



St. Patrick's High School, Keady
Mathematics Department

GCSE Mathematics Practice Booklet

M6

Topic 1 – Number 1

Ratio

Estimations

Binary

Section A – Non Calculator Questions / Mark Scheme Pages 1-22

Section B – Calculator Questions / Mark Scheme Pages 23 - 39

Questions taken from CCEA Past Papers

Q1

Estimate $\frac{604 \times 2.91}{7.9 - 3.76}$

Show all your working.

Answer _____ [2]

Q2

(a) Estimate the total weight of 69 pies weighing 102 g each.

Answer _____ g [1]

(b) Estimate the greatest number of pencils costing 39p each that can be bought with £20

Answer _____ [2]

Q3 (a) There are 6 eggs in each egg box.

Estimate the total number of boxes needed to pack 297 eggs.

Answer _____ [2]

(b) Tommy earns £6.15 per hour.

Estimate his earnings for 39 hours.

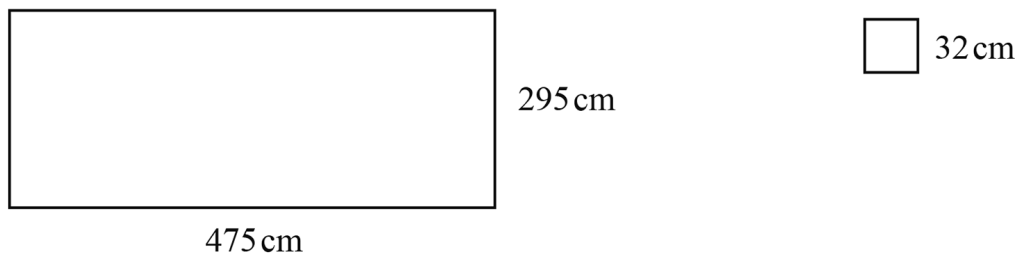
Answer £ _____ [2]

Q4

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]

Q5

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]

Q6 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]

Q7 Explain why $\sqrt{73}$ must be a number between 8 and 9

[2]

Q8 Estimate the value of 98×6.9

You must show your work.

Answer _____ [2]

Q9 (a) Estimate the cost of 31 books at £8.85 each.

Answer £ _____ [1]

(b) Estimate how many 18.5 cm lengths of tape can be cut from 1500 cm.

Answer _____ [1]

Q10 A sheet of paper is 300 mm long and 210 mm wide.

Find in its simplest form the ratio of the length of the sheet to the width of the sheet.

Answer _____ [2]

Q11 (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]

Q12

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]

Q13 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]

Q14

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]

Q15

(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]

Q16

(a) Write 25 as a binary number.

Answer _____ [1]

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

Answer _____ [1]

Q17

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

Answer _____ [1]

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

Answer _____ [1]

Q18

- (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]

Q19

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]

Q20

(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. $\frac{600 \times 3}{8 - 4}$ or $\frac{604 \times 3}{8 - 4}$ MA1
 $\frac{1800}{4} = 450$ or $\frac{1812}{4} = 453$ A1

2. (a) 7000 A1
 (b) $2000 \div 40 = 50$ M1 A1

3. (a) $\frac{300}{6} = 50$ M1 A1
 (b) $6 \times 40 = \text{£}240$ M1 A1

4. $\frac{480}{30} = 16$ 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
-

5. (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
-

6. $\frac{30}{4 \times 0.5}$ **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
-

7. $8^2 = 64$ and $9^2 = 81$ C1
73 lies between 64 and 81 C1
-

8. 100×7 M1
700 A1
-

9. **(a)** 270 A1
(b) 75 A1
-

10. $300 : 210$ A1
 $= 10 : 7$ A1

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

12. 272
 44
 68
 48 A3

13. Using 14 A1
 $\frac{1}{2}$ $\frac{2}{7}$ $\frac{3}{14}$ A2
(A1 for 2 correct **or** $\frac{7}{14}, \frac{4}{14}, \frac{3}{14}$)

14. (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
-

15. (a) 60:40 ans 3:2 A1 A1
- (b) $\frac{5}{8}$ A1
-

16. (a) 11001 A1
- (b) 105 A1
-

17. (a) 21 A1
- (b) 11010 A1
-

18.

(a) Base 2 rather than base 10 **or** Binary system uses only 2 symbols A1

(b) 63 A1

(c) 1010111 A1

19.

110110 = 54 A1

54 + 20 = 74 A1

74 = 1001010 A1

20.

(a) 1111 A1

(b) 64 A1

Q1

CHOCOLATE ICE CREAM

250 g Dark Chocolate

100 g Butter

120 g Caster Sugar

150 ml Water

3 Eggs

500 ml Double Cream

This ice cream recipe will serve 4 people.

(a) How much caster sugar is needed in a recipe for 7 people?

Answer _____ g [2]

(b) Liz has 13 eggs and needs to make chocolate ice cream for 17 people.

Does she have enough eggs? Explain your answer.

[2]

Q2 The exchange rate between pounds and euro is $\text{£}1 = \text{€}1.35$

Sam buys a coat for $\text{€}108$

How much does the coat cost in (£) pounds?

Answer £ _____ [2]

Q3 Philip rents a holiday home in Florida in May.

It costs him $\text{£}680$

Dave rents the same home in August for $\text{\$}1400$

Given $\text{£}1 = \text{\$}1.52$ how much **more** does Dave pay in £ for the holiday home?

Answer £ _____ [4]

- Q4** (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]

Q5

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]

Q6 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]

Q7 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]

Q8

- (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]

Q9 Orange juice is mixed with water in the ratio 1:11 (orange juice:water).
How much orange juice and how much water make up 3 litres in total?
Give your answers in ml.

Answer Orange juice _____ ml

Water _____ ml

Q10 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]

Q11



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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]

Q12

(a) Write 25 as a binary number.

Answer _____ [1]

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

Answer _____ [1]

Q13

Write the binary number 1011001 as a decimal number.

Answer _____ [1]

Q14

(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) $120 \div 4 \times 7 = 210$ g M1 A1
 (b) $\frac{3}{4} \times 17 = 12.75$ therefore she has enough eggs C2
-

2. $108 \div 1.35$ M1
 80 A1
-

3. $1400 \div 1.52 = \text{£}921.05$ M1 A1
 $921.05 - 680 = \text{£}241.05$ M1 A1
-

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

5. 272
 44
 68
 48 A3

6. €140 = £117.647 MA1
 \$200 = £119.76 MA1
 \$200 is worth more A1

7. 14.00 A1
 11.20 A1
 8.40 A1

8. **(a)** 36 : 24 3 : 2 A1 A1
(b) 39, 13 A1 A1

9. Using $\frac{1}{12}$ M1
 250, 2750 A1 A1
-

10.

Spaghetti	375g
Eggs	6
Cream	57ml
Parmesan	36g

All correct A3
 (A2 for 3 correct, A1 for 2 correct)

11.

- (a) $15 \div 6 \times 2 = 5$ M1A1
 (b) all painters work at the same rate or houses are the same size A1
-

12.

- (a) 11001 A1
 (b) 105 A1
-

13.

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

14.

(a) 10011

A1

(b) $h - y = 3m$

MA1

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

A1