Mathspace

Our global village

Facts about our global village

There are over 6.9 billion people on Earth today. Who is this large community composed of?

1 Convert the following facts to percentages to find out.

Race

- 0.61 Asian
- $\frac{12}{100}$ European
- 0.08 North American
- 0.05 South American & Caribbean
- 0.13 African
- $\frac{1}{100}$ Oceania (this includes Australia)

Conditions

- 0.43 live without basic sanitation
- $\frac{1}{3}$ don't have access to clean, safe drinking water
- 0.13 are hungry and/or malnourished

Wealth

- 0.06 of the population own 59% of the entire wealth
- $\frac{1}{5}$ of the population have 75% of the income
- 0.53 of the population live on $2.50 or less per day

Education and technology

- 0.14 can't read
- 0.07 have a secondary education
- 0.12 have a computer
- 0.03 have the internet

How rich are you?

If you have a bed to sleep on, food to eat and a roof over your head, you're richer than what percentage of the entire world's population?

2 To find out, complete this decimal calculation and *convert your answer to a percentage*.

$1.2 - 2.7 + 3.5 - 1.25 =$

How many people?

Currently, there are approximately 6 900 000 000 people living on Earth.

3 Using the facts you now know about our world, calculate how many people:

(a) don't have access to clean water

(b) struggle to live on $2.50 or less per day

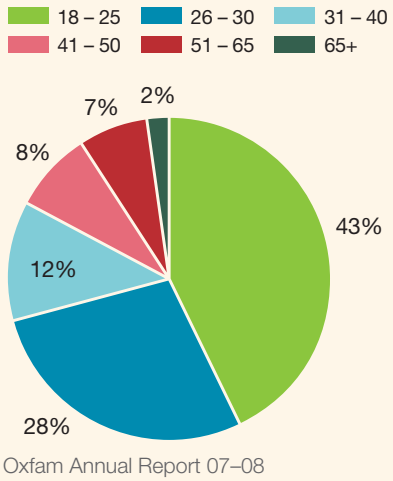
(c) have a computer

(d) don't have a secondary school education.

I want to help

There are many charities out there that are trying to create more equality in the world—Oxfam is one of these. Charities often rely on the generosity of ordinary people. Here is a pie chart of the age groups of Oxfam volunteers.

Volunteers by age group



Oxfam Annual Report 07–08

4 Using the pie chart above, find out the following.

(a) What percentage of volunteers are between 18 and 30?

(b) Why do you think most volunteers are in this age range?

(c) One of the challenges charities face is the need to pay for fundraising and administration costs. If Oxfam spends 24.4% of its income on fundraising and 8.9% on administration costs, what percentage of its income is available to go directly to community-aid projects?

In the future

5 Imagine it's the year 2055. How do you hope the 'global village' percentages have changed? Write down your predictions and ideas.

4.10 Rates

In the previous section, we used ratios to compare two or more amounts of the same type of quantity (e.g. millilitres of water and millilitres of cordial).

A **rate** is a way of comparing two amounts of different types of quantities. They usually involve the word *per* which means 'for each' and have the symbol / or the letter 'p'. A rate is written as the number of the first quantity for every 1 of the second quantity. Some examples of rates are:

If the price of petrol is $1.29/L, you will pay $1.29 for 1 litre of petrol.

Cricketers scoring at 4 runs per over will score an average of 4 runs in 1 over.

The unitary method

If we know how much 1 litre of petrol costs, we can calculate the cost of any other volume of petrol by multiplying by the cost of one litre.

If we know that 50 L of petrol costs $75, we can work out the cost of 4 L, 15 L, 37 L or any other volume of petrol by first calculating how much 1 L costs.

Solving problems by first calculating a number (such as cost) per unit is called the **unitary method**.

Worked Example 25 WE25

(a) If 8 kg of oranges costs $24, find the cost of 6 kg of oranges.

(b) A machine in a soft drink factory produces 210 bottles every hour. How many bottles would be produced in 40 minutes?

Thinking		Working
(a)	**1** Calculate the cost of one 'unit' of the amount (1 kg of oranges).	(a) $24 for 8 kg = $3 for 1 kg (÷ 8)
	2 Multiply the cost/unit by the number of units.	= $18 for 6 kg (× 6)

(b) 1	Calculate the number of items produced in one minute.	(b) 210 ÷ 60 = 3.5 bottles/min
2	Multiply the number produced in one minute by the number of minutes. Round your answer to a sensible value.	3.5 bottles/min × 40 min = 140 bottles in 40 min

Comparing prices

Many supermarket products come in different sizes, which makes it difficult to compare the prices. For example: Which is better value for money, a 500 g box of breakfast cereal for $5.99, or the larger 820 g box for $7.21?

We can use the unitary method to compare the prices. We could divide the prices by the mass of the boxes to find the price per 1 g of the cereal, but, instead, we will compare the price per 100 g, as this is how supermarkets are required to display many of their prices. The price per 100 g (or 100 mL, or 1 kg or 1 L) is called the **unit price**. Unit prices enable shoppers to easily compare sizes and brands to find products that are the best value for money.

To convert the prices to prices per 100 g, we could divide the price by the mass to find the price for 1 g, then multiply by 100. For example: 500 g box: $5.99 ÷ 500 × 100 = $1.20 per 100 g
820 g box: $7.21 ÷ 820 × 100 = $0.88 per 100 g

However, a quicker method is to mentally divide the mass by 100 to find the number of 100 g 'lots'. We can then divide the price by this number; e.g.

500 ÷ 100 = 5
$5.99 ÷ 5 = $1.20 per 100 g

820 ÷ 100 = 8.2
$7.21 ÷ 8.2 = $0.88 per 100 g

Worked Example 26 WE26

Calculate the unit price (price per 100 g) of the following pair of products, and so determine which one is better value for money: A 500 g packet of pasta for $2.42 or a 750 g packet for $3.44.

Thinking	Working
1 Divide the mass of the first product by 100.	500 g ÷ 100 g = 5
2 Divide the price of the first product by your answer to step **1**.	$2.42 ÷ 5 = $0.48/100 g
3 Repeat steps **1** and **2** for the second product.	750 g ÷ 100 g = 7.5 $3.44 ÷ 7.5 = $0.46/100 g
4 State your answer.	The 750 g packet is slightly better value for money (2c less per 100 g).

4.10 Rates

Navigator

Answers page 645

Q1, Q2, Q3, Q7, Q8, Q9, Q12, Q13, Q14, Q15, Q16, Q19	Q1, Q2, Q3, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q20	Q1 (d)–(f), Q2 (d)–(f), Q4, Q5, Q6, Q8, Q10, Q11, Q12, Q14, Q15, Q17, Q18, Q19, Q20

Fluency

WE25

1 **(a)** If 15 kg of potatoes costs $12, find the cost of 7 kg of potatoes.

(b) A machine in a food canning factory produces 250 cans every hour. How many cans would be produced in 25 minutes?

(c) If 14 pens cost $5.60, find the cost of 3 pens.

(d) Farmer Harry buys 8 cows for $6800. How much would 10 cows have cost him?

(e) If 21 bags of rice weigh 35 kg, how much do 15 bags of rice weigh?

(f) A printing machine prints 70 pages in 8 minutes. How many pages could it print in one hour?

WE26

2 Calculate the unit price (the price per 100 g) of the following pairs of products, and so determine which one is better value for money.

(a) a 600 g jar of jam for $4.09 or a 250 g jar for $2.68

(b) a 500 g packet of pasta for $2.81 or a 750 g packet for $3.45

(c) a 375 g jar of tomato paste for $1.28 or a 500 g jar for $3.25

(d) a 200 g jar of peanut butter for $3.21 or a 375 g jar for $4.93

(e) a 500 mL bottle of soy sauce for $2.71 or a 920 mL bottle for $4.29

(f) a 450 g bag of cat food for $3.78 or a 1 kg bag for $8.79

3 Nazeh has saved $2000 in 4 months. If he continues to save at this rate, how much will he have by the end of the year?

A $6000 **B** $8000 **C** $12 000 **D** $24 000

4 An entertainer receives $450 000 for a season of five performances, each of which lasts $1\frac{1}{2}$ hours. The rate of pay per minute is closest to:

A $60 000 **B** $5000

C $1500 **D** $1000

Understanding

5 A caterer knows that 4 loaves of bread can make enough sandwiches for 25 people. How many loaves will he need to make enough sandwiches for 120 people?

6 **(a)** Which is better value for money, a 280 g jar of jam for $5.15, or a 400 g jar for $6.42?

(b) The 280 g jar goes on special for $4.49. Does this change your answer to **(a)**?

7 A mobile phone carrier charges 75c for 30 seconds. How much will a 4-minute phone call cost?

8 Rajid's cricket team required 85 runs from 12 overs to win the game. At what rate, in runs per over, must they score to win? (Answer to one decimal place.)

9 **(a)** Calculate the price per item in each pack of the following products, and so determine which pack is better value for money.

(i) a packet of 6 muesli bars for $4.83, or a packet of 10 for $7.51

(ii) a 12-pack of cans of soft drink for $14.20, an 18-pack for $20.21, or a 30-pack for $27.51

(iii) a box of 50 tea bags for $3.20, or a box of 200 for $7.99

(b) Describe another way you could compare the prices of the tea bags in part **(a) (iii)**.

10 Lucy has bought a 1 year subscription to *Australian Explorer* magazine. She paid $102 for 12 monthly magazines. The regular price at the newsagent for one copy of the magazine is $9.95. How much will Lucy save:

(a) per magazine **(b)** over the 1 year period?

11 Andrea has a leaky tap in her bathroom. She places a container underneath it and collects 1.2 litres in 8 hours. If Andrea does not fix the tap, use a mental or written method to calculate how much water would be lost in:

(a) 1 day **(b)** 1 week?

12 A 200 g serve of yoghurt contains 6.5 g of fat. Use a mental or written method to calculate how much fat there is in:

(a) a 100 g serve **(b)** a 400 g serve **(c)** a 500 g serve.

13 A 5-minute phone call costs $3.00. If the same call rate is charged, use a mental or written method to calculate the cost of:

(a) a 10-minute call **(b)** a 1-minute call **(c)** a 13-minute call.

Reasoning

14 Charlie's bakery sells hot cross buns in packets of 6. One packet costs $7.20. A customer wants to buy exactly 10 buns. Charlie is happy to take 4 buns from a second packet, but how much should he charge the customer?

15 Imagine that you are standing in a supermarket, comparing the following pairs of products. Do some mental calculations to determine which product is the better value for money. Rounding prices slightly may help to simplify some calculations. Show how you arrived at your answer.

(a) A 1 kg box of washing powder for $5.49, or a 4 kg box for $15.97.

(b) Four 250 mL cartons of orange juice for $1.25 each, or a 1 litre carton for $3.99.

(c) Buying 500 g of ham from the deli counter where the price is $13 per kg, or buying it in a packet for $5.83.

(d) A 400 g jar of honey for $7.99, or a 300 g jar for $6.54.

(e) Give some reasons why people might prefer to buy a product even though it is not the best value for money.

16 A mobile phone carrier charges a rate of 85 cents per minute for pre-paid calls. Calls made on a phone plan are charged at 75 cents per minute, plus a 35 cent connection fee. Which of the two types of charge is cheaper for a 5-minute phone call?

17 During the month of January, the water level in a Northern Territory dam increased by 78 000 kilolitres (1 kilolitre = 1000 litres).

(a) How many kilolitres per day was this? (Round your answer to two decimal places.)

(b) If the dam continued to fill at this rate, use your answer to **(a)** to calculate how much water will have flowed into the dam by the end of the year. (Assume there are 365 days in a year.)

(c) Would it be sensible to use your answer to **(b)** as a prediction for the amount of water that will flow into the dam over the year? Give some reasons for your answer.

18 'Trim and Tasty' cheese comes in three different-sized blocks:

250 g for $4.50
500 g for $7.42
750 g for $9.76

(a) How many times bigger than the 250 g block is the 500 g block?

(b) If the prices of the 500 g block and the 750 g block were in the same proportion to the price of the 250 g block as their sizes, what would you expect their prices to be?

(c) Often (but not always) larger sizes of a product have cheaper unit prices. Suggest a reason why this is the case.

Open-ended

19 List four supermarket products whose unit price would be usefully calculated per 100 mL, or per L.

20 Kumar needs 4.5 kg of rice for the students who are attending his cooking classes. It is available in the following sizes and prices.

500 g for $1.24 1 kg for $2.35 1.5 kg for $3.59 2 kg for $4.52

(a) List at least three different combinations of sizes that would give Kumar 4.5 kg of rice.

(b) Which combination is the cheapest?

Outside the Square Puzzle

Happy numbers

1 Write down your favourite single-digit number.

2 Multiply that number by 9.

3 Multiply this new number by 12 345 679. (Unless your calculator has more than 8 digits in its display you will need to do this by hand to see the full effect.)

4 If you did choose your favourite number, then the answer should make you very happy. Does it work for other single-digit numbers? Can you explain why it works?

Strategy options

- Guess and check.
- Work backwards.
- Test all possible combinations.

Challenge 4

1 What percentage of whole numbers from 6 to 25 inclusive (i.e. including 6 and 25) are exact multiples of 6?

A 5 **B** 20 **C** 25 **D** 30

2 The numbers 5, 8, 7 and 3 are written on cards. Where should they be placed so that the following product has the greatest possible value?

$\square \times 0.\square\square\square$

3 Evaluate $0.1^2 - 0.1^3$.

4 Zinadene has $\frac{3}{4}$ of a dollar and Katrine has $\frac{3}{10}$ of a dollar. Together they have:

A \$0.95 **B** \$1.00 **C** \$1.05 **D** \$1.10

5 $200 \div 2.5 = 80$. Therefore, $20 \div 0.25 =$

A 0.80 **B** 8.0 **C** 80 **D** 800

6 When doing a series of additions using his calculator, Trent noticed that he added 49 095 instead of 49.95. In order to correct his error with a single entry, he should now:

A add 49.95 **B** subtract 49 045.05

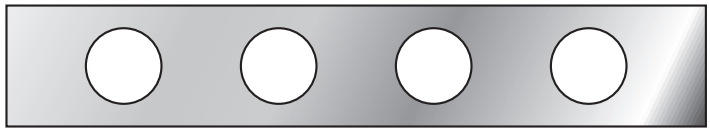
C add 49 045.05 **D** subtract 49 095

7 A decimal with 2 decimal places is multiplied by a decimal with 3 decimal places. Explain with number examples how the solution could have:

(a) 5 decimal places **(b)** 4 decimal places **(c)** 3 decimal places.

8 In Felicity's first six netball games she averaged 7.5 goals per game. If the least number of goals she scored was 4, what is the lowest possible value for the highest number of goals she scored?

9 Four holes are to be drilled along the centre line of a strip of metal so that their centres are 2.25 cm apart. The centres of the two end holes are to be 3.35 cm from their corresponding ends. What is the length of the strip of metal?



10 What is the quotient when 0.01 is divided by 0.002?

11 Mikaela had her salary reduced by 10%. She was later promoted and her salary was increased by 10%. If her original salary was \$30 000, her present salary is:

A \$24 300 **B** \$27 000 **C** \$29 700 **D** \$30 000

12 $\frac{2009}{20.09}$ equals

A 100 **B** 10 **C** 0.1 **D** 0.01

13 A town has 5000 residents, of whom 60% voted in a local council election. The result was that, of those who voted, 37% voted for *P*, 32% for *Q* and 31% for *R*. Under the voting system, *P* was elected. The number of residents who voted for *P* was:

A 1850 **B** 1110 **C** 960 **D** 930

Chapter review 4

D.I.Y. Summary

Key Words

decimal places	part : whole ratio	recurring decimal
decimal point	per cent	round
digit	place value	terminating decimal
equivalent ratios	rate	unit price
part : part ratio	ratio	unitary method

Copy and complete the following using the words and phrases from this list, where appropriate, to write a summary for this chapter. A word or phrase may be used more than once.

1 4.87 has three _____s and two _____ .

2 When adding or subtracting decimals, it is important to line up the _____s.

3 _____ are created by multiplying each part in the ratio by the same number.

4 _____s compare two or more parts of a whole.

5 A _____ has a finite number of decimal places, a _____ has an infinite number of decimals, in a repeating pattern.

6 _____ literally means 'for every hundred'.

7 Calculating a _____ helps to compare the prices of different sizes and brands of products.

8 Explain the difference between 'round down' and 'round up'.

Fluency

1 Write in expanded fractional form. Ex 4.1

(a) 0.968 **(b)** 5.0702 **(c)** 6.005

2 Write as decimals: Ex 4.1

(a) six tenths, five hundredths, two thousandths and four ten-thousandths

(b) eight hundredths, nine hundred-thousandths and three millionths

3 Write as decimals: Ex 4.1

(a) $4 + \frac{3}{10} + \frac{8}{100} + \frac{6}{10\,000}$ **(b)** $50 + 7 + \frac{3}{100} + \frac{2}{1000} + \frac{9}{100\,000}$

4 Write each of the following in expanded word form. Ex 4.1

(a) 1.8531 **(b)** 0.070 06 **(c)** 61.0009

5 Write the value of the 9 in each decimal as **(i)** a fraction **(ii)** in words. Ex 4.1

(a) 5.091 **(b)** 0.0659 **(c)** 25.291

6 Write < or > in each of the following pairs of numbers to make a true statement. Ex 4.1

(a) 3.0427 _____ 3.0274 **(b)** 0.009 95 _____ 0.01

7 Write in order from smallest to largest. Ex 4.1

(a) 0.6055, 0.5506, 0.607 **(b)** 0.071, 0.701, 0.71

8 Copy this number line and show the positions of the following numbers: 0.25, 1.45, 0.09, 2.05. Ex.4.1

9 Round each of the following to the number of decimal places shown in the brackets. Ex.4.2

(a) 4.398 (1) **(b)** 34.6503 (2) **(c)** 23.098 (1) **(d)** 102.4728 (2)

10 Round the following to the nearest 5 cents. Ex.4.2

(a) \$41.21 **(b)** \$10.03 **(c)** \$79.97 **(d)** \$98.98

11 Write each of the following as a single fraction or mixed number in simplest form. Ex.4.3

(a) 3.9 **(b)** 0.62 **(c)** 2.45 **(d)** 0.0018

12 Write the following fractions as decimals, using the correct notation for recurring decimals if necessary. Ex.4.3

(a) $\frac{4}{5}$ **(b)** $\frac{19}{20}$ **(c)** $\frac{2}{9}$ **(d)** $\frac{10}{12}$

13 Calculate: Ex.4.4

(a) 23.6 + 4.79 **(b)** 3.768 + 10.9205 + 0.77 **(c)** 6 + 0.408 + 35.025

(d) 10.367 – 2.65 **(e)** 2.082 – 0.394 **(f)** 7 – 2.2198

14 Find the following products. Ex.4.5

(a) 3.376×4 **(b)** 2.99×35 **(c)** 6.09×33

(d) 23.6×2000 **(e)** 0.548×300 **(f)** 0.069×50

(g) 0.6×0.9 **(h)** 0.009×0.04 **(i)** 5.2×3.8

15 Calculate the following. Round answers to three decimal places where necessary. Ex.4.6

(a) $10.32 \div 4$ **(b)** $7.028 \div 7$ **(c)** $3.75 \div 8$

(d) $480.6 \div 2000$ **(e)** $8.23 \div 500$ **(f)** $54.63 \div 300$

(g) $0.48 \div 0.04$ **(h)** $1.2 \div 0.5$ **(i)** $11.9 \div 0.002$

16 Write the following fractions as percentages. Ex.4.7

(a) $\frac{7}{10}$ **(b)** $\frac{5}{4}$ **(c)** $\frac{1}{8}$ **(d)** $\frac{2}{3}$

17 Convert the following decimals to percentages. Ex.4.7

(a) 0.38 **(b)** 0.96 **(c)** 3.55 **(d)** 0.09 **(e)** 3.234 **(f)** 0.5432

18 Calculate the following percentages. Ex.4.8

(a) 40% of \$60 **(b)** 15% of 85 L **(c)** 83% of 200 m **(d)** 12.5% of \$600

19 Write the following results as percentages, rounding answers to one decimal place if necessary. Ex.4.8

(a) 13 out of 20 **(b)** 35 out of 70

(c) 14 out of 40 **(d)** 28 out of 30

20 There are 56 girls and 64 boys in Year 7. Ex.4.9

(a) Write the ratio boys : girls in simplest form.

(b) Write the number of girls as a fraction of the total number of students, in simplest form.

(c) Write the number of boys as a percentage of the total number of students, to the nearest whole number.

21 **(a)** A 10 kg box of tomatoes costs $23.50. Use the unitary method to calculate the cost of a 3 kg box.

Ex 4.10

(b) If a 250 g block of cheese costs $7.85, find the unit price (the price per 100 g).

Understanding

22 Write the populations of the following countries as whole numbers.

(a) China: 1.326 billion

(b) India: 1.14 billion

(c) Indonesia: 228.2 million

(d) New Zealand: 4.27 million

23 An employer wants to buy each of her staff a uniform. If each uniform costs $75.59, how much will the uniforms cost:

(a) for 40 staff

(b) for 100 staff?

24 Kayla bought the following items while out shopping: A $30 T-shirt discounted by 10%, and a $60 pair of jeans discounted by 40%.

(a) Calculate the dollar value of each of the discounts.

(b) Subtract the discount amount to find how much Kayla paid for each item.

25 **(a)** Which is better value for money: a 250 g jar of honey for $2.98, or a 400 g jar for $4.23?

(b) The 250 g jar goes on special for $1.98. Does this change your answer to **(a)**?

(c) Give one or two reasons why people might prefer to buy a certain size or product, even though it may not have the cheapest unit price.

26 A salad dressing is made by mixing oil and vinegar in the ratio 3 : 1.

(a) How much oil should be mixed with 25 mL of vinegar?

(b) Helen mixes 60 mL of oil with 40 mL of vinegar. Is this an equivalent ratio to the one given above? Demonstrate your answer by writing it in simplest form.

27 In a springboard diving competition, Claudia needed a score of 52 or more to take first place. For her final dive she chose a dive with a degree of difficulty of 2.7. The scores she received from the judges were 7.0, 8.0, 7.5, 8.5, 7.5, 8.0 and 8.0.

(a) Remove the highest and lowest scores and calculate the average of the remaining five scores (add them up and then divide by 5).

(b) Calculate the 'three-judge total' by multiplying this average by 3.

(c) Calculate her final score by multiplying the 'three-judge total' by the degree of difficulty. Did she do well enough to win?

Reasoning

28 Tim buys 6 individual cans of drink for $0.87 per can.

(a) If he pays in cash, find the total cost of the cans.

(b) A pack of 6 cans costs $4.80. How much could Tim have saved by buying the 6 pack?

(c) What is the individual cost of the cans in the 6 pack?

(d) Tim needs to buy 40 cans for a party. What is the cheapest way to buy them?

29 There must be at least one supervisor for every 12 children at a childcare facility. If there are 54 children booked in for a day, how many supervisors will be needed? Give a reason for your answer.

30 Sally is shopping for shoes. She has found the pair she wants in two different stores. Store A has them priced at $65, with a 'take 25% off' tag on them. Store B has them priced at $75, but the store is having a '30% off everything' sale. Where should Sally buy her shoes? Explain your choice by showing the relevant calculations.

NAPLAN practice 4

Numeracy: Non-calculator

1 Which number is greater than 0.06?

A 0.0069 **B** 0.007 **C** 0.05 **D** 0.1

2 Geraldine buys 400 snack bars for the school camp. If each bar costs $0.64, how much would Geraldine pay for the 400 bars?

A $25.60 **B** $256 **C** $464 **D** $25 600

3 What is the answer to 5.4 ÷ 0.9?

A 0.06 **B** 0.6 **C** 6.6 **D** 6

4 20% of a class have the flu. The class has 25 students. How many have the flu?

A 4 **B** 5 **C** 10 **D** 20

Numeracy: Calculator allowed

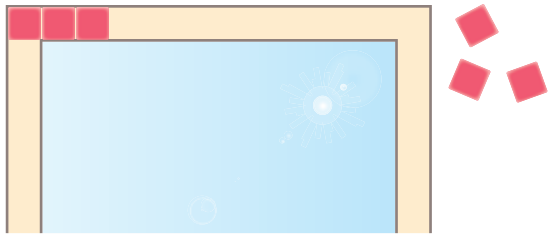
5 A pack of 10 lollipops costs $4.60.
A pack of 6 costs $3.20.
You need to buy 22 lollipops.

What is the least amount you can pay?

6 The price of grapes at the supermarket is $14 per kg. If Jack paid $3.50 for his grapes, how many grams did he buy?

A 0.25 g **B** 25 g **C** 100 g **D** 250 g

7 Lucy is adding a row of square tiles across the top of a mirror. Each tile is 4.5 cm wide. The mirror is 56 cm wide. Lucy wants to tile right across the top, with no gaps between the tiles. What calculation should she do to work out how many tiles she needs?



A 4.5 ÷ 56 **B** 5.6 ÷ 4.5 **C** 56 ÷ 4.5 **D** 4.5 × 56

8 The material for the curtains in the classroom costs $21.30 per metre. 8.4 m is needed. How much will the material cost?

Mixed review B

Fluency

1 Write the following fractions in simplest form. Ex.3.2

(a) $\frac{12}{40}$ **(b)** $\frac{15}{50}$ **(c)** $\frac{48}{64}$ **(d)** $\frac{20}{65}$

2 Write a positive or a negative integer to describe the following. Ex.2.4

(a) a withdrawal from a bank account of $74 **(b)** a weight gain of 3 kg

(c) 215 m below sea level **(d)** an increase in length of 8 m

3 For each of the following numbers: Ex.2.3

(i) use a factor tree to find the prime factors

(ii) write the number as a product of its prime factors, using index notation.

(a) 76 **(b)** 108 **(c)** 250

4 Calculate approximate answers to the following by rounding to a convenient multiple of 5 or 10. Ex.1.4

(a) 238×21 **(b)** 107×31 **(c)** $478 \div 39$ **(d)** $604 \div 153$

5 For each pair of fractions, determine which one is larger, then write a > or < sign between them. Ex.3.3

(a) $\frac{2}{3}$ _____ $\frac{2}{5}$ **(b)** $\frac{5}{12}$ _____ $\frac{5}{9}$ **(c)** $\frac{11}{15}$ _____ $\frac{3}{4}$

6 Find: Ex.4.5, 4.6

(a) 0.45×0.6 **(b)** $45.9 \div 3$ **(c)** $43.5 \div 0.1$

7 Calculate the following by first writing a single sign between the integers. Ex.2.7

(a) $-1 + (-5)$ **(b)** $3 - (-11)$ **(c)** $-6 - (+4)$

(d) $9 + (-17)$ **(e)** $-8 - (-14)$ **(f)** $21 - (+30)$

8 Write each of the following as a fraction in simplest form. Ex.4.3

(a) 0.32 **(b)** 1.24 **(c)** 3.237

9 Write the following in index form. Ex.1.2

(a) $7 \times 7 \times 7 \times 7$ **(b)** 4 squared

(c) $2 \times 2 \times 3 \times 3 \times 3$ **(d)** 11 cubed

10 Find the lowest common multiples of the following numbers. Ex.2.1

(a) 5 and 6 **(b)** 3 and 6 **(c)** 2, 3 and 5

11 Write < or > between the following pairs of numbers. Ex.2.4

(a) -5 _____ 3 **(b)** -4 _____ -11 **(c)** -7 _____ 0

12 Find the HCF of the following numbers. Ex.2.1

(a) 12 and 30 **(b)** 16 and 40 **(c)** 24 and 60

13 Calculate the following. Write your answers in simplest form. Ex.3.4

(a) $\frac{1}{5} + \frac{3}{4}$ **(b)** $1\frac{2}{3} + 2\frac{3}{8}$ **(c)** $\frac{5}{6} - \frac{3}{8}$ **(d)** $3\frac{1}{4} - 2\frac{1}{2}$

Understanding

14 Use an appropriate mental strategy to calculate the following.

(a) 29×7 **(b)** 44×11 **(c)** 13×15

(d) $260 \div 4$ **(e)** $2 \times 4 \times 7 \times 5$ **(f)** $440 \div 8$

15 Erin calculates that she needs 9 lots of 0.35 m of ribbon for her textiles project. She wants to round up to the nearest metre so that she makes sure she has enough.

(a) Calculate how many metres she should buy.

(b) If the ribbon costs \$0.75 per m, how much will she pay?

16 Write **(i)** a fraction in simplest form and **(ii)** a percentage to represent the following situations.

(a) 12 black jelly beans in a bag of 40

(b) 120 Year 7 students in a school of 520 students

17 A 250 g serve of tinned soup contains 7 g of fat. Calculate the amount of fat contained in:

(a) a 500 g serve **(b)** a 50 g serve **(c)** a 150 g serve.

18 7 pizzas were each sliced into 6 equal pieces.

(a) If $4\frac{5}{6}$ pizzas were eaten, how many slices is that?

(b) How many slices are left over?

19 Camilla is on an athlete's diet where $\frac{2}{3}$ of her daily energy must come from carbohydrates, $\frac{1}{4}$ from protein, and the rest from fats. Her daily energy allowance is 4800 kJ.

(a) Calculate how many kJ of carbohydrates she must have every day.

(b) Calculate how many kJ of protein she must have every day.

(c) What fraction of her daily kJ intake is fat?

20 Explain why $3^2 = 9$, but $3 \times 2 = 6$.

Reasoning

21 A lighting display in the city has a set of blue lights that flash every 6 minutes, and a set of red lights that flash every 8 minutes. How many times an hour will the lights flash together?

22 There is a large block of chocolate sitting in the Williams family pantry. Chloe breaks off and eats $\frac{1}{6}$, and returns the rest. Later, her brother Eamon breaks off and eats $\frac{2}{3}$ of the rest.

(a) What fraction of the original block is left?

(b) If the original block contained 54 squares of chocolate, who ate more, Chloe or Eamon?

23 Shania surveyed 130 Year 7 students to find out which charity they wanted to fundraise for. Shania reported back to the Student Council that 65% of the Year 7s wanted to support the Red Cross.

(a) What is 65% of 130?

(b) Considering that we are working with numbers of students, what is 'strange' about your answer to **(a)**?

(c) What might have been the actual number of students who said they wanted to support the Red Cross? Explain how Shania obtained her figure of 65%.

24 How many whole numbers lie on the number line between $\frac{4}{3}$ and $\frac{38}{4}$?

25 Jeffery has 46 footy cards in his collection. His little brother Joseph has half as many in his collection, whereas his friend Shahin's collection is twice the size of Jeffery's. How many more cards has Shahin than Joseph?