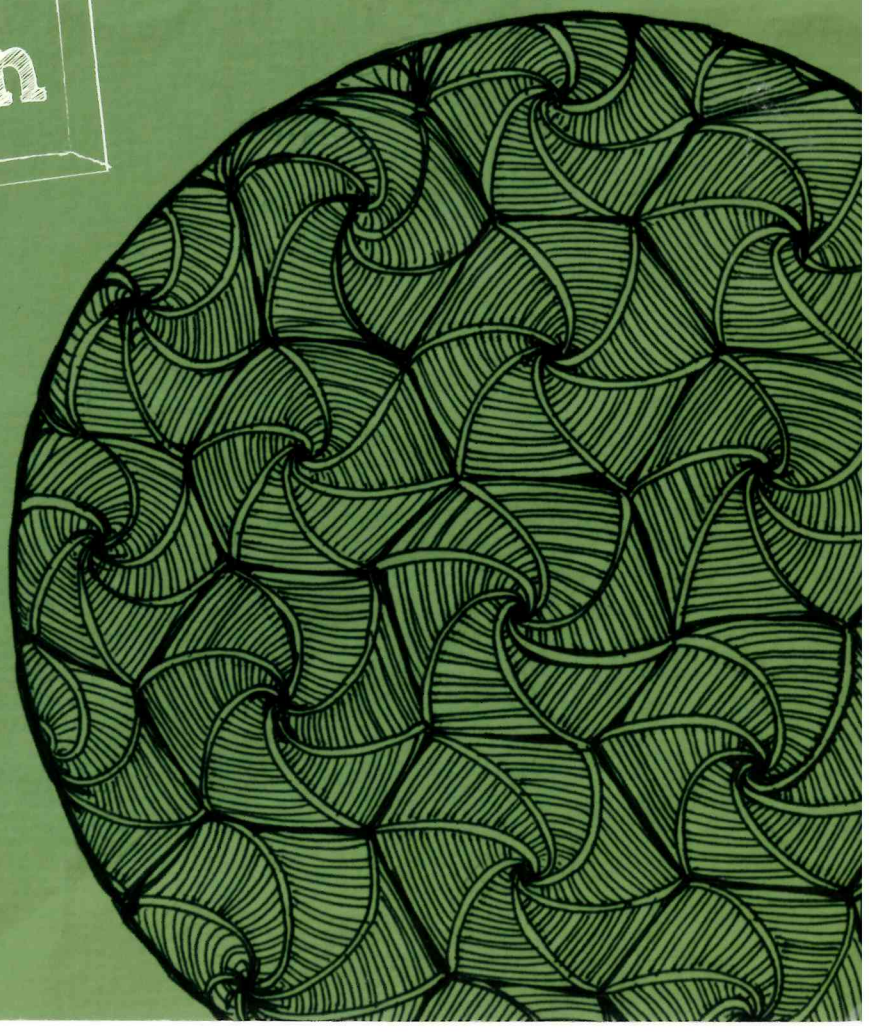
REVISE EDEXCEL GCSE (9–1)

Mathematics

REVISION WORKBOOK

Foundation

For the (9–1) exams



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Mathematics
Foundation

REVISION WORKBOOK

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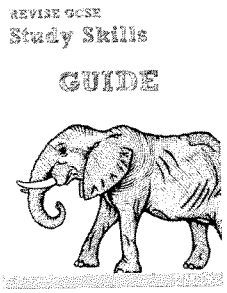

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Contents

A small bit of small print
Edexcel publishes Sample Assessment Material and the Specification on its website. This is the official content and this book should be used in conjunction with it. The questions in 'Now try this' have been written to help you practise every topic in the book. Remember: the real exam questions may not look like this.

Percentages

1 Find

Per cent means out of one hundred.

Guided

(a) 9% of 50

$\frac{9}{100} \times$ ..... = ...

(2 marks)

(b) 4% of 275

..... **(2 marks)**

2 Express the following as percentages

Guided

(a) 35 out of 56

$\frac{35}{56} \times$ ..... = ... %

(2 marks)

(b) 15 out of 75

.....% **(2 marks)**

3 A ticket for the theatre costs £96 plus a booking charge of 8%. Work out

For part (a), find 8% of £96. For part (b), add this amount on to the original price.

(a) the amount of the booking charge

£..... **(2 marks)**

(b) the total cost of a theatre ticket.

£..... **(2 marks)**

4 Alice bought a car for £15 000. After one year the car was worth 12% less.
Work out the new value of the car.

£..... **(3 marks)**

5 Suki invited 128 people to a Christmas party. 48 people were adults.
Express 48 as a percentage of 128.

.....% **(2 marks)**

6 The table gives information about boys who choose French or German and girls who choose French or German at school.

	Number of boys	Number of girls
French	84	56
German	54	126

(a) Work out the percentage of girls who chose French.

Start by finding the total number of girls.

.....% **(3 marks)**

(b) 30% of the students who chose French passed their exam.
60% of the students who chose German passed their exam.
Show that 47% of all students passed their exam.

(4 marks)

Fractions, decimals and percentages

1 Write these percentages as fractions in their simplest form.

Per cent means out of one hundred.

Simplify your fraction if possible.

Guided

(a) 24%

$24\% = \frac{24}{100} =$ .....

..... **(1 mark)**

(b) 64%

..... **(1 mark)**

(c) 72%

..... **(1 mark)**

2 Write the following numbers in order, starting with the smallest.

(a) 0.62 $\frac{3}{10}$ 61%

..... **(2 marks)**

(b) 33% 0.32 $\frac{7}{20}$

..... **(2 marks)**

(c) 0.38 37% $\frac{2}{5}$

..... **(2 marks)**

3 John earns £2300 per month. He spends 15% of his salary as rent and $\frac{3}{5}$ of his salary on bills.
Work out how much John has left after he has paid his rent and bills.

You will need to use problem-solving skills throughout your exam – **be prepared!**

Guided

PROBLEM SOLVED!

Plan your strategy before you start. You'll save time if you convert $\frac{3}{5}$ into a percentage.

$\frac{3}{5} =$ ..... %

15% + ... % = ... %

100% − ..... % = ... %

..... % of £2300 = £..... **(3 marks)**

4 There are 120 students in Year 11.
$\frac{9}{20}$ of the students travel to school by bike.
15% of the students travel to school by car.
The rest of the students walk to school. How many students walk to school?

..... **(3 marks)**

5 Amy earns £2100 each month and saves 30% of this.
Bhavna earns £1800 and saves $\frac{1}{3}$ of this.
Who saves the most money each month?

Don't just write down a name. You have to show your working then write a conclusion.

..... **(3 marks)**

Percentage change 1

Guided

1 (a) Decrease 78 by 4% Start by finding 4% of 78. (b) Increase 126 by 4%

$\frac{4}{100} \times$ ..... = ...

78 − ..... = ... **(1 mark)**

(c) Decrease 96 by 12% (d) Increase 242 by 14%

..... **(1 mark)** ..... **(1 mark)**

2 A shop sells mobile phones. The shop sells a mobile phone for £135.
A discount of 6% is given. Work out the price of the mobile phone after discount.

£..... **(2 marks)**

Guided

3 Find the percentage change of the following discounts.

	Original price (£)	New price (£)	Percentage change
(a)	640	512	$\frac{640 - .....}{640} \times 100 =$ .....%
(b)	160	208	.....%
(c)	1560	2106	.....%
(d)	2750	2475	.....%

(12 marks)

4 Noah and Chloe are collecting reward points in an online video game.

(a) Noah collected 3200 points last month and 4315 points this month.
Work out the percentage increase in the number of points he collected.

.....% **(3 marks)**

(b) Chloe collected 5100 points last month and 3672 points this month.
Work out the percentage decrease in the number of points she collected.

.....% **(3 marks)**

5 Niamh and Owen received the same percentage pay rise in 2015.
In 2014 Niamh earned £24 500 per year. In 2015 she received a pay rise to £25 970.
In 2014 Owen earned £22 000.
Work out Owen's salary in 2015.

£..... **(4 marks)**

Percentage change 2

Guided

6 Aaron is comparing the cost of flights from two airlines. Both airlines charge a credit card charge and a booking fee.

Tricky-jet	**Kelly-air**
Credit card charge: 3%	Credit card charge: 5%
Booking fee: £5	Booking fee: £2

A ticket is advertised as costing £90 from both airlines. Work out which airline is cheaper after the additional charges are applied.

Tricky-jet

3 × ..... = ...

.....

£..... + £..... + £..... = £.....

Kelly-air

5 × ..... = ...

.....

£..... + £..... + £..... = £.....

..... is cheaper. **(4 marks)**

7 Zac wants to buy some concrete posts. He finds two companies on the internet.

Postland	**C & R**
10 posts for £10.50 each and receive a 15% discount	5 posts for £37.75 plus 20% VAT

Zac needs to buy ten concrete posts and wants the cheapest option.
Which of the two shops should Zac buy the concrete posts from?

Remember to show all your working and write a conclusion.

..... **(4 marks)**

8 Sandeep wants to buy a pair of trainers. He finds that two online shops sell the trainers he wants.

Footworld	**Sportish**
£42.50 for a pair	£30.90 for a pair plus VAT at 20%
Online discount of 22%	

Sandeep wants to pay the lowest price. Which shop should Sandeep by his trainers from?

..... **4 marks)**

Ratio 1

1 Write the following ratios in their simplest form.

Guided

(a) 45 : 30

45 : 30

÷ ..... ÷ .....

..... : .....

Divide both parts of the ratio by the same number.

(2 marks)

(b) 54 : 16

..... **(2 marks)**

(c) 56 : 64

..... **(2 marks)**

2 (a) Divide £50 in the ratio 2 : 3

Guided

Total parts = ... + ...

1 part = 50 ÷ ..... = ...

2 parts = ... × ..... = ...

3 parts = ... × ..... = ...

(2 marks)

(b) Divide £750 in the ratio 2 : 5 : 8

..... **(2 marks)**

3 Sandeep is going to make a pizza. He uses cheese, peppers and dough in the ratio 2 : 3 : 7
He uses 56 g of dough. Work out the number of grams of cheese and the number of grams of peppers he uses.

Seven parts of the ratio represents 56 g. Work out how much one part of the ratio represents.

cheese ..... g

pepper ..... g **(3 marks)**

4 Anjali, Paul and Faye are travelling in a car from Wolverhampton to London.
They share the driving so that the distances driven are in the ratio 3 : 4 : 5
Anjali drives 36 miles.
Calculate the distances Paul and Faye each drive.

Paul ..... miles

Faye ..... miles **(3 marks)**

5 Amish, Benji and Cary save some money in the ratio 3 : 4 : 9
Cary saved £120 more than Benji.

(a) Show that Amish saved £72.

(2 marks)

(b) Show that the total amount of money saved was £384.

(2 marks)

Ratio 2

Guided

6 Solder is made from lead and tin. The ratio of the mass of lead to the mass of tin is 2 : 3

(a) Kyle made 70 g of solder. Work out the mass of the lead used.

Total parts = ... + ...

1 part = 70 ÷ ..... = ...

2 parts = 2 × ..... = ... **(2 marks)**

(b) He then uses 16 g of lead to make some more solder.
Work out the mass of solder he made.

..... **(2 marks)**

Guided

PROBLEM SOLVED!

7 Gabby and Harry shared some money based on their ages. The ratio of Gabby's age to Harry's age is 3 : 8. Harry received £2000 more than Gabby. How much money did they share?

You will need to use problem-solving skills throughout your exam – **be prepared!**

8 − 3 = 5 parts

5 parts = £2000

1 part = £2000 ÷ 5 = ...

11 parts = 11 × ..... = ...

In total they shared £..... **(3 marks)**

Harry received £2000 more than Gabby and 8 − 3 = 5 so five parts of the ratio represents £2000.

8 Asha uses an old recipe to make some cakes.
The ratio of the weights of flour, margarine and sugar needed for the recipe is 5 : 4 : 3
Asha has the following amounts of each ingredient.

1825 g of flour
700 g of margarine
250 g of sugar

Each cake needs 48 g of the combined ingredients. Show that the maximum number of cakes she can make is 20.

3 marks)

Metric units

Guided

1 Change

(a) 45 mm to cm

You need to remember the metric conversions.

45 mm ÷ ..... = ...cm **(1 mark)**

(b) 72 cm to mm

.....mm **(1 mark)**

(c) 3.5 km to m

Kilo means one thousand.

.....m **(1 mark)**

(d) 5.3 kg to g

.....g **(1 mark)**

(e) 4.3 litres to m*l*

4.3 litres × ..... = ...m*l* **(1 mark)**

(f) 480 mg to g

.....g **(1 mark)**

Guided

2 Change

(a) 15 cm to mm

.....mm **(1 mark)**

(b) 28 mm to cm

28 mm ÷ ..... = ...cm **(1 mark)**

(c) 1800 g to kg

.....kg **(1 mark)**

(d) 2800 m to km

.....km **(1 mark)**

(e) 53 m*l* to litres

..... litres **(1 mark)**

(f) 145 g to mg

145 g × ..... = ...mg **(1 mark)**

3 How many 125 m*l* cups can be filled from a bottle holding 2 litres of squash?

Convert 2 litres into m*l*.

..... **(2 marks)**

4 How many 75 mm pieces of wood can be cut from a piece of wood of length 6 m?

..... **(2 marks)**

5 A book shelf is 1 m wide.
Joe wants to place a set of books across the shelf.
He has 20 books. Each book is 5.2 cm wide.
Will he have enough space for all the books?

Don't just answer 'yes' or 'no'. You need to show your working then write a conclusion.

..... **(3 marks)**

Reverse percentages

Guided

1 In a sale all prices are reduced by 30%.
Andy buys a shirt on sale for £42.
Work out the original price of the shirt.

First work out the multiplier for a 30% decrease.

100% − 30% = ...%

$\frac{\text{.....}}{100}$ = ...

£42 ÷ ..... = £.....

(3 marks)

Guided

2 Brinder receives a pay rise of 6%.
After the pay rise, Brinder earns a salary of £35 245.
Work out Brinder's salary before the pay rise.

First work out the multiplier for a 6% increase.

100% + ...% = ...%

$\frac{\text{.....}}{100}$ = ...

£35 245 ÷ ..... = £.....

(3 marks)

3 Kam bought a new car. The car depreciates by 15% each year.
After one year the car was worth £28 560.
Work out the price of the car when it was new.

Check that your answer makes sense. The original price of the car should be **greater** than £28 560.

£..... **(3 marks)**

4 Kate's weekly wage this year is £560.
This is 8% more than her weekly wage last year. Ken says, 'Your weekly wage was £515.20 last year.'
Is Ken correct?
You must show your working.

You can do this question without using reverse percentages. Increase £515.20 by 8% and compare your answer to £560. Remember to write a conclusion.

(3 marks)

PROBLEM SOLVED!

5 Alison and Nav invested some money in the stock market in 2014.
This table shows the value of their investments in 2015.

Who invested the most money originally?
Give reasons for your answer.

You will need to use problem-solving skills throughout your exam – **be prepared!**

	Value in 2015	Percentage increase since original investment
Alison	£1848	12%
Nav	£1764	5%

.....

(4 marks)

Growth and decay

Guided

1 Raj invests £12 000 for four years at 10% per annum compound interest.
Work out the value of the investment at the end of four years.

First work out the multiplier for a 10% increase.

100% + 10% = ...%

$\frac{\text{.....}}{100}$ = ...

£12 000 × (.....)$^{\text{.....}}$ = £..... **(2 marks)**

2 Neil invests £5800 at a compound interest rate of 6% per annum.
At the end of n complete years the investment has grown to £6907.89.
Work out the value of n.

Choose some values of n and work out the amount of investment after n years.

n = ... **2 marks)**

Guided

3 Chris bought a lorry that had a value of £24 000.
Each year the value of the lorry depreciates by 15%.

First work out the multiplier.

(a) Work out the value of the lorry at the end of four years.

100% − .....% = ...%

$\frac{\text{.....}}{100}$ = ...

£24 000 × (.....)$^{\text{.....}}$ = £..... **(2 marks)**

(b) Brian bought a new car for £12 000. Each year the value of the car depreciates by 12%. Work out the value of the car at the end of five years.

£..... **(2 marks)**

4 Daljit invests £1500 on 1 January 2010 at a compound interest rate of r% per annum. The value, £V, of this investment after n years is given by the formula $V = 1500 \times (1.065)^n$.

(a) Write down the value of r.

Work out what percentage would give a multiplier of 1.065.

r = ... **(1 mark)**

(b) Work out the value of Daljit's investment after 10 years.

£..... **(2 marks)**

5 Terry buys a new vacuum cleaner for £350. The value of the machine depreciates by 25% each year. Terry says,

'4 × 25% = 100%, so after four years the vacuum cleaner will have no value.'

Explain why Terry is wrong.

..... **(2 marks)**

Speed

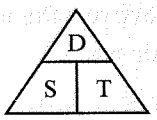
1 Anjali runs 400 metres in 44.7 seconds.
Work out Anjali's average speed.

Guided

Speed = distance ÷ time

Speed = ... ÷ ..... = ...m/s

This is the formula triangle for speed:



(2 marks)

2 The distance from Manchester to Rome is 1700 km.
A plane flies from Manchester to Rome in four hours.
Work out the average speed of the plane.

..... km/h **(2 marks)**

3 Sandeep drives 250 km at an average speed of 75 km/h. Work out the time taken for Sandeep's journey.

..... hours ..... minutes **(3 marks)**

4 Selma drives for four hours. Her average speed is 60 km/h.
Work out the total distance she travels.

Guided

Always write down the formula.

Distance = ... × .....

Distance = ... × ..... = ...m **(2 marks)**

5 Pavan is driving in France. The legal speed limit on French motorways is 130 km/h. He travels from one junction to another in 15 minutes and he covers a distance of 35 km. Show that he has broken the speed limit.

(3 marks)

6 Jane travelled 50 km in 1 hour 15 minutes.
Karen travelled 80 km in 2 hours and 45 minutes.
Who had the lower average speed? You must show your working.

(3 marks)

7 At a school's sports day the 100 m race was won in 14.82 seconds and the 200 m was won in 29.78 seconds. Which race was won with a faster average speed?
You must show all your working.

(3 marks)

Density

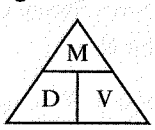
Guided

1 What is the density of a piece of wood that has a mass of 17.5 grams and a volume of 20 cm^3?

Density = mass ÷ volume

Density = ... ÷ ..... = ... g/cm^3

This is the formula triangle for density:



(2 marks)

Guided

2 Len has a silver ring which has a volume of 14 cm^3. The density of silver is 10.5 grams per cm^3. Work out the mass of the silver ring.

Mass = ... × .....

Always write down the formula.

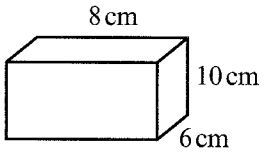
Mass = ... × ..... = ... g **(2 marks)**

3 Petrol has a density of 0.8 g/cm^3. The petrol in a can has a mass of 8.3 kg. How much petrol, in cm^3, does the can contain?

Convert kg into g.

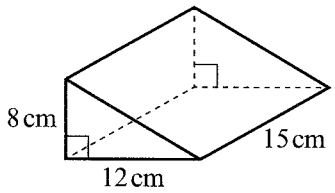
..... cm^3 **(3 marks)**

4 This solid cuboid is made of plastic. The plastic has a density of 0.9 g per cm^3. Work out the mass of the cuboid.



..... g **(4 marks)**

5 The diagram shows a solid triangular prism. The prism is made of iron. Iron has a density of 7.87 g per cm^3. Work out the mass of the prism.



Remember, the volume of a prism is given by:
Volume = Length × Area of cross-section.

..... g **(3 marks)**

6 Gavin weighed some metal beads. They had a mass of 950 g. The volume of the beads was 96 cm^3. Gavin worked out the density and claimed that the metal was gold. Use the information in the table to work out whether Gavin is correct. You must show all of your working.

Metal	Density g/cm^3
Gold	19.3
Copper	8.6
Bronze	9.9

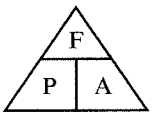
(3 marks)

Other compound measures

Guided

1 A safe exerts a force of 600 N on to the floor. The area of the base of the floor is 1.5 m^2. Work out the pressure exerted on the floor.

This is the formula triangle for pressure:



Pressure = force ÷ area

Pressure = ... ÷ ..... = ... N/m^2

Make sure you give units with your answer. The force is in N and the area is in m^2, so the units of pressure will be N/m^2.

(2 marks)

2 Ray exerts a force of 900 N on to the ground. His feet have an area of 0.024 square metres each. Work out the pressure he exerts on the ground.

How many feet does Ray have?

..... N/m^2 **(3 marks)**

Guided

3 The pressure between a car's four tyres and the road is 400 000 N/m^2.
The car exerts a force of 10 000 N on the road.
Work out the area of contact between each tyre and the road.

Area = ... ÷ .....

Always write down the formula.

Area = ... ÷ ..... = ... m^2 **(2 marks)**

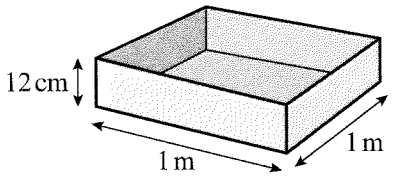
4 There are 140 litres of oil in a tank.
When Owen opens the tank, oil flows out at a rate of 4 litres per minute.
How many minutes will it take for the tank to become completely empty?

..... minutes **(2 marks)**

PROBLEM SOLVED!

5 An overflow pan at a factory can be modelled as a cuboid.

You will need to use problem-solving skills throughout your exam – **be prepared!**



The pan is half-full of water.
The water flows out of the pan at an average rate of 250 millilitres per second.
Show that the pan will be completely empty after 4 minutes.

$1\ cm^3 = 1\ ml$. Remember to convert metres to cm before calculating the volume of the cuboid.

(3 marks)

Proportion

1 David bought 4 kg of apples from the supermarket for £1.60.
What is the cost of 7 kg of apples?

Find the cost of 1 kg.

Guided

4 kg costs 160p

1 kg costs ..... ÷ ..... = ...

7 kg costs ..... × ..... = ... **(2 marks)**

2 A fabric shop sells material by the metre.
Andy bought 3 m of material for £2.25. What is the cost of 11 m of the same material?

£..... **(2 marks)**

3 Two bottles of grape juice fill eight glasses. How many glasses can be filled from eight bottles of grape juice?

..... glasses **(2 marks)**

4 Ten men take eight days to build a wall.
How long will it take four men to do the same job?

Work out how long it will take one person to build the wall.

Guided

10 men work 8 days

1 man works ..... × ..... = ...

4 men work ..... ÷ ..... = ... days **(2 marks)**

5 A school building can be decorated by 12 men working eight hours a day for five days. Mike wants to know how long it would take 10 men working six hours a day.

..... **(2 marks)**

6 An amount of money is divided among eight children. Each child receives £24.
If the same amount of money was divided among 12 children, how much would each child receive?

£..... **(2 marks)**

7 A **large** basket of sweets costs £4.80 and holds 200 g. A **medium** basket of sweets costs £4.50 and holds 175 g. Which size basket is better value for money?

Show all your working and then write a conclusion.

..... **(3 marks)**

Proportion and graphs

1 The force, F, on a mass is directly proportional to the acceleration, a, of the mass. When $a = 25$, $F = 650$. Work out the value of F when $a = 45$.

Guided

$\frac{F}{45} = \frac{650}{25}$

You can compare ratios to work out F.

$F =$ ..... $\times$ ..... $=$ ..... **(2 marks)**

2 The resistance R ohms of a wire is inversely proportional to the cross-sectional area A cm^2 of a wire. When $A = 0.1$, $R = 30$. Work out the value of R when $A = 0.4$.

$R \times 0.4 =$ .....

.....

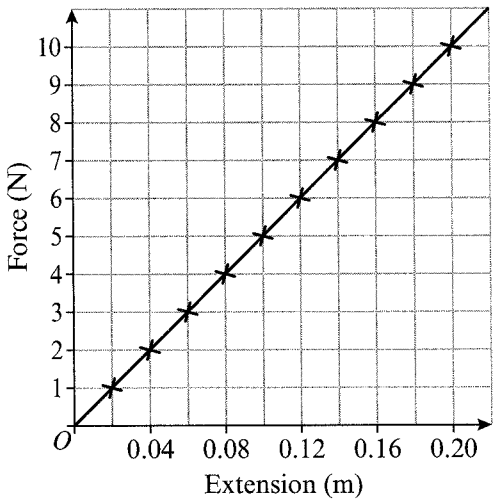
$R =$ ..... $\times$ ..... $=$ ..... **(2 marks)**

3 x and y are inversely proportional. Circle the equation that could describe the relationship between x and y.

$x = 2y$ $\quad x = 3\sqrt{y}$ $\quad x = \frac{1}{2y}$ $\quad x = \frac{y}{5}$

(1 mark)

4



This graph shows the relationship between the extension, in m, of a spring and the force, in N.

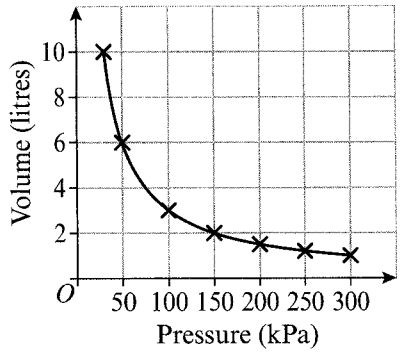
(a) Use the graph to find the force when the extension is 0.1 m.

..... **(1 mark)**

(b) What evidence is there from the graph to show that force is directly proportional to extension?

..... **(2 marks)**

5



This graph shows the relationship between pressure, in kPa, and volume, in litres.

(a) Use the graph to find the volume when the pressure is 150 kPa.

..... **(1 mark)**

(b) What evidence is there from the graph to show that volume is inversely proportional to pressure?

..... **(2 marks)**

Problem-solving practice 1

1 Julie got 41 out of 50 marks in a mathematics test.
She got 50 out of 60 marks in a statistics test.
In which test did Julie get the higher percentage mark?
You must show all your working.

(3 marks)

2 There are 500 students at Pennhouse School.
122 students were absent from school on Monday.
Rachael says that more than 25% of the students were absent on Monday.
Is she correct? Explain your answer.

Calculate 25% of 500 then write a conclusion.

.....

(3 marks)

3 Karen wants to buy a game for her new PS4.
She finds that two online shops sell the game she wants.

Nile
Game costs £35.50
Online discount of 16%
Delivery charge of £2.75

T-bay
Game costs £30.90 + VAT
VAT at 20%
No delivery charge

Karen wants to pay the lowest price.
Which shop should Karen buy her game from? You must show all your working.

(4 marks)

4 Avtar has a full 900 m*l* bottle of patio sealer. He is going to mix some of the patio sealer with water. Here is the information on the label of the bottle.

Patio sealer (900 m*l*)
Mix $\frac{1}{5}$ of the patio sealer with 5400 m*l* of water

Avtar is going to use 900 m*l* of water. How many millilitres of patio sealer should Avtar use? You must show your working.

(4 marks)

Problem-solving practice 2

5 Taran employs eight people to plaster a building in six days.
He realises that he needs to plaster the building in just four days.
Taran says that he needs three more people working at the same rate to plaster the building in four days.
Is he correct? You must show your working.

(2 marks)

6 Brett is going to buy some bird food. Bird food is sold in 200 g boxes costing £2.50 and in 1000 g boxes costing £10.50. Which box of bird food gives the better value for money? You must show your working.

(3 marks)

7 This is a list of ingredients for making an apple and almond crumble for four people.
Rachel has the following ingredients:

Ingredients for **4** people	Rachel's ingredients
80 g flour	1.2 kg flour
60 g almonds	200 g almonds
90 g brown sugar	500 g brown sugar
60 g butter	250 g butter
4 apples	16 apples

She wants to make an apple crumble for 15 people.
Does she have enough ingredients?
Show all of your working.

(3 marks)

8 Kim wants to save a deposit for a house. His target is to save £17 500 in four years.
He invests £14 000 in an ISA for four years at 6% per annum compound interest.
Does he have enough money for his deposit? You must show your working.

(3 marks)

9 nth term is $3n - 1$
$3n - 1 = 34$
$3n = 35$
$n = \frac{35}{3}$
n is not an integer therefore 34 is not a term in this linear sequence

10 $(3x + 4)(2x - 1) = A$
$6x^2 - 4 + 8x - 3x = A$
$6x^2 + 5x - 4 = A$

RATIO & PROPORTION

55. Percentages

1 (a) 4.5 (b) 11
2 (a) 62.5% (b) 20%
3 (a) £7.68 (b) £103.68
4 £13 200
5 37.5%
6 (a) 30.8%
(b) $\frac{30}{100} \times 140 = 42$ (French)
$\frac{60}{100} \times 180 = 108$ (German)
$\frac{150}{320} \times 100 = 46.9\% = 47\%$

56. Fractions, decimals and percentages

1 (a) $\frac{6}{25}$ (b) $\frac{16}{25}$ (c) $\frac{18}{25}$
2 (a) $\frac{3}{10}$, 61%, 0.62 (b) 0.32, 33%, $\frac{7}{20}$
(c) 37%, 0.38, $\frac{2}{5}$
3 £575
4 48
5 $\frac{30}{100} \times £2100 = £630$ (Amy)
$\frac{1}{3} \times £1800 = £600$ (Bhavna)
Amy saves the most money each month

57. Percentage change 1

1 (a) 74.88 (b) 131.04 (c) 84.48 (d) 275.88
2 £126.90
3 (a) 20% (b) 30% (c) 35% (d) 10%
4 (a) 34.8% (b) 28%
5 £23 320

58. Percentage change 2

6 Kelly-air
7 Postland
8 Footworld

59. Ratio 1

1 (a) 3 : 2 (b) 27 : 8 (c) 7 : 8
2 (a) 20 : 30 (b) 100 : 250 : 400
3 cheese = 16 g, peppers = 24 g
4 Paul = 48 miles, Faye = 60 miles
5 (a) 1 part is 24, $24 \times 3 = £72$
(b) $(3 \times 24) + (4 \times 24) + (9 \times 24) = £384$

60. Ratio 2

6 (a) 28 g (b) 40 g
7 £4400
8 $48 \div 12 = 4$
Flour = 20, margarine = 16 and sugar = 12
Flour = $1825 \div 20 = 91.25$, margarine = $700 \div 16 = 43.75$ and sugar = $250 \div 12 = 20.83$
Therefore, maximum, number of cakes = 20

61. Metric units

1 (a) 4.5 cm (b) 720 mm (c) 3500 m
(d) 5300 g (e) 4300 ml (f) 0.48 g
2 (a) 150 mm (b) 2.8 cm (c) 1.8 kg
(d) 2.8 km (e) 0.053 litres (f) 145 000 mg
3 16
4 80
5 No, can only fit 19

62. Reverse percentages

1 £60
2 £33 250
3 £33 600
4 No, Kate earned £518.52 last year
5 Alison invested £1650 and Nav invested £1680. Nav invested more than Alison.

63. Growth and decay

1 £17 569.20
2 $n = 3$
3 (a) £12 528.15 (b) £6332.78
4 (a) 6.5% (b) £2815.71
5 It is worth £110.74

64. Speed

1 8.9 m/s
2 425 km/h
3 3 hours 20 minutes
4 240 000 m
5 $35 \div 0.25 = 140$ km/h
140 is greater than 130
6 Karen has the lower average speed
7 100 m race

65. Density

1 0.875 g/cm^3
2 147 g
3 10 375 cm^3
4 432 g
5 5666.4 g
6 Gavin is not correct, it is bronze

66. Other compound measures

1 400 N/m^2
2 18 750 N/m^2
3 0.00625 m^2
4 35 minutes
5 12 cm × 100 cm × 100 cm = 120 000 cm^3
$120\,000 \div 2 = 60\,000$
60 000 cm^3 = 60 000 ml
ml : seconds
250 : 1
60000 : 240
240 seconds is 4 minutes

67. Proportion

1 £2.80
2 £8.25
3 32
4 20
5 8 days
6 £16
7

Large	Medium
£ : g	£ : g
4.80 : 200	4.50 : 175
0.024 : 1	0.026 : 1

The large basket is better value for money

68. Proportion and graphs

1 1170
2 7.5
3 $x = \frac{1}{2y}$
4 (a) 5
(b) The graph is a straight line passing through the origin / there is a constant increase / as extension increases, force increases
5 (a) 2 (b) As pressure increases, volume decreases

69. Problem-solving practice 1

1 Statistics
2 False, $(122 \div 500) \times 100 = 24.4\%$
3 Nile is cheaper
4 $5400 \div 900 = 6$
$\frac{1}{6}$ of $\frac{1}{5}$ of 900 = 30 ml

70. Problem-solving practice 2

5 No, he needs four more people

6 1000 g

7 No. She needs (60 ÷ 4) × 15 = 225 g of almonds and she only has 200 g.

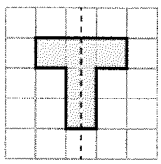
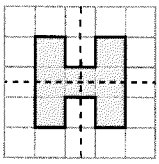
8 $\frac{100 + 6}{100} = 1.06$

£14 000 × $(1.06)^4$ = £17 674.68

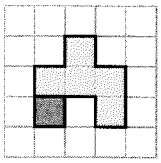
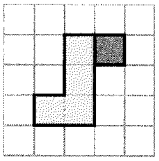
Kim has enough money

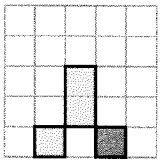
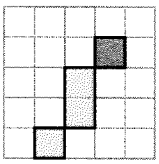
GEOMETRY & MEASURES

71. Symmetry

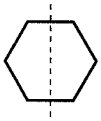
1 (a)  (b) 

2 (a) 4 (b) 2 or 3 (c) 1

3 (a)  (b) 

(c)  (d) 

4 (a) 6

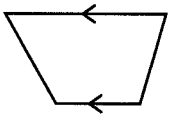
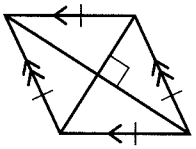
(b)  (There are other possible lines)

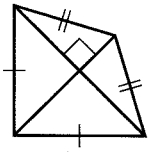
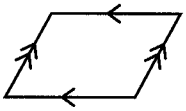
72. Quadrilaterals

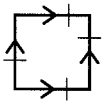
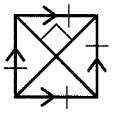
1 (a) Rectangle (b) Trapezium

(c) Parallelogram (d) Square

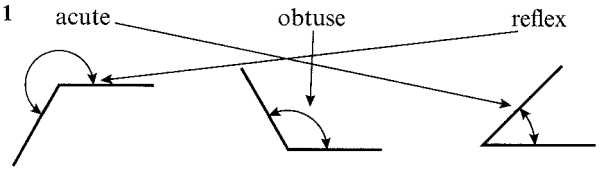
(e) Rhombus (f) Kite

2 (a)  (b) 

(c)  (d) 

(e)  (f) 

73. Angles 1

1 

2 (a) (i) Obtuse angle

(ii) $x°$ is more that 90° but less than 180°

(b) (i) Reflex angle

(ii) $x°$ is more than 180° but less than 360°

3 (a) (i) 109°

(ii) Angles on a straight line add up to 180°

(b) (i) 146°

(ii) Angles round a point add up to 360°

74. Angles 2

4 292°

5 (a) (i) 60°

(ii) The triangle is an equilateral triangle

(b) 150°

6 (a) 65° because angles on a straight line add up to 180°

(b) 65° because x and y are alternate angles

(c) 65° because x and z are corresponding angles

75. Solving angle problems

1 (a) (i) 42°

(ii) Alternate angles

(iii) 111 because angles on a straight line add up to 180°

(b) (i) 110°

(ii) Corresponding angles

(iii) 40°

(iv) Isosceles triangle

2 39°

76. Angles in polygons

1 (a) 72° (b) 60° (c) 45°

2 (a) 40° (b) 9

3 (a) 12 (b) 10 (c) 20

4 135°

5 360° ÷ 6 = 60°

180° − 60° = 120°

180° − 120° = 60°

60° ÷ 2 = 30°

77. Time and timetables

1 (a) 15:15 (b) 02:25 (c) 23:48

2 (a) 4.25 am (b) 12.10 pm (c) 8.32 pm

3 52 minutes

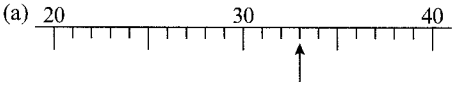
4 15:30

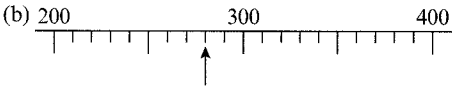
5 (a) E (b) 111 minutes

(c) 07:45 (d) 09:32

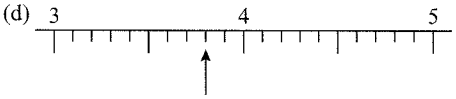
78. Reading scales

1 (a) 23 (b) 340 (c) 5300 (d) 4.6

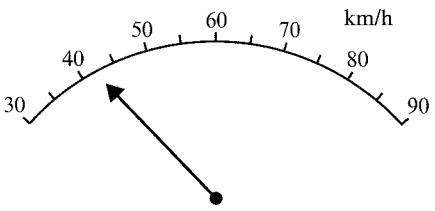
2 (a) 

(b) 

(c) 

(d) 

3 (a) 65 km/h

(b) 

4 0.75 kg

79. Perimeter and area

1 (a) (i) 5 cm^2 (ii) 12 cm

2 (a) 9 cm^2 (b) 6 cm^2

3 (a) 40 cm (b) 27 cm (c) 72 cm (d) 58 cm