SOLUTIONS

Candidate surname   Other name

Maths Planner

AQA

June 2023 Predicted Paper

Mathematics
PAPER 2 (Calculator)
Foundation Tier

Time 1 hour 30 minutes

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator, Formulae Sheet (enclosed). Tracing paper may be used.

Total Marks

____

80

Q	Topic(s)	Q	Topic(s)
1	Solving linear equations	13	Substitution
2	Rounding	14	Using a calculator / Rounding
3	Simplifying expressions	15	Arithmetic sequences
4	Percentage of amounts / unit conversion	16	Sharing ratio / Probability
5	Parts of a circle	17	Error intervals
6	Ratio in the form 1:n	18	Equation of a straight line
7	Time calculations	19	Best buys
8	HCF	20	Averages from grouped table
9	Bearings	21	Probability tables
10	Fractions of amounts / money	22	Applied area
11	Transformations	23	Identity / equation solving
12	Number reasoning	24	Geometric sequences

1 Solve the following equations to find x

    (a) $x - 12 = -20$ **[1 mark]**

              Answer $x = -8$

    (b) $4x - 3 = 11$ **[2 marks]**

$$4x - 3 = 11$$
$$4x = 14$$
$$x = \frac{14}{4} = \frac{7}{2} \text{ or } 3.5$$

              Answer

2   Round 7655 to the nearest 10   **[1 mark]**

              Answer   7660

3   Simplify $7x + 3y + 4x - y$ **[2 marks]**

              Answer $11x + 2y$

4   Find 35% of 480kg   **[3 marks]**
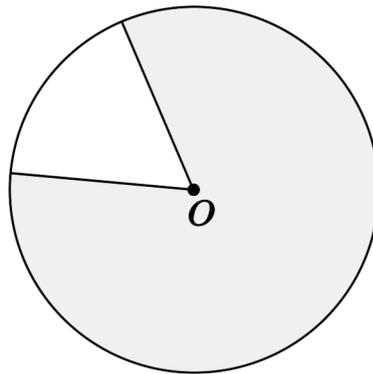
$$0.35 \times 480 = 168 \text{kg}$$
$$\times 1000$$

              Answer   16800   g

5   Write down the word that describes the shaded area

[1 mark]

Answer   _Sector (major)_

6   If A:B = 3:15
Write A:B in the form **n:1**

[1 mark]

$$A : B$$
$$3:15$$
$$\div 15 \left[\frac{3:15}{3:1} \right] \div 15$$
$$\frac{}{15}$$

Answer $\frac{3}{15} : 1$ or $0.2 : 1$ or $\frac{1}{5} : 1$

7   Jamie leaves his house at 8 am.
It takes Jamie three-quarters of 5 hours to get to his destination.

(a)   At what time should Jamie arrive at his destination?

[3 marks]

$$\frac{3}{4} \times 5 = 3.75 \text{ hrs}$$

3 hrs 45 mins

Answer   11:45 am

(b)   Write down one assumption you have made in making your calculation.

[1 mark]

* No traffic
* Journey had <u>No</u> interruptions

8 **(a)** List all the factors of 36   **[1 mark]**

$$1, 2, 3, 4, 6, 9, 12, 18, 36$$

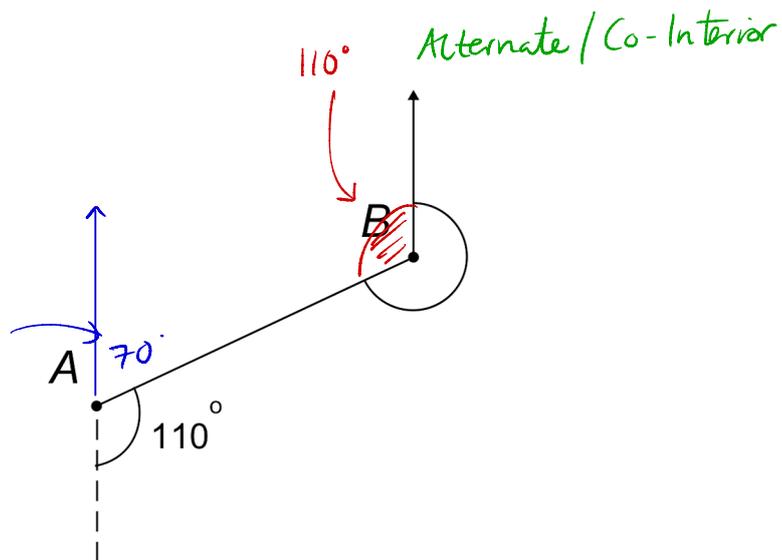**(b)** List all the factors of 54   **[1 mark]**

$$1, 2, 3, 6, 9, 18, 27, 54$$

(c) Write down the HCF of 36 and 54   **[1 mark]**

Answer _____ 18 _____

9

$110°$

Alternate / Co-Interior

$70°$

A

$110°$

B

Calculate bearing A from B   **[2 marks]**

$$360 - 110 = 250$$

Answer _____ 250 _____ °

10   Tariq has 18 bottles of prime hydration.
      Each bottle holds 500ml.
      He sells $\frac{2}{3}$ of his bottles.

(a)   Work out how many litres of prime hydration Tariq kept for himself.   **[3 marks]**

$18 \times 500ml = 9000ml$

9 litres

Keeps $\frac{1}{3}$: $\frac{1}{3}$ of 9 litres

$\frac{1}{3} \times 9 = 3$

Answer _____ 3 ____ litres

(b)   Tariq paid £2.99 per bottle and sold each bottle for £6.
      Calculate how much profit tariq made.   **[2 marks]**

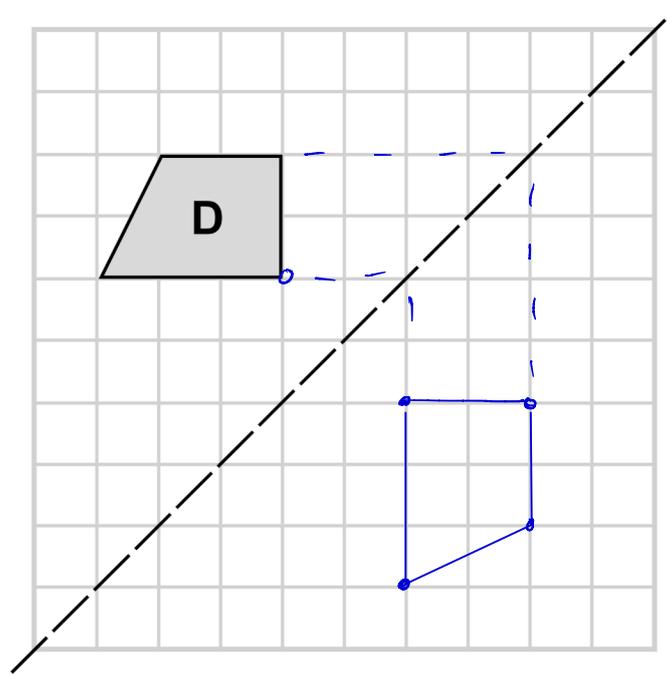$2.99 \times 18 = £53.82$ (spent)

Sold $\frac{2}{3}$ of $18 = 12$ bottles.

$12 \times 6 = £72$

Profit $= 72 - 53.82$

£ ____ 18.18 ____

11 **(a)** Reflect shape **D** in the mirror line. **[1 mark]**

D

(b) Write down the mathematical name for shape **D**. **[1 mark]**

Trapezium

(c) Given shape **D** is enlarged by a scale factor of $3\frac{1}{2}$
Calculate the area of the enlarged shape. **[3 marks]**

Area of D = 5   LSF = 3.5

ASF = 3.5^2 = 12.25

A = 5 × 12.25

Answer   = 61.25 units²

12 (a) Sarah is thinking of a number.

This number is a multiple of 7 and also a factor of 70.

Write down Sarah's number.

[1 marks]

Answer _____ 7 ~ 14 _____

(b) John has two numbers.

One of the numbers is a square number and the other is a prime number.

The square number is less than 50 and the prime number is more than 20.

List one possible pair of numbers that John might have.

[2 mark]

SQUARES: 1, 4, 9, 16, 25, 36, 49

PRIMES: 23, 29, 31, 37, 47, ...

Answer _____ Any combo. _____

13 If $a = -2$, $b = -7$, and $c = 5$

Work out the value of $b^2 - 4ac$

[2 marks]

$(-7)^2 - 4(-2)(5)$

Answer _____ 89 _____

14 (a) Use your calculator to work out

$$\frac{\sqrt{sin(30)+2.01^4}}{(6.7-3.20)^{\frac{1}{2}}}$$

Write down all the figures shown on your calculator **[2 marks]**

Answer 2.192350859

(b) Round your answer to part **(a)** to 2 significant figures

$2.\underline{1}|9$

[1 mark]

Answer 2.2

15 The first five terms of an arithmetic sequence are

    1.4   0.6   -0.2   -1   -1.8

-0.8 -0.8

(a) Write down the next two terms of this sequence. **[1 mark]**

-2.6 , -3.4

(b) Write an expression in terms of n, for the nth term of this sequence.

[2 marks]

$1.4-(-0.8)=2.2$

Answer $-0.8n+2.2$

16 Simone carried out a survey of **her year group** at school.
Simone's year group consists of 200 students.

$\frac{3}{5} \times 200 = 120$

Favourite Console	Frequency
Switch	15
Playstation	30
PC	27
Xbox	48

$120 - (15 + 27)$

$= 78$

(a) The ratio of students who prefer Xbox to those who prefer PlayStation is 8:5
Given 30 students preferred Playstation.

Complete the table.   **[3 marks]**

$X : P \quad total$
$8 : 5 \qquad 13$
$48 : 30 \qquad 78$ $\Big) \times 6$

(b) From the data collected.
A student was selected at random.
Work out the probability that they preferred an Xbox **or** Switch.   **[2 marks]**

$48 + 15 = 63$

Answer _____ $\dfrac{63}{120}$ _____

Question 12 continues on the next page

(c) Simone says

"From my survey, it shows that the most preferred console in my school is an Xbox"

Is Simone correct? **[1 mark]**

No, just her year group was used... May not be representative.
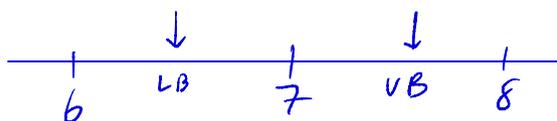
(d) Write down **one** criticism of Simone's survey. **[1 mark]**

No option for 'other'
No option for 'none'

17 The length of a rectangle is measured as 7 cm, correct to the nearest cm.

(a) Write down the error interval for the length of the rectangle. **[2 marks]**

[number line from 6 to 8, with LB marked before 7 and UB marked after 7]

$$6.5 \leq \text{length} < 7.5$$

Given the exact width of the rectangle is 4cm.
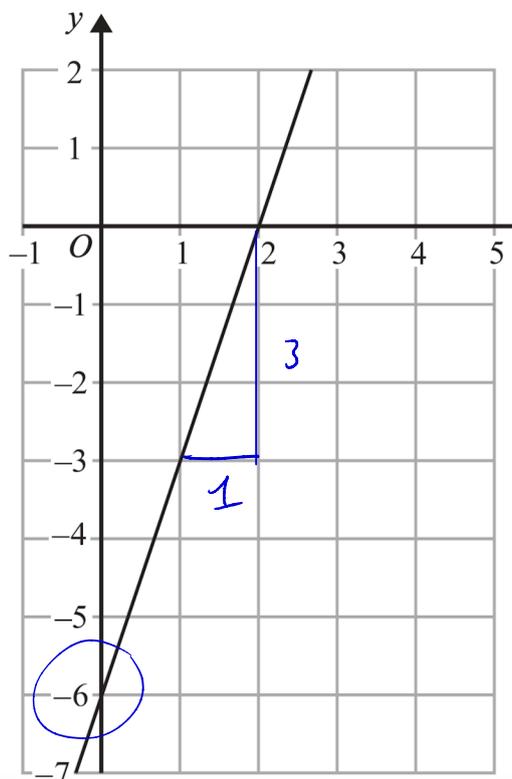Calculate the smallest possible area of the rectangle. **[2 marks]**

$$A = l \times w$$
$$= 6.5 \times 4$$

Answer _____26_____ cm²

18 The line **L** is shown on the grid

(a) Calculate the gradient of line **L** [2 marks]

$$M = \frac{\Delta y}{\Delta x} \quad or \quad \frac{rise}{run}$$

$$= \frac{3}{1}$$

Answer _____ 3 _____

(b) Write down the coordinates for the y-intercept. [1 mark]

Answer _____ $(0, -6)$ _____

(c) Write down the equation of line **L** in the form $y = mx + c$ [1 mark]

Answer _____ $y = 3x - 6$ _____

19 The supermarket has two brands of laundry detergent on sale.

Brand A	Brand B
1500ml for £3.80	2 litres for £5.50

Brand B has a special offer of 15% discount.

If a family typically uses 3 litres of laundry detergent per week,
How much could they save in a month by choosing the cheaper option?

[4 marks]

Brand A

$\div 1.5 \left[\begin{array}{c} 1.5 \text{ litres} = £3.80 \\ 1 \text{ litre} = £2.53 \end{array} \right] \div 1.5$

Brand B

$\downarrow 15\%$ $\boxed{\times 0.85}$

$5.50 \times 0.85 = £4.68$

$\div 2 \left[\begin{array}{c} 2 \text{ litres} = £4.68 \\ 1 \text{ litre} = £2.34 \end{array} \right.$

BRAND B IS BETTER VALUE...

1 litre = £2.53	1 litre = £2.34
3 litres = £7.59/week	3 litres = £7.02/week
£7.59 × 4 = £30.36	£7.02 × 4 = £28.08

SAVINGS = 30.36 − 28.08

Answer   £2.28

20 The table shows Mr Andrews year 10 GCSE Paper 1 mock results.

Score (m marks)	Frequency		mp	$f \cdot mp$
$0 < m \leq 20$	8	$\times$	10	80
$20 < m \leq 40$	15	$\times$	30	450
$40 < m \leq 60$	8	$\times$	50	400
$60 < m \leq 80$	4	$\times$	70	280
	35			1210

(a) Write down the modal interval of scores. **[1 mark]**

Answer $20 < m \leq 40$

(b) Work out an estimate for the mean number of marks Mr Andrews class achieved.
Give your answer to 1 d.p.

[3 mark]

$$\bar{x} = \frac{\sum f \cdot mp}{\sum f} = \frac{1210}{35} = 34.571\ldots$$

Answer $34.6 \ (1dp)$

21 A bag contains only red counters, blue counters, green counters and yellow counters.
A counter is taken at random.

The table shows the probabilities of taking a counter from the bag.

Colour	red	blue	green	yellow
Probability	0.12	0.64	0.16	0.08
		$4x$	x	

The probability of taking a blue counter is 4 times greater than the probability of taking a green counter.

There are 50 yellow counters.

$1 - (0.12 + 0.08) = 0.8$

(a) Work out the number of blue counters in the bag **[3 marks]**

$4x + x = 0.8$ $8\% = 50$
$5x = 0.8$ $64\% = 400$ $\Big) \times 8$
$x = 0.16$

Answer _____400_____

(b) Chloe takes a counter from the bag, notes its colour and then replaces it. She then selects a second counter.

Find the probability that Chloe takes two different colours. **[3 marks]**
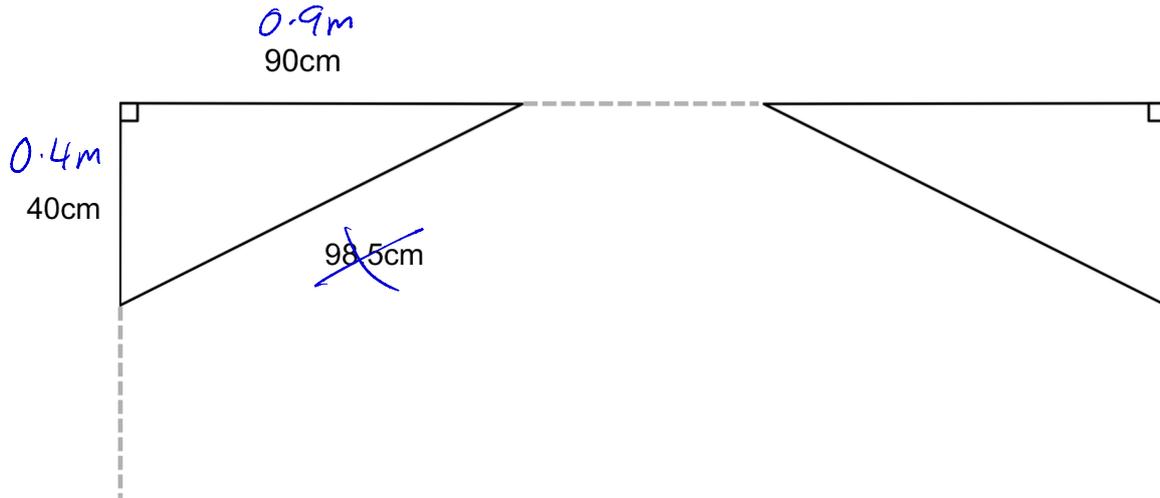
$P(Same) = P(RR) + P(BB) + P(GG) + P(YY)$
$= 0.12^2 + 0.64^2 + 0.16^2 + 0.08^2$
$= 0.456$

$P(Different) = 1 - 0.456$

Answer ____0.544____ (4.4%)

22 The diagram shows two congruent corner supports of a structure.

0.9m
90cm

0.4m
40cm

~~98.5cm~~

Each support needs two coats of spray paint.
A can of spray paint covers 1.5m²
John has already used 45% of his last can. → 100% - 45% = 55%

×0.55

Will he have enough spray paint left to paint both supports?
Show full workings to justify your answer.   **[4 mark]**

Area 1 support = $\frac{b \times h}{2}$ = $\frac{0.4 \times 0.9}{2}$ = 0.18m²

Area 2 supports × 2 coats = 0.18 × 2 × 2

= 0.72 m²
↑
Required to spray

1.5m²

1.5 × 0.55 = 0.825m²

Yes! 0.825 > 0.72

23 Here is an identity.

$$a(2x - y) \equiv 6x + by$$

Work out the values of *a* and *b*. **[3 marks]**

$$2ax - ay \equiv 6x + by$$

$$2a = 6 \qquad -a = b$$
$$a = 3 \qquad -3 = b$$

$$a = \underline{\quad 3 \quad} \qquad b = \underline{\quad -3 \quad}$$

24 The first 5 terms of a geometric sequence are

$$25 \qquad 15 \qquad 9 \qquad 5.4 \qquad 3.24$$

A different geometric sequence has the same common ratio
Complete the missing terms of this sequence. **[3 marks]**

$$150 \qquad \underline{90} \qquad \underline{54} \qquad \underline{32.4} \qquad 19.44$$

$$\times \frac{3}{5}$$

$$\text{Common ratio} = \frac{15}{25} = \frac{3}{5}$$

$$150 \times \frac{3}{5} = 90$$