \dots\dots\dots$
 (b) $\frac{1}{9} \times [\frac{1}{3} \times 513] = \dots\dots\dots$

- (c) $\frac{2}{3} \times [\frac{3}{5} \times 685] = \dots\dots\dots$
 (b) $\frac{3}{7} \times [\frac{5}{8} \times 392] = \dots\dots\dots$

10 marks

12 marks

E4: N is an unknown number. Work out the value of N

- (a) $\frac{1}{2} \times [\frac{1}{3} \times N] = 17$
 (b) $\frac{1}{4} \times [\frac{1}{5} \times N] = 23$

N =

- (c) $\frac{2}{3} \times [\frac{1}{4} \times N] = 15$
 (d) $\frac{3}{4} \times [\frac{7}{10} \times N] = 210$

N =

Extension Test Total = /40

Fractions, Decimals, % and Ratio

ASSESSMENT ANSWERS

Attempt all questions.

WRITE THE ANSWERS ON THIS SHEET.

Foundation Section: Basic Techniques

1. Make each fraction equivalent to $\frac{1}{2}$ 2. Make each fraction equivalent to $\frac{1}{4}$

$\frac{3}{6}$	$\frac{1}{2}$	$\frac{6}{12}$	$\frac{2}{8}$	$\frac{5}{10}$	$\frac{10}{40}$
$\frac{4}{8}$	$\frac{2}{4}$	$\frac{7}{14}$	$\frac{1}{4}$	$\frac{20}{40}$	$\frac{11}{44}$
$\frac{10}{20}$	$\frac{3}{6}$	$\frac{10}{20}$	$\frac{3}{12}$	$\frac{6}{24}$	$\frac{4}{16}$

3. Is each of these statements true (T) or false (F)?

(a) $0.7 = \frac{7}{10}$..T..	(b) $0.43 = \frac{43}{100}$..F..	(c) $2.25 = 2\frac{1}{4}$..T..
(d) $0.3 = \frac{3}{100}$..F..	(e) $0.11 = \frac{11}{100}$..T..	(f) $3.5 = 3\frac{1}{2}$..T..
(g) $0.09 = \frac{9}{100}$..T..	(h) $0.213 = \frac{213}{1000}$..F..	(i) $1.75 = 1\frac{3}{4}$..T..

4. Write each of these fractions as decimals:

(a) $\frac{2}{10} = .02$	(b) $\frac{27}{100} = .27$	(c) $5\frac{1}{2} = 5.5$
(d) $2\frac{3}{10} = 2.3$	(e) $\frac{9}{1000} = .009$	(f) $1\frac{1}{4} = 1.25$

5. Which one is the equivalent mixed number? Circle it.

$\frac{5}{3} = 1\frac{2}{3}$	$\frac{11}{4} = 2\frac{3}{4}$	$\frac{23}{5} = 4\frac{3}{5}$
$\frac{5\frac{1}{3}}{3} = 1\frac{2}{3}$	$\frac{2\frac{3}{4}}{3\frac{1}{4}} = 2\frac{1}{4}$	$\frac{4\frac{1}{5}}{2\frac{3}{5}} = 4\frac{3}{5}$

6. Which one is the equivalent top heavy fraction? Circle it.

$3\frac{1}{4} = \frac{13}{4}$	$2\frac{2}{3} = \frac{8}{3}$	$2\frac{2}{3} = \frac{11}{3}$
$\frac{13}{4} = 3\frac{1}{4}$	$\frac{23}{6} = 3\frac{5}{6}$	$\frac{19}{10} = 1\frac{9}{10}$

7. Complete each pair of equivalent fractions:

$\frac{3}{7} = \frac{9}{21}$	$\frac{2}{3} = \frac{8}{12}$	$\frac{5}{7} = \frac{25}{35}$
$\frac{3}{7} = \frac{21}{49}$	$\frac{2}{3} = \frac{21}{31.5}$	$\frac{5}{9} = \frac{25}{45}$

F: %
F+H: %

8. Find the simplest form of each fraction:

$\frac{3}{6} = \frac{1}{2}$	$\frac{9}{12} = \frac{3}{4}$	$\frac{5}{20} = \frac{1}{4}$	$\frac{25}{30} = \frac{5}{6}$	$\frac{15}{35} = \frac{3}{7}$
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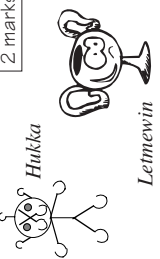
9. Simplify each fraction by cancelling. Show your cancelling clearly.

$\frac{60}{90} = \frac{2}{3}$	$\frac{45}{120} = \frac{3}{8}$
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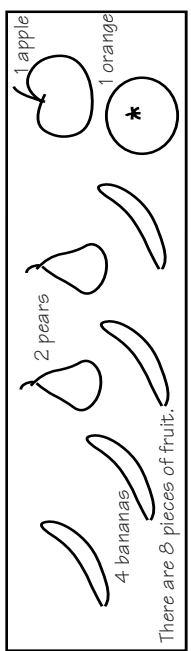
10. (a) What fraction of 1 cm is 1 mm?
(b) What fraction of one hour is 25 minutes?

$\frac{1}{10}$
 $\frac{25}{60}$ or $\frac{5}{12}$

11. (a) In a test, Hukka got half of the test right. What was Hukka's percentage mark? ..50%...
(b) Letmewin got $\frac{3}{4}$ of the test right. What was Letmewin's percentage mark? ...75%...



12. There are 8 pieces of fruit.



What fraction of these fruits are (a) bananas $\frac{1}{2}$ (b) pears $\frac{1}{4}$ (c) apples $\frac{12.5}{100}$

13. What percentage of the fruits are (a) bananas 50% (b) pears 25% (c) apples 12.5%

14. There are 24 pupils in 7BL. In February, 25% of them caught mumps. 33 $\frac{1}{3}$ % of them had chicken pox.

How many had mumps? ..6...
How many had chicken pox? ..8...

15. $\frac{1}{4}$ of £20 = ..£5...
 $\frac{1}{3}$ of 12 kg = ..4 kg...
 $\frac{1}{5}$ of 20p = ..4p...
 $\frac{2}{5}$ of 20p = ..8p...

$\frac{1}{10}$ of £20 = ..£2...
 $\frac{2}{3}$ of £21 = ..£14...

16. 50% of £40 = ..£20...
33 $\frac{1}{3}$ % of £15 = ..£5...
10% of 50p = ..5p...
75% of £80 = ..£60...
25% of £20 = ..£5...
66 $\frac{2}{3}$ % of £9 = ..£6...

17. Write each percentage as a fraction in its simplest form: 8 marks

50% = $\frac{1}{2}$ 25% = $\frac{1}{4}$ 75% = $\frac{3}{4}$ 10% = $\frac{1}{10}$

7% = $\frac{7}{100}$ 20% = $\frac{1}{5}$ 33 $\frac{1}{3}$ % = $\frac{1}{3}$ 90% = $\frac{9}{10}$

18. Work these out. Give the answers as whole numbers or mixed numbers: 4 marks

5 x $\frac{1}{3}$ = $\frac{5}{3}$ 6 x $\frac{1}{2}$ = 3 5 x $\frac{3}{4}$ = $\frac{15}{4}$ 2 x $\frac{3}{5}$ = $\frac{6}{5}$

19. Complete: 6 marks

$\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$ $\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$ $1\frac{1}{2} - \frac{1}{4} = 1\frac{1}{4}$

$\frac{3}{4} + \frac{1}{2} = 1\frac{1}{4}$ $\frac{5}{7} - \frac{4}{7} = \frac{1}{7}$ $1\frac{1}{2} + 2\frac{1}{2} = 4$

20. Here, answers should be given in simplest form. 4 marks

Any improper fractions should be changed to mixed numbers.

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

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

21. A perfect cup of cappuccino should contain 35% coffee, 35% steamed milk and the rest should be milk froth. 1 mark

What percentage of the cappuccino should be froth? **30%**

22. In the Y7 P.E. lesson, 35% of the students played football, 30% played hockey, 25% did dance and the rest played badminton. 1 mark

What percentage of the students played badminton? **12%**

23. At Hope Junior Badminton Club, 25 of the members are girls and 20 are boys. 3 marks

(a) For every 5 girls there are **4** boys.

(b) What fraction of the members are boys?
 Give your answer in simplest form. $\frac{25}{45} = \frac{5}{9}$

(c) The ratio of girls to boys is 25 : 20.
 Give this ratio in simplest form **5 : 4**

24. Share £25 in the ratio 1 : 4 1 mark

£5...&...£20...

Foundation Section Total = /100 = %

Higher Section: More difficult questions 9 marks

25. Express Mary Rose's test scores as percentages:
 Maths: $\frac{37}{74} = .50\%$ French: $\frac{37}{50} = .74\%$ Science: $\frac{78}{150} = .52\%$

26. 12 marks

There are six fractions equivalent to $\frac{2}{3}$ in this box.

Put a loop round each one.

27. Here, answers should be given in simplest form. 14 marks

Any improper fractions should be changed to mixed numbers.

$\frac{3}{8} + \frac{1}{4} = \frac{3}{8} + \frac{2}{8} = \frac{5}{8}$ $\frac{2}{5} + \frac{9}{10} = \frac{4}{10} + \frac{9}{10} = \frac{13}{10} = 1\frac{3}{10}$

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

28. 15 marks

A group of children were asked what they had had for dinner that day.

(a) How many children were in the group asked? **40**

(b) What fraction of the group had pizza? $\frac{1}{4}$

(c) What percentage of the group had burgers? **25%**

(d) What percentage of the group had hot dogs? **20%**

(e) What percentage of the group had curry? **12.5%**

Foundation and Higher Sections Total = /150 = %

Fractions, Decimals, % and Ratio

EXTENSION TEST ANSWERS

Attempt all questions.

WRITE THE ANSWERS ON THIS SHEET.

E1: Task 1: 10% of £80 = $\frac{1}{10}$ of £80 = £8

10 marks

Using the given information, work out:

(a) 5% of £80 = £4

(b) 15% of £80 = £12

(c) $2\frac{1}{2}$ % of £80 = £2

(d) $17\frac{1}{2}$ % of £80 = £14

Task 2: Similarly, work out:

(a) 10% of £48 = £4.80

(b) 5% of £48 = £2.40

(c) $2\frac{1}{2}$ % of £48 = £1.20

(d) $12\frac{1}{2}$ % of £80 = £6

Task 3: In the U.K., VAT (Value Added Tax) is charged at 17.5% on most goods.

Work out the VAT chargeable on a TV costing £440.

£77

E2: Work out each fraction of the given amount.

8 marks

Marks will only be given if working is shown.

(a) $\frac{2}{3}$ of £69 = £46

(b) $\frac{3}{4}$ of £468 = £351

(c) $\frac{5}{7}$ of £959 = £685

(d) $\frac{5}{8}$ of £2112 = £1320

E3: Evaluate each expression:

10 marks

Marks will only be given if working is shown.

(a) $\frac{1}{2} \times [\frac{1}{4} \times 120] = 15$

(b) $\frac{1}{9} \times [\frac{1}{3} \times 513] = 19$

(c) $\frac{2}{3} \times [\frac{3}{5} \times 685] = 274$

(b) $\frac{3}{7} \times [\frac{5}{8} \times 392] = 105$

12 marks

E4: N is an unknown number. Work out the value of N

(a) $\frac{1}{2} \times [\frac{1}{3} \times N] = 17$

(b) $\frac{1}{4} \times [\frac{1}{5} \times N] = 23$

N = 102

N = 460

(c) $\frac{2}{3} \times [\frac{1}{4} \times N] = 15$

(d) $\frac{3}{4} \times [\frac{7}{10} \times N] = 210$

N = 90

N = 400

Extension Test Total = /40

Fractions, Decimals, Percentages & Ratios

Date Name.....

I can do the following :

I need	My score	✓	Framework page reference
make fractions equivalent to a half & a quarter	7/14		p62
recognise equivalent fractions and decimals	5/9		p64
change fractions to decimals	3/6		p64
convert top heavy fractions to mixed numbers	3/6		p62
make equivalent fractions	3/5		p62
simplify fractions by cancelling	5/9		p62
find one amount as a fraction of another	1/2		p60
equate simple fractions and percentages	1/2		p70
recognise fractions and percentages of amounts	3/5		p70
work with percentages	1/2		p72
find fractions of amounts	3/6		p66
find percentages of amounts	3/6		p72
change percentages to fractions in simplest form	4/8		p70
multiply a fraction by an integer	2/4		p68
add and subtract simple fractions	3/6		p66
work with percentages in context	1/2		p74
work with ratios	2/4		p80

Graded by difficulty

Q25	fairly difficult	difficult	very difficult	extremely difficult
Q26				
Q27				
Q28				

Higher Section: Tick if half marks, or more, are achieved

Extension Test (optional)

E1	E2	E3	E4

Tick if half marks, or more, are achieved

Teacher's comment:

signed

Marks	
F:	%
F+H:	%
Ext:	/40

Parent's comment (optional):

signed

Fractions, Decimals, Percentages & Ratios

Date Name.....

I can do the following :

I need	My score	✓	Framework page reference
make fractions equivalent to a half & a quarter	7/14		p62
recognise equivalent fractions and decimals	5/9		p64
change fractions to decimals	3/6		p64
convert top heavy fractions to mixed numbers	3/6		p62
make equivalent fractions	3/5		p62
simplify fractions by cancelling	5/9		p62
find one amount as a fraction of another	1/2		p60
equate simple fractions and percentages	1/2		p70
recognise fractions and percentages of amounts	3/5		p70
work with percentages	1/2		p72
find fractions of amounts	3/6		p66
find percentages of amounts	3/6		p72
change percentages to fractions in simplest form	4/8		p70
multiply a fraction by an integer	2/4		p68
add and subtract simple fractions	3/6		p66
work with percentages in context	1/2		p74
work with ratios	2/4		p80

Graded by difficulty

Q25	fairly difficult	difficult	very difficult	extremely difficult
Q26				
Q27				
Q28				

Higher Section: Tick if half marks, or more, are achieved

Extension Test (optional)

E1	E2	E3	E4

Tick if half marks, or more, are achieved

Teacher's comment:

signed

Marks	
F:	%
F+H:	%
Ext:	/40

Parent's comment (optional):

signed