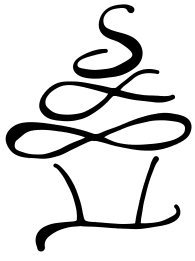
Practice Booklet

MYP 2 · Year 8 Mathematics

Unit 8.1 · Fractions, Decimals and Percentages

Name: _____

8.1.1	Forms of fractions · Questions 1–17
8.1.2	Four operations with fractions · Questions 18–34
8.1.3	Fractions, decimals and percentages · Questions 35–52
8.1.4	Percentage increase and decrease · Questions 53–69
Homework	Homework page and checking record
Answers	For checking and correcting in green pen



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How to use this booklet and your homework

READ THIS FIRST

Choosing your level

Every part of the unit has four levels. Start where you feel comfortable and move between them freely. Most questions ask you to explain as well as answer, because being able to say *why* is what makes a method stick.

Learning
Simple numbers, with a bar or a grid drawn beside you.

Practising
The standard question, with your reasoning written out.

Challenging
Working backwards, and finding what is wrong with someone else's thinking.

Mastery
Explaining why a rule must be true, and testing it on new cases.

Working on your homework

Pens and setting out

- Answers in blue or black non-erasable pen, or in pencil.
- Colour and highlighters are for annotating your work and showing the steps of a method.
- Never erase a mistake. Rework it underneath so you can see what changed.

Green pen is for checking. When you finish, use the answers at the back to check your work.

- **Got it wrong?** Circle the question number, then make your correction and write your error analysis in green pen.
- **Still can't work out how to solve it?** Put a star ★ next to the question number, so we know to go over it in class.

Each sheet

- Your name goes on every sheet, because they are handed in one at a time.
- Each question is worth up to 3 marks. If a question has parts (a, b, c...), each part is marked out of 3. At the end of each level, write your score out of the total for that level.
- Questions are numbered 1, 2, 3... all the way through the booklet, so we can say exactly which ones to do.
- If you are stuck after trying, ask for help. Showing me what you tried is a good start.

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8.1.1 Forms of fractions

LEARNING

Name:

Key vocabulary

Word	Meaning	Example
numerator	the number above the line: how many parts you have	3 in $\frac{3}{4}$
denominator	the number below the line: how many equal parts the whole is cut into	4 in $\frac{3}{4}$
the whole	the complete amount, or 1	$\frac{4}{4} = 1$
equivalent fractions	fractions with the same value, written with different numbers	$\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$
highest common factor (HCF)	the biggest number that divides exactly into two numbers	HCF of 12 and 18 is 6
simplest form	no common factor except 1	$\frac{12}{18} = \frac{2}{3}$
improper fraction	numerator bigger than or equal to the denominator	$\frac{7}{4}$
mixed numeral	a whole number and a fraction together	$1\frac{3}{4}$

The value of a fraction does not change when you write it a different way, only how it is written changes. “The big one” is a fraction equal to 1, such as $\frac{2}{2}$, that you multiply or divide by.

Learning

1 Look at the two bars.



a) What fraction of the first bar is shaded?

b) What fraction of the second bar is shaded?

c) What do you notice about the two fractions?

2 Use the big one to fill in the missing numbers.

a) $\frac{1}{2} = \frac{\square}{6}$ b) $\frac{2}{3} = \frac{8}{\square}$ c) $\frac{3}{4} = \frac{\square}{12}$

3 Simplify by dividing the numerator and the denominator by the highest common factor (HCF).

a) $\frac{6}{8}$ b) $\frac{10}{15}$ c) $\frac{12}{18}$

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Name:

Learning (continued)

4 a) Write $\frac{7}{4}$ as a mixed numeral. Draw 7 quarters to help you.

b) Write $2\frac{1}{3}$ as an improper fraction. Work out 2 × 3 + 1 first

5 Use the words in the vocabulary box to complete the sentences. In $\frac{3}{5}$, 3 is the _____ and 5 is the _____. Equivalent fractions have the same _____ but are written in different ways

Learning score _____ / 15

Practising

6 Which is larger, $\frac{5}{8}$ or $\frac{2}{3}$? Show how you compared them

7 Put in order, smallest first: $\frac{3}{4}$, $\frac{5}{8}$, $\frac{7}{12}$. Say which common denominator you used and why

8 Fill the gaps. a) $\frac{3}{5} = \frac{\square}{20}$ b) $\frac{14}{21} = \frac{2}{\square}$ c) $\frac{24}{36} = \frac{\square}{3}$

9 Simplify fully, in as few steps as you can. a) $\frac{42}{56}$ b) $\frac{45}{60}$ c) $\frac{18}{48}$

10 a) Write $\frac{17}{5}$ as a mixed numeral.

b) Write $4\frac{2}{7}$ as an improper fraction.

c) Write $3\frac{3}{8}$ as an improper fraction

Practising score _____ / 27

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8.1.1 Forms of fractions

CHALLENGING · MASTERY

Name:

Challenging

11 Find a fraction that lies between $\frac{1}{3}$ and $\frac{1}{2}$. Explain the method you used

12 Find and describe the mistake. Ben simplifies $\frac{12}{18}$ by subtracting 6 from the numerator and the denominator to get $\frac{6}{12} = \frac{1}{2}$

13 $\frac{n}{12}$ is between $\frac{1}{3}$ and $\frac{3}{4}$. List every whole number n could be

14 Write $\frac{100}{7}$ as a mixed numeral. Then check your answer by changing it back into an improper fraction

Challenging score _____ / 12

Mastery

15 Use a bar model to explain why multiplying the numerator and the denominator by the same number does not change the value of a fraction

16 A fraction is equivalent to $\frac{2}{3}$. Its numerator and denominator add up to 35. Find the fraction

17 How many fractions lie between $\frac{1}{3}$ and $\frac{1}{2}$? Justify your answer

Mastery score _____ / 9

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8.1.2 Four operations with fractions

LEARNING

Name:

Key vocabulary

Word	Meaning	Example
common denominator	a denominator two fractions share, so the pieces are the same size	$\frac{1}{2} = \frac{3}{6}$ and $\frac{1}{3} = \frac{2}{6}$
simplify	write a fraction in simplest form, dividing by the big one	$\frac{6}{12} = \frac{1}{2}$
reciprocal	a fraction turned upside down; a number times its reciprocal is 1	the reciprocal of $\frac{4}{5}$ is $\frac{5}{4}$
product	the answer to a multiplication	$\frac{2}{3} \times \frac{3}{4}$ has product $\frac{1}{2}$
quotient	the answer to a division	$3 \div \frac{1}{4}$ has quotient 12
mixed numeral	a whole number and a fraction together	$2\frac{1}{2} = \frac{5}{2}$

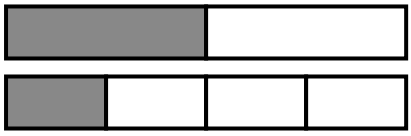
Add and subtract with a common denominator. Multiply with an area model. Divide by asking how many fit.

Learning

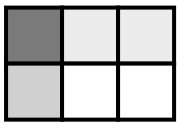
18 Look at the denominators. Why do you not need a common denominator?

a) $\frac{1}{5} + \frac{2}{5}$ b) $\frac{5}{6} - \frac{1}{6}$ c) $\frac{3}{8} + \frac{1}{8}$

19 Cut both bars into quarters, then work out $\frac{1}{2} + \frac{1}{4}$.



20 The grid shows $\frac{1}{2}$ of $\frac{1}{3}$.



a) How many equal pieces are in the whole grid?

b) How many pieces are shaded, dark or light?

c) Write $\frac{1}{2} \times \frac{1}{3}$ as one fraction

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Name:

Learning (continued)

21 How many quarters fit into 3 wholes? Draw 3 bars cut into quarters, then write $3 \div \frac{1}{4} =$

Learning score _____ / 12

Practising

22 a) $\frac{2}{3} + \frac{1}{4}$ b) $\frac{5}{6} - \frac{1}{4}$ c) $\frac{3}{5} + \frac{3}{10}$

23 Cancel before you multiply in at least one of these.

a) $\frac{3}{4} \times \frac{2}{5}$ b) $\frac{5}{6} \times \frac{3}{10}$ c) $\frac{2}{3} \times \frac{9}{16}$

24 Multiply by the reciprocal. a) $\frac{3}{4} \div \frac{1}{8}$ b) $4 \div \frac{2}{5}$ c) $\frac{2}{3} \div \frac{4}{9}$

25 Work with mixed numerals.

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

b) $2\frac{1}{2} \times \frac{2}{5}$. For b), change the mixed numeral to an improper fraction first

26 Without calculating, say whether each answer will be bigger or smaller than the starting number.

a) $12 \times \frac{1}{4}$ b) $3 \div \frac{1}{4}$ c) $8 \times \frac{3}{2}$

27 A recipe needs $\frac{3}{4}$ cup of flour. You make $\frac{2}{3}$ of the recipe. How much flour do you need, and which operation did you use?

Practising score _____ / 30

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8.1.2 Four operations with fractions

CHALLENGING · MASTERY

Name:

Challenging

28 Fill the gap: $\frac{2}{3} + \square = \frac{5}{6}$. Explain how you worked backwards

29 Find and describe the mistake. Mia writes $\frac{1}{2} + \frac{1}{3} = \frac{2}{5}$

30 $\frac{2}{3}$ of a number is 12. Find the number and say why you divided rather than multiplied

31 A class has 24 pupils. $\frac{2}{3}$ play sport and $\frac{3}{4}$ of those play football.

a) How many pupils play sport?

b) How many play football?

c) What fraction of the class plays football?

Challenging score _____ / 12

Mastery

32 Use an area diagram to explain why you multiply the numerators and multiply the denominators

33 Multiplying makes numbers bigger. Is that always true? Give an example where it is not, and explain what decides it

34 Explain why dividing by $\frac{1}{4}$ gives the same answer as multiplying by 4, in words a Year 7 student would follow

Mastery score _____ / 9

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8.1.3 Fractions, decimals and percentages

LEARNING

Name:

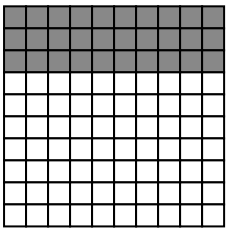
Key vocabulary

Word	Meaning	Example
fraction	parts of a whole: a numerator over a denominator	$\frac{3}{4}$
decimal	a number with a decimal point	0.75
per cent (%)	out of 100	$75\% = \frac{75}{100}$
terminating decimal	a decimal that ends	$\frac{1}{8} = 0.125$
recurring decimal	a decimal whose digits repeat forever	$\frac{1}{3} = 0.333...$
equivalent forms	the same value written in different ways	$\frac{3}{4} = 0.75 = 75\%$

The fraction bar means divide: numerator ÷ denominator. The value does not change, only how it is written.

Learning

35 Look at the hundred square.



Write the shaded part three ways. a) as a fraction over 100 b) as a decimal c) as a percentage

36 Divide the numerator by the denominator to write each fraction as a decimal and as a percentage.

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

37 Write as percentages. a) 0.3 b) 0.45 c) 0.07. What did you multiply by?

38 Use the words in the vocabulary box. A percentage means out of _____. A decimal that ends, like 0.125, is called a _____ decimal. A decimal whose digits repeat forever, like 0.333..., is called a _____ decimal

Learning score _____ / 24

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8.1.3 Fractions, decimals and percentages

PRACTISING

Name:

Practising

39 Write as decimals by dividing. a) $\frac{3}{8}$ b) $\frac{7}{20}$ c) $\frac{5}{6}$

40 Write as a fraction in simplest form. a) 50% b) 40% c) 75%

41 Write as a fraction in simplest form. a) 0.35 b) 12.5% c) 0.04

42 Which is largest: 0.7, $\frac{3}{4}$ or 72%? Say which form you converted everything to, and why

43 Put in order, smallest first: $\frac{2}{5}$, 0.38, 41%

44 A test result is 17 out of 25. Convert it to a percentage. Another test is 31 out of 40. Which result is better, and how do you know?

45 Without a calculator, say whether each decimal terminates or recurs.
a) $\frac{1}{4}$ b) $\frac{1}{3}$ c) $\frac{1}{5}$

Practising score _____ **/ 39**

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8.1.3 Fractions, decimals and percentages

CHALLENGING · MASTERY

Name:

Challenging

46 Put in order, smallest first: 0.65, $\frac{5}{8}$, 63%, $\frac{2}{3}$

47 Find and describe the mistake. A student says 0.4 is smaller than 0.35 because 4 is smaller than 35

48 Convert $\frac{1}{6}$ and $\frac{1}{9}$ to decimals. What do you notice? Can you predict $\frac{1}{12}$ before you check?

49 In a survey $\frac{7}{20}$ of students walk, 0.3 take the bus and 28% cycle. The rest are driven. What percentage are driven?

Challenging score _____ **/ 12**

Mastery

50 Test the denominators 2, 3, 4, 5, 6, 8, 9, 10, 12 and 20. Which unit fractions terminate and which recur? Describe the pattern, then predict for 16 and 15 before you check

51 Explain why $\frac{3}{4}$, 0.75 and 75% are all the same number, even though they look different. Use the words “value” and “written”

52 Explain why every fraction gives either a terminating or a recurring decimal and never anything random

Mastery score _____ **/ 9**

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8.1.4 Percentage increase and decrease

LEARNING

Name:

Key vocabulary

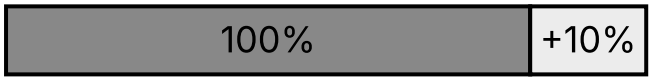
Word	Meaning	Example
percentage	a number out of 100	$20\% = \frac{20}{100}$
increase	the amount gets bigger	40 up to 50
decrease	the amount gets smaller	40 down to 30
multiplier	the number you multiply by to make the change in one step	× 1.2
original amount	the amount before the change	45 in 45 × 1.2
new amount	the amount after the change	54 in 45 × 1.2

Increase: multiplier = 1 + the rise as a decimal. Decrease: multiplier = 1 − the fall as a decimal.

Learning

53 Find each amount without a calculator. a) 10% of 80 b) 20% of 80 c) 25% of 60 d) 50% of 44

54 The bar shows 40 as 100% with a further 10% added on.



a) What is 10% of 40? b) What is the new amount?

55 Complete. Increase by 20%: 100% + 20% = ☐% so multiply by ☐. Decrease by 20%: 100% − 20% = ☐% so multiply by ☐

56 Decrease 90 by 20% using the multiplier

57 Use the words in the vocabulary box. A jacket costs CHF 45 and goes up to CHF 54. The CHF 45 is the _____ amount and CHF 54 is the _____ amount. To go from 45 to 54 we multiply by the _____ 1.2

Learning score _____ **/ 27**

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8.1.4 Percentage increase and decrease

PRACTISING

Name:

Practising

58 Write the multiplier for each change. a) a 15% rise b) an 8% rise c) a 35% fall d) a 4% fall

59 A jacket costs CHF 45 and its price rises by 20%. Find the new price using one multiplication

60 A coat costs CHF 120 and is reduced by 35%. Find the sale price. Estimate first to check your answer

61 a) Increase 60 by 15%. b) Decrease 250 by 12%

62 A class of 25 grows to 28.
a) What is the increase?
b) What is the increase as a percentage of the original number?

Practising score _____ / 27

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8.1.4 Percentage increase and decrease

CHALLENGING · MASTERY

Name:

Challenging

63 After a 20% rise a price is CHF 54. Find the original price and explain why you divided

64 Find and describe the mistake. Sam increases 50 by 20% by working out 50 × 0.2 = 10 and says the new amount is 10

65 A price rises by 20% and then falls by 20%. Is it back where it started? Use CHF 100 to show your working

66 A shop offers "20% off, then a further 10% off". Is that the same as 30% off? Justify your answer

Challenging score _____ **/ 12**

Mastery

67 Explain, using a bar model, why the multiplier for a 20% rise is 1.2 and not 0.2

68 One newspaper says "crime up 100%" and another says "crime doubled". Are they saying the same thing? Which is clearer, and why?

69 What single multiplier undoes a 25% decrease? Explain why it is not 1.25

Mastery score _____ **/ 9**

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Homework and checking record

HAND THIS PAGE IN WITH YOUR SHEETS

Name:

Your teacher will tell you which sheet and questions to do. Choose your level, set out your work in pen or pencil, then check it with the answers at the back using a **green pen**: circle wrong question numbers, and star ★ any you still cannot solve.

Sheet	Questions	Which ones I did	Checked in green ✓	Teacher
8.1.1 Forms of fractions	Q1–17			
8.1.2 Four operations with fractions	Q18–34			
8.1.3 Fractions, decimals and percentages	Q35–52			
8.1.4 Percentage increase and decrease	Q53–69			

Error analysis

Circle the number of any question you got wrong. Star ★ it if you still cannot solve it after correcting. Then write the questions you need to rework, and what you will do differently:

One thing I understand better now

Score: Parent / guardian signature:

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Answers

CHECK IN GREEN PEN

8.1.1 Forms of fractions

Learning

1 a) $\frac{4}{8}$

b) $\frac{2}{4}$

c) They are equivalent: the shaded part is the same size, so the value does not change, only how it is written changes

2 a) 3, because $\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$ b) 12, because $\frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$ c) 9, because $\frac{3}{4} \times \frac{3}{3} = \frac{9}{12}$

3 a) $\frac{3}{4}$, dividing by $\frac{2}{2}$ b) $\frac{2}{3}$, dividing by $\frac{5}{5}$ c) $\frac{2}{3}$, dividing by $\frac{6}{6}$

4 a) $1\frac{3}{4}$: four quarters make 1 whole and 3 quarters are left over

b) $2 \times 3 + 1 = 7$, so $2\frac{1}{3} = \frac{7}{3}$

5 In $\frac{3}{5}$, 3 is the numerator and 5 is the denominator. Equivalent fractions have the same value but are written in different ways

Practising

6 $\frac{2}{3}$, because $\frac{5}{8} = \frac{15}{24}$ and $\frac{2}{3} = \frac{16}{24}$ and $\frac{16}{24}$ is larger

7 $\frac{7}{12}$, $\frac{5}{8}$, $\frac{3}{4}$. 24 is a common denominator of 4, 8 and 12, and the fractions become $\frac{18}{24}$, $\frac{15}{24}$ and $\frac{14}{24}$

8 a) 12, multiplying by $\frac{4}{4}$ b) 3, dividing by $\frac{7}{7}$ c) 2, dividing by $\frac{12}{12}$

9 a) $\frac{3}{4}$ (HCF 14) b) $\frac{3}{4}$ (HCF 15) c) $\frac{3}{8}$ (HCF 6)

10 a) $17 \div 5 = 3$ remainder 2, so $3\frac{2}{5}$ b) $4 \times 7 + 2 = 30$, so $\frac{30}{7}$ c) $3 \times 8 + 3 = 27$, so $\frac{27}{8}$

Challenging

11 Any of $\frac{5}{12}$, $\frac{2}{5}$ or $\frac{3}{7}$. One way: $\frac{1}{3} = \frac{4}{12}$ and $\frac{1}{2} = \frac{6}{12}$, so $\frac{5}{12}$ is between them

12 Subtracting changes the value of the fraction. To keep the value the same, divide the numerator and denominator by the same number, here the big one $\frac{6}{6}$: $\frac{12}{18} = \frac{2}{3}$

13 $\frac{1}{3} = \frac{4}{12}$ and $\frac{3}{4} = \frac{9}{12}$, so n = 5, 6, 7 or 8

14 $100 \div 7 = 14$ remainder 2, so $14\frac{2}{7}$. Check: $14 \times 7 + 2 = 100$, so $\frac{100}{7}$ ✓

Mastery

15 Each part is cut into the same number of smaller parts, so the number of parts shaded and the number of parts in the whole both multiply by the same number. The shaded part of the bar is still the same size. Multiplying by the big one, which equals 1, never changes the value

16 $\frac{2}{3} = \frac{2k}{3}$k, so 5k = 35 and k = 7. The fraction is $\frac{14}{21}$

17 Infinitely many. Writing the fractions with a larger common denominator always leaves room for more. With denominator 120, $\frac{1}{3} = \frac{40}{120}$ and $\frac{1}{2} = \frac{60}{120}$ have 19 fractions between them; with denominator 1200 there are 199, and so on

8.1.2 Four operations with fractions

Learning

18 a) $\frac{3}{5}$

b) $\frac{4}{6} = \frac{2}{3}$

c) $\frac{4}{8} = \frac{1}{2}$. The pieces are already the same size, so only the number of pieces changes

19 $\frac{1}{2} = \frac{2}{4}$, so $\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$

20 a) 6

b) 1

c) $\frac{1}{6}$. The whole grid has 3 × 2 = 6 pieces and 1 × 1 = 1 is shaded twice

21 12 quarters fit, because 3 × 4 = 12, so $3 \div \frac{1}{4} = 12$

Practising

22 a) $\frac{8}{12} + \frac{3}{12} = \frac{11}{12}$ b) $\frac{10}{12} - \frac{3}{12} = \frac{7}{12}$ c) $\frac{6}{10} + \frac{3}{10} = \frac{9}{10}$

23 a) $\frac{6}{20} = \frac{3}{10}$ b) $\frac{15}{60} = \frac{1}{4}$ c) $\frac{18}{48} = \frac{3}{8}$

24 a) $\frac{3}{4} \times 8 = 6$ b) $4 \times \frac{5}{2} = 10$ c) $\frac{2}{3} \times \frac{9}{4} = \frac{18}{12} = \frac{3}{2} = 1\frac{1}{2}$

25 a) $1 + 2 = 3$ and $\frac{1}{2} + \frac{3}{4} = \frac{2}{4} + \frac{3}{4} = \frac{5}{4} = 1\frac{1}{4}$, so the total is $4\frac{1}{4}$

b) $2\frac{1}{2} = \frac{5}{2}$, and $\frac{5}{2} \times \frac{2}{5} = \frac{10}{10} = 1$

26 a) smaller, because $\frac{1}{4}$ is less than 1

b) bigger, because more quarters fit than wholes

c) bigger, because $\frac{3}{2}$ is more than 1

27 $\frac{3}{4} \times \frac{2}{3} = \frac{6}{12} = \frac{1}{2}$ cup. “Of” means multiply

Challenging

28 $\frac{5}{6} - \frac{2}{3} = \frac{5}{6} - \frac{4}{6} = \frac{1}{6}$. You undo the addition by subtracting

29 She added the numerators and added the denominators. Halves and thirds are different sizes of piece, so they must be changed to sixths first: $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$

30 $12 \div \frac{2}{3} = 12 \times \frac{3}{2} = 18$. You are undoing a multiplication, so you divide

31 a) 16

b) 12

c) $\frac{3}{4} \times \frac{2}{3} = \frac{6}{12} = \frac{1}{2}$, which matches 12 out of 24

Mastery

32 The denominators set the grid: rows × columns gives the number of pieces in the whole. The numerators pick out a block of rows and columns, and the overlap has numerator × numerator pieces. For example $\frac{2}{3} \times \frac{3}{4}$ has 12 pieces in the whole and 6 in the overlap

33 Not always. Multiplying by a number between 0 and 1 gives a smaller answer, for example $12 \times \frac{1}{4} = 3$. It depends on whether the multiplier is greater than 1

34 Dividing by $\frac{1}{4}$ asks how many quarters fit. Four quarters fit into each whole, so you multiply the number of wholes by 4

8.1.3 Fractions, decimals and percentages

Learning	**35**	a) $\frac{30}{100}$ b) 0.3 c) 30%
	36	a) 1 ÷ 2 = 0.5 = 50% b) 1 ÷ 4 = 0.25 = 25% c) 3 ÷ 4 = 0.75 = 75%
	37	a) 30% b) 45% c) 7%. You multiply by 100 because a percentage counts hundredths
	38	A percentage means out of 100. A decimal that ends is a terminating decimal. A decimal whose digits repeat forever is a recurring decimal
Practising	**39**	a) 0.375 b) 0.35 c) 0.8333... (recurring)
	40	a) $\frac{50}{100} = \frac{1}{2}$ b) $\frac{40}{100} = \frac{2}{5}$ c) $\frac{75}{100} = \frac{3}{4}$
	41	a) $\frac{35}{100} = \frac{7}{20}$ b) 12.5% = 0.125 = $\frac{125}{1000} = \frac{1}{8}$ c) $\frac{4}{100} = \frac{1}{25}$
	42	$\frac{3}{4}$ is largest. As decimals they are 0.7, 0.75 and 0.72. Using one form makes the values easy to compare
	43	0.38, $\frac{2}{5}$, 41%. As percentages they are 38%, 40% and 41%
	44	$\frac{17}{25}$ = 68%. $\frac{31}{40}$ = 0.775 = 77.5%. The second is better. Percentages put both results out of the same total
	45	a) terminates, 0.25 b) recurs, 0.333... c) terminates, 0.2
Challenging	**46**	$\frac{5}{8}$ = 62.5%, 63%, 0.65 = 65%, $\frac{2}{3}$ = 66.7%, so $\frac{5}{8}$, 63%, 0.65, $\frac{2}{3}$
	47	The digits after the decimal point are tenths and hundredths, not whole numbers. 0.4 = 0.40 = 40 hundredths, which is more than 35 hundredths
	48	$\frac{1}{6}$ = 0.1666... and $\frac{1}{9}$ = 0.111... Both recur. $\frac{1}{12}$ = 0.08333... also recurs
	49	$\frac{7}{20}$ = 35%, 0.3 = 30%, so 35% + 30% + 28% = 93% and 100% − 93% = 7% are driven
Mastery	**50**	Terminate: 2, 4, 5, 8, 10, 20. Recur: 3, 6, 9, 12. The terminating ones only have 2s and 5s as prime factors. $\frac{1}{16}$ terminates (0.0625) and $\frac{1}{15}$ recurs (0.0666...)
	51	They have the same value because they describe the same part of the whole: 75 out of 100 squares, or 3 out of 4 equal parts. The value does not change, only how it is written changes
	52	When you divide, only a limited number of remainders is possible. Either the remainder becomes 0 and the decimal ends, or a remainder repeats and then the digits repeat from there on

8.1.4 Percentage increase and decrease

Learning	**53**	a) 8 b) 16, which is double 10% c) 15 d) 22
	54	a) 4 b) 40 + 4 = 44
	55	120% so multiply by 1.2. 80% so multiply by 0.8
	56	90 × 0.8 = 72
	57	The CHF 45 is the original amount and CHF 54 is the new amount. We multiply by the multiplier 1.2
Practising	**58**	a) 1.15 b) 1.08 c) 0.65 d) 0.96
	59	45 × 1.2 = CHF 54
	60	Estimate: 35% is a bit more than a third, so about 40 off, and 120 − 40 = 80. 120 × 0.65 = CHF 78
	61	a) 60 × 1.15 = 69 b) 250 × 0.88 = 220
	62	a) 28 − 25 = 3 b) $\frac{3}{25}$ = 0.12 = 12%. You divide the increase by the original 25
Challenging	**63**	54 ÷ 1.2 = CHF 45. The multiplier 1.2 must be undone, and division undoes multiplication. Check: 45 × 1.2 = 54
	64	50 × 0.2 only finds 20% of 50, which is the extra. The new amount keeps the original 100% and adds the 20%, so the multiplier is 1.2 and 50 × 1.2 = 60
	65	No. 100 × 1.2 = 120 and then 120 × 0.8 = 96. The fall is 20% of the larger amount, 120, so it takes off more than the rise added
	66	No. The multiplier is 0.8 × 0.9 = 0.72, which is a 28% reduction, not 30%. The second 10% is taken off the reduced price
Mastery	**67**	The original bar is 100% of itself and you keep all of it. A rise of 20% adds another 20% on the end, so the new bar is 120% of the original. 120% = 1.2. Multiplying by 0.2 would give only the extra piece
	68	Yes, they mean the same: the multiplier is 1 + 1 = 2. “Doubled” is usually clearer because “up 100%” can be misread as no change
	69	Undo a multiplication by 0.75 by dividing by 0.75, which is multiplying by $\frac{4}{3}$ = 1.333… The fall was a quarter of the original amount, but a rise of 25% would be a quarter of the smaller amount, so it is not enough