



St. Patrick's High School, Keady
Mathematics Department

GCSE Mathematics Practice Booklet

M7

Topic 1 – Number 1

Ratio

Binary

Section A – Non Calculator Questions / Mark Scheme Pages 1-16

Section B – Calculator Questions / Mark Scheme Pages 17-29

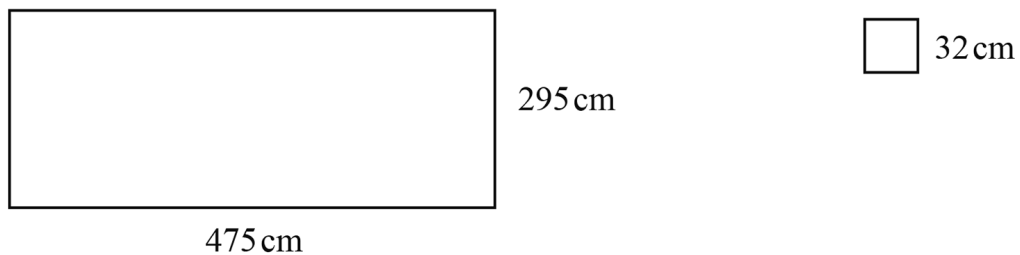
Questions taken from CCEA Past Papers

Q1

A rectangular room measures 475 cm by 295 cm.

Estimate the number of square tiles of side 32 cm needed to tile the floor.

Show all your working clearly.



Answer _____ [3]

Q2

A manager wishes to buy new uniforms for his 30 staff.

A shirt costs £8.15 and trousers cost £19.95

- (a) Estimate** the total cost of the uniforms.
Show all steps of your working clearly.

Answer £ _____ [2]

- (b)** Without any further calculation, decide whether your estimate will be an overestimate or an underestimate of the exact cost.

Explain your reasoning clearly.

_____ [2]

Q3 Amy, Katie and Maria use their calculators to work out the value of

$$\frac{27.98}{4.27 \times 0.48}$$

Amy gets 3.145, Katie gets 136.51 and Maria gets 13.651

Use approximations to show which one of them is correct.

You must show all your working.

[3]

Q4 Explain why $\sqrt{73}$ must be a number between 8 and 9

[2]

Q5 (a) Lucy has a bag containing only 5p and 20p coins.

The ratio of the number of 5p coins to the number of 20p coins is 5 : 4

Work out the ratio of the total value of the 5p coins to the total value of the 20p coins.

Give your answer in its simplest form.

Answer _____ [2]

(b) John and Mark share an amount of money in the ratio 5 : 6

Mark's share is £48

What was the total amount shared?

Answer £ _____ [2]

Q6 Here is a recipe for making some scones.

Self-raising flour	340 g
Caster sugar	55 g
Butter	85 g
Milk	125 ml
Natural yoghurt	60 ml

Linda has only 100 ml of milk.

Complete the table to show how much of the other ingredients she needs.

Self-raising flour	_____ g
Caster sugar	_____ g
Butter	_____ g
Milk	100 ml
Natural yoghurt	_____ ml

[3]

Q7 The prize money in a golf tournament is divided between the three golfers who finish first, second and third in the ratio 7 : 4 : 3

What **fraction** of the prize money does each of the first three golfers receive?

Write each fraction in its simplest form.

Answer 1st _____ 2nd _____ 3rd _____ [3]

Q8

This recipe makes 16 scones with the following ingredients.

<p style="text-align: center;">Ingredients</p> <ul style="list-style-type: none">• 250 g flour• 1 tsp baking powder• 40 g butter• 25 g sugar• 1 large egg• about 100 ml milk	
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Source: Getty Images 609903116

(a) Paul wants to make 20 scones.

How much butter will he need?

Answer _____ g [2]

(b) Paul has 300 g of flour.

Has he enough flour to make 20 scones?

Show all your working.

Answer _____ because _____ [2]

Q9

(a) 60% of entrants pass a test.

What is the ratio of
number who pass : number who fail?

Give your answer in simplest form.

Answer _____ [2]

(b) The ratio of boys : girls born in a hospital one week was 3 : 5

What fraction were girls?

Answer _____ [1]

Q10

(a) Write 25 as a binary number.

Answer _____ [1]

(b) Write the binary number 1101001 in decimal form.

Answer _____ [1]

Q11

(a) Write the binary number 10101 as a decimal number.

Answer _____ [1]

(b) Write the decimal number 26 as a binary number.

Answer _____ [1]

Q12

- (a) What is the main difference between the Binary number system and the Decimal number system?

Answer _____ [1]

- (b) Write the binary number 111111 as a decimal number.

Answer _____ [1]

- (c) Write the decimal number 87 as a binary number.

Answer _____ [1]

Q13

110110 is a binary number.

20 is a decimal number.

Work out the total of the two numbers.

Give your answer as a binary number.

Answer _____ [3]

Q14

(a) Write the decimal number 15 as a binary number.

Answer _____ [1]

(b) Write the binary number 1000000 as a decimal number.

Answer _____ [1]

1. $\frac{480}{30} = 16$ MA1
- $\frac{300}{30} = 10$ MA1
- $16 \times 10 = 160$ MA1
- or**
- $480 \times 300 = 144\,000$ MA1
- $30 \times 30 = 900$ MA1
- $\frac{144\,000}{900} = 160$ MA1
-

2. (a) $30 \times 8 + 30 \times 20$ MA1
 $= 240 + 600$
 $= 840$ A1
- (b) Underestimate because 30×15 rounded down for shirts and only 30×5 pence rounded up for trousers; so overall effect will be lower than actual cost (or similar explanation) A2
- or**
- (a) $30 \times (8 + 20) = 30 \times 28 = (30 \times 30)$ MA1
 $= 900$ A1
- (b) Overestimate because total of shirt and trousers rounded up; so overall effect will be higher than the actual cost (or similar explanation) A2
-

3. $\frac{30}{4 \times 0.5}$ **or** $\frac{28}{4 \times 0.5}$ C1
 $\frac{30}{12} = 15$ **or** $\frac{28}{2} = 14$ C1
 This is closest to 13.651 so Maria is correct C1
-

4. $8^2 = 64$ and $9^2 = 81$ C1
 73 lies between 64 and 81 C1
-

5. **(a)** 25 : 80 MA1
 5 : 16 A1
(b) $48 \div 6 = 8$ MA1
 $11 \times 8 = 88$ A1
-

6. 272
 44
 68
 48 A3
-

7.

Using 14

A1

$$\frac{1}{2} \quad \frac{2}{7} \quad \frac{3}{14}$$

A2

(A1 for 2 correct or $\frac{7}{14}, \frac{4}{14}, \frac{3}{14}$)

8.

(a) $40 \div 4 \times 5 = 50$ g

M1 A1

(b) $250 \div 4 = 62.5$ $62.5 \times 5 = 312.5$

MA1

No because he needs 12.5 g more
(or at least 310 or $\frac{1}{4}$ of 250g is more than 50g) or equivalent

A1

9.

(a) 60:40 ans 3:2

A1 A1

(b) $\frac{5}{8}$

A1

10.

(a) 11001

A1

(b) 105

A1

- 11.
- | | |
|------------------|----|
| (a) 21 | A1 |
| (b) 11010 | A1 |
-

- 12.
- | | |
|---|----|
| (a) Base 2 rather than base 10 or Binary system uses only 2 symbols | A1 |
| (b) 63 | A1 |
| (c) 1010111 | A1 |
-

- 13.
- | | |
|--------------|----|
| 110110 = 54 | A1 |
| 54 + 20 = 74 | A1 |
| 74 = 1001010 | A1 |
-

- 14.
- | | |
|-----------------|----|
| (a) 1111 | A1 |
| (b) 64 | A1 |
-

- Q1** (a) The teacher to pupil ratio in a school is 1:15
There are 960 pupils in the school.
How many teachers are there?

Answer _____ [2]

- (b) 418 of these pupils play football, netball or hockey in the ratio 11:3:8
How many pupils play netball?

Answer _____ [3]

Q2

Here is a recipe for making some scones.

Self-raising flour	340 g
Caster sugar	55 g
Butter	85 g
Milk	125 ml
Natural yoghurt	60 ml

Linda has only 100 ml of milk.

Complete the table to show how much of the other ingredients she needs.

Self-raising flour	_____ g
Caster sugar	_____ g
Butter	_____ g
Milk	100 ml
Natural yoghurt	_____ ml

[3]

Q3 Marie is booking a cruise holiday. She is offered a discount of €140 or she can have \$200 to spend on board her cruise.

Use the exchange rates below to work out which is the better offer, €140 or \$200

$$£1 = €1.19$$

$$£1 = \$1.67$$

You must show working to justify your answer.

Answer _____ [3]

Q4 Andrew, Karan and Caroline share £33.60 in the ratio 5 : 4 : 3

Work out how much money they each receive.

Answer Andrew £ _____

Karan £ _____

Caroline £ _____ [3]

Q5

- (a) In a choir there are 36 female and 24 male singers.

Write down the ratio of female to male singers in its simplest form.

Answer _____ [2]

- (b) There are 52 people in an orchestra.
The ratio of males to females is 3:1
Calculate the number of males and females in the orchestra.

Answer _____ males, _____ females [2]

Q6 Marie has a recipe for Spaghetti Carbonara which requires the following ingredients.

Spaghetti	500 g
Bacon	200 g
Eggs	8
Cream	76 ml
Parmesan	48 g

Marie only has 150 g of bacon.

Work out how much of the other ingredients she should use.

Answer

Spaghetti	g
Eggs	
Cream	ml
Parmesan	g

[3]

Q7



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It takes 2 days to paint the outside of 6 houses.

(a) How long would it take to paint the outside of 15 houses?

Answer _____ days [2]

(b) State one assumption you made in answering part **(a)**.

Answer _____

_____ [1]

Q8

(a) Write 25 as a binary number.

Answer _____ [1]

(b) Write the binary number 1101001 in decimal form.

Answer _____ [1]

Q9

Write the binary number 1011001 as a decimal number.

Answer _____ [1]

Q10

(a) Write the decimal number 19 as a binary number.

Answer _____ [1]

(b) Rearrange $h - 3m = y$ to make m the subject.

Answer _____ [2]

1. (a) $960 \div 15 = 64$ M1 A1
- (b) $418 \div 22$ M1
19 A1
 $3 \times 19 = 57$ MA1
-

2. 272
44
68
48 A3
-

3. €140 = £117.647 MA1
\$200 = £119.76 MA1
\$200 is worth more A1
-

4. 14.00 A1
11.20 A1
8.40 A1
-

5.

(a) 36 : 24 3 : 2

A1 A1

(b) 39, 13

A1 A1

6.

Spaghetti	375g
Eggs	6
Cream	57ml
Parmesan	36g

All correct

A3

(A2 for 3 correct, A1 for 2 correct)

7.

(a) $15 \div 6 \times 2 = 5$

M1A1

(b) all painters work at the same rate or houses are the same size

A1

8.

(a) 11001

A1

(b) 105

A1

9.

64	32	16	8	4	2	1
1	0	1	1	0	0	1

$$= 64 + 16 + 8 + 1$$

$$= 89 \text{ (correct answer, with no work shown, gains mark)}$$

MA1

10.

(a) 10011

A1

(b) $h - y = 3m$

MA1

$$m = \frac{h - y}{3}$$

A1