# Mark scheme

# **<u>GCSE Edexcel Foundation Tier Paper 2 & 3 Likely Topics – 2025</u>**

# Question 1

10hours

Calculate the scale factor by dividing the greater length of wall by the lesser length of wall.

scale factor =  $180 \div 60$ = 3

② Write a ratio table and use the scale factor to find the required time.

180m	×3 ←	60m
30hours	$\stackrel{\div 3}{\rightarrow}$	10hours

## **Question 2**

30hours

Work out how long it would take to fill up the tank with only 1 tap.

6 taps 35 hours  $\div 6 \downarrow \qquad \downarrow \times 6$ 1 tap 210 hours

② Now work out how long it would take to fill up the tank with 7 taps.

1 tap 210 hours  $\times 7 \downarrow \qquad \downarrow \div 7$ 7 taps 30 hours

## **Question 3**

 $\frac{1}{2}$ 

① Probabilities of exhaustive events add up to 1.

 $1 - \frac{11}{22} = \frac{1}{2}$ 

56 120

#### **Question 5**

Cost = £3.12

① Work out the cost for 3 popcorn bags.

3 popcorn bags =  $3 \times 0.79$ = pound 2.37

<sup>②</sup> Work out the cost for 1 toffee apple.

1 toffee apple = pound 0.75

③ Work out the total cost.

total = 2.37 + 0.75= pound 3.12

#### **Question 6**

5grapefruits

① Work out how many grapefruits can be bought.

3 grapefruits ⇒  $0.25 \times 3 = €0.75$ 4 grapefruits ⇒  $0.25 \times 4 = €1$ 5 grapefruits ⇒  $0.25 \times 5 = €1.25$ 6 grapefruits ⇒  $0.25 \times 6 = €1.50$ ⇒ grapefruits = 5

#### **Question 7**

Website **A** is cheaper by **30** pence.

## **Question 8**

59¢

#### **Question 9**

2:3

1 List out all the factors of  $\,18\,$  and  $\,27\,$ 

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

 $\ensuremath{\textcircled{}}$  ldentify the highest common factor of  $\ensuremath{18}$  and  $\ensuremath{27}$ 

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

Highest Common Factor = 9

③ Divide both numbers by the highest common factor to fully simplify the ratio.

$$\begin{array}{c} 18:27\\ \begin{array}{c} \div 9 \downarrow \downarrow \div 9\\ 2:3 \end{array}$$

## **Question 10**

1.4:1

Divide both parts by 20.

$$\begin{array}{c} 28:20\\ \div 20 \downarrow \downarrow \div 20\\ 1.4:1 \end{array}$$

#### **Question 11**

1:4

Identify the bar for the colour blue (B) and read off the number of students who selected this colour.

The number of students who selected blue is 7

<sup>②</sup> Count the value from each colour to find the total number of students.

```
red = 6
green = 4
blue = 7
orange = 8
purple = 4
turquoise = 6
Total = 6 + 4 + 7 + 8 + 4 + 6 = 35
```

③ The number of students who did not prefer blue is given by 35 - 7 = 28



3 Write down the ratio of students who preferred blue to the number of students who did not.

7:28

⑤ Simplify the ratio to its simplest form.

## **Question 12**

1:2

1

## **Question 13**

Diagram A

## **Question 14**

13

① Count the number of tiles in each pattern in the sequence.



 $\ensuremath{\textcircled{O}}$  Work out how the number of tiles increases from one pattern to the next.

③ Extend the sequence to find the 6th term.

$$3 \underbrace{5}_{+2} \underbrace{7}_{+2} \underbrace{9}_{+2} \underbrace{11}_{+2} \underbrace{13}_{+2} \underbrace{7}_{+2} \underbrace{9}_{+2} \underbrace{11}_{+2} \underbrace{13}_{+2} \underbrace$$

① Work out how the sequence changes from one term to the next.



② Extend the sequence to find the next four terms.



#### **Question 16**

1250 6250 31250

① Work out how the sequence changes from one term to the next.



② Extend the sequence to find the next three terms.



#### **Question 17**

307

① Substitute n = 77 into 4n - 1

77th term =  $4 \times 77 - 1$ = 307

#### **Question 18**

6 - 5n

① Find the common difference.

$$1 \underbrace{-4}_{-5} \underbrace{-9}_{-5} \underbrace{-9}_{-5} \underbrace{-14}_{-5}$$

② The common difference is -5, so we consider the sequence with *n*th term of -5n.

-5, -10, -15, -20, ...

③ The first term of the sequence with this formula is -5, but the first term of the original sequence is 1. So an adjustment of +6 is required.

Therefore, the *n*th term is 6 - 5n. **Question 19** 

7m

 $\bigcirc$  Divide by 100

 $700 \div 100 = 7 \text{ m}$ 

#### **Question 20**

78800g

0 Multiply by 1000

 $78.8 \times 1000 = 78800 \text{ g}$ 

#### **Question 21**

130 litres , 29000 ml , 900 ml , 130 litres

① Choose a common unit (ml).

② Convert each entry to ml.



130 litres = 130000 ml [29000 ml = 29000 ml] 130 litres = 130000 ml [900 ml = 900 ml]

③ Sort the converted measures.

900 ml
29000 ml
130000 ml
130000 ml

④ Write down the original measures.

=	900 ml]
=	29000 ml]
=	130000 ml
=	130000 ml



① Plot the first point (127,12) by going 127 units along the *x*-axis and 12 units along on the *y*-axis.



<sup>(2)</sup> Plot the second point (129,22) by going 129 units along the *x*-axis and 22 units up the *y*-axis.



Yes

Plot the additional data point.



<sup>②</sup> Consider the overall trend of the data.



The point is not in line with the overall trend and is a long way from the line of best fit, so it is an outlier.

## **Question 24**

Positive correlation

① As height increases, arm length also increases meaning there is **positive correlation**.



This can be seen by the upward trend in the data on the scatter diagram.

## **Question 25**

3.90833

1 Press [3], then [ $\overleftarrow{\sqrt{n}}$ ] (usually using the shift key) to insert a cube root.

<sup>(2)</sup> Type the expression under the root, then press [=] or [EXE].

3.9083319568262

## **Question 26**

0.0992

① Press  $\left[\frac{n}{n}\right]$  to insert a fraction.

#### <sup>②</sup> Type in the numerator.

 $\frac{\sqrt{35.8}-8.02}{\Box}$ 

③ Press down and enter the denominator.

 $\frac{\sqrt{35.8 - 8.02}}{4.48 + 3.65^3}$ 

(4) Press [=] or  $_{[EXE]}$  to evaluate the expression.

 $\frac{\sqrt{35.8 - 8.02}}{4.48 + 3.65^3}$ 

#### **Question 27**

19x

① Collect terms in *x*.

8x + 14x + 6x - 9x = 19x

#### **Question 28**

x = 3

① Subtract 12 from both sides get x by itself.

 $\begin{array}{rcl} x + 12 &=& 15 \\ & -12 \downarrow & \downarrow & -12 \\ & x &=& 3 \end{array}$ 

## **Question 29**

```
x = \frac{3}{2}
```

① Add 6 to both sides.

6 = 8x - 6+6 \ \ +6 12 = 8x



0.09924607

② Divide both sides by 8.

$$12 = 8x$$
  
$$\div 8 \downarrow \qquad \downarrow \div 8$$
  
$$\frac{3}{2} = x$$

③ Conclude that  $x = \frac{3}{2}$ 

#### **Question 30**

x = -2

① Add x to both sides.

8 - x = 10+x  $\downarrow \quad \downarrow \quad +x$ 8 = 10 + x

② Solve the resulting equation.

8 = 10 + x $-10 \downarrow \downarrow -10$ -2 = x

#### **Question 31**

15 °*C* 

① Sort the list into ascending order.

<sup>②</sup> To find the mode, identify the number that appears the most often.

-5	0	13	<u>15</u>	15
15	16	16	18	24

#### **Question 32**

n = 6 pets

① Calculate the total number of known pets.

10 + 10 + 8 + 3 + 5 + 1 + 5 + 6 + 9 = 57

② Calculate the total pets.

 $\frac{\text{total}_{\text{pets}}}{\text{count}_{\text{families}}} = \text{mean}$  $\text{total}_{\text{pets}} = \text{mean} \times \text{count}_{\text{families}}$  $= 6.3 \times 10$ = 63

 $\bigcirc$  Find the difference to work out n.

$$n = 63 - 57$$
$$= 6 \text{ pets}$$

## **Question 33**

14grams

① Identify the lowest and highest number in the list.

Lowest = 10Highest = 24

<sup>②</sup> Work out the range by finding the difference between these numbers.

Range = 24 - 10= 14

#### **Question 34**

6.3

① Sort the list into ascending order.

0 0.2 3.7 4.7 6.3 6.9 8 9.4 9.9

 $\ensuremath{\textcircled{}}$  Work out the position of the median.

Position = 
$$\frac{n+1}{2}$$
  
=  $\frac{9+1}{2}$   
=  $\frac{10}{2}$   
= 5<sup>th</sup>

③ Identify the number in this position to find the median.

## **Question 35**

 $x^7$ 

① Write x as  $x^1$  and write  $x^6$  as x multiplied by itself 6 times.

② Add together how many x's there are in total (or add the powers) and write the answer in index form  $(x^{\Box})$ .

## **Question 36**

 $2^2$ 

① When dividing powers, subtract the indices/exponents.

$$\frac{2^{7}}{2^{5}} = 2^{7-5}$$
$$= 2^{2}$$

**Question 37** 

1

0 Anything raised to the power of 0 is equal to 1

$$m^0 = 1$$

## **Question 38**

 $m^{18}~{
m or}~m^{18}$ 

① Multiply the powers together.

$$(m^6)^3 = m^{6 \times 3} = m^{18}$$

## **Question 39**

 $6^{14}$ 

Use laws of indices to simplify.

$$6^2 \times (6^6)^2 = 6^2 \times 6^{12}$$
  
=  $6^{14}$ 

## **Question 40**

 $p^4$ 

Use laws of indices to simplify.

$$\frac{p^7 \times p^7}{p^{10}} = \frac{p^{14}}{p^{10}} = p^4$$

## **Question 41**

 $8s^{3}t^{7}$ 

① Separate each part and group the coefficients and each variable.

 $4s^{3}t^{4} \times 2t^{3}$ = 4 × s<sup>3</sup> × t<sup>4</sup> × 2 × t<sup>3</sup> = 4 × 2 × s<sup>3</sup> × t<sup>4</sup> × t<sup>3</sup>

<sup>②</sup> Multiply the numbers and add the powers.

$$4 \times 2 \times s^{3} \times t^{4} \times t^{3}$$
  
=  $8 \times s^{3} \times t^{4+3}$   
=  $8 \times s^{3} \times t^{7}$   
=  $8s^{3}t^{7}$ 

#### **Question 42**

7

① Identify the row representing 6 texts.

Number of texts	Frequency	
6	DOOO	

 $\ensuremath{\textcircled{O}}$  Use the key to calculate what frequency the whole symbols in the row represent.

Key: 
$$\bigcirc = 2$$
  
 $\bigcirc \bigcirc \bigcirc \rightarrow 3 \text{ times } 2 =$ 

③ Use the key to work out what frequency the partial symbol in the row represents.

6

Key: 
$$\bigcirc = 2$$

4 Find the total.

Frequency = 6 + 1Frequency = 7

## **Question 43**

	Quantity
0	0
G	1
D	0
	0

Use the key to identify the frequency that a whole circle represents.

Key: () = 4

O Divide the number of pupils who own 4 pens by the frequency represented by a whole circle.

 $3 \div 4 = \frac{3}{4}$ 

3 Identify from the result of the division that there are zero whole circles required.

④ Convert the fraction from the result of the division into a part-circle.

 $\frac{3}{4} \rightarrow \mathbf{C}$ 

⑤ Complete the row of the pictogram.

Number of pens	Frequency
4	G

Кеу: 🔲 =

2

## 0 Identify the row representing 6 grams.

Mass	Frequency
I	
6	

② Separate the symbols in the row into partial symbols.

Mass	Frequency
6	

③ Count the partial symbols.

$$\Box \Box \Box \Box \to 4 \text{parts}$$

3 Use the number of parts with the given frequency for the row to find the value for 1 part.

```
4parts is for 4 pencils
\div 4 \downarrow \downarrow \div 4
1 part is for 1 pencil
```

 $\ensuremath{\textcircled{}}$  Use the value of the partial symbol to find the value for the whole symbol.

```
1 part is for 1 pencil

\times 2 \downarrow \downarrow \times 2

2 parts is for 2 pencils
```



<sup>6</sup> Complete the key.



16 6

① Calculate the total parts in the ratio.

8 + 3 = 11 parts

<sup>②</sup> Determine the value of one part in the ratio.

 $22 \div 11 = 2$ 

③ Multiply the ratio by the value of one part.

```
8:3

\times 2 \downarrow \downarrow \times 2

16:6

8 parts has the value 16

3 parts has the value 6
```

Question 46

£40

① Determine how many parts in the ratio corresponds to £260' />.

Vamika : Jiya : Mia 5 : 7 : 13

 $\pounds 260$  corresponds to 13 parts in the ratio.

② Calculate the value of one part in the ratio.

 $\pounds 260 \div 13 = \pounds 20$ 

③ Calculate the difference in number of parts for Vamika and Jiya.

7 - 5 = 2

④ Calculate the value of 2 parts.

 $2 \times \pounds 20 = \pounds 40$ 

20 counters

0 Determine how many parts in the ratio corresponds to 2~ more yellow counters than green counters.

green : yellow : purple 10:11:1211 - 10 = 1 parts in the ratio.

<sup>②</sup> Calculate the value of one part in the ratio.

 $2 \div 1 = 2$  counters

③ Multiply the number of parts for green counters by the value of one part.

 $10 \times 2 = 20$  counters

#### **Question 48**

 $a = 60^{\circ}$  $b = 30^{\circ}$ 

## **Question 49**

8(4z + 5)

You need to find the highest number that is a common factor of 32 and 40. This number is 8.

We can write 8() and consider what we need to multiply 8 by to get each of the terms.

 $8 \times 4z = 32z$  and  $8 \times 5 = 40$ . Therefore:

32z + 40 = 8(4z + 5)

#### **Question 50**

9r(5s + 6)

## **Question 51**

5s(2s + 3)

## **Question 52**

(x + 10)(x + 1)



 Set up a sum and product problem to help factorise the expression.

$$x^{2}+11x+10$$
  
 $-+-= 11$   
 $--= 10$ 

 $\ensuremath{@}$  Find two numbers which add to  $\ 11 \$  and multiply to  $\ 10 \ .$ 

$$10 + 1 = 11$$
  
 $10 \times 1 = 10$ 

③ Use these values to rewrite the expression in the form of (x + a)(x + b).

$$x^{2} + 11x + 10 = (x + 10)(x + 1)$$

## **Question 53**

14z + 6x + 8y

① Multiply all terms in the bracket by 2, then simplify.

$$2(7z + 3x + 4y)$$
  
= 2 × 7z + 2 × 3x + 2 × 4y  
= 14z + 6x + 8y

② Alternatively, using the grid method.

×	7 🏚	+3	+4🏟
2	14z	+6x	+8y

= 14z + 6x + 8y

## **Question 54**

 $14x^2 - 14x$ 

① Multiply all terms in the bracket by 7x, and then simplify.



$$7x(2x-2) = 7x \times 2x + 7x \times -2 = 14x^2 - 14x$$

 $y^2 + 5y + 6$ 

① Multiply each term in the first bracket by each term in the second bracket.

 $(y+2)(y+3) = y \times y + y \times 3 + 2 \times y + 2 \times 3 = y^2 + 3y + 2y + 6$ 

② Simplify.

$$= y^2 + 5y + 6$$

#### **Question 56**

36a

① Rearrange and multiply.

 $2 \times 3a \times 6 = 2 \times 3 \times 6 \times a$ = 36a

**Question 57** 

 $10a^3p$ 

## **Question 58**

 $28q^2y$ 





① Plot points at (0,0) and (3, 10).



 $\ensuremath{\textcircled{O}}$  Join with a straight line.



15.75 to 16.55 miles

Draw a horizontal line from 26 kilometres, then a vertical line.



② Read the value.

16.1 miles.

## **Question 61**

3%



① Write as a fraction then as a percentage.

$$\frac{3}{100} = 0.03$$
  
= 3%

## **Question 62**

 $\frac{61}{100}$ 

## **Question 63**

70%

Question 64

8

1 Round 7.77 to 1 significant figure.

O Round 79 to 1 significant figure.

7 ↓ 80

3 Round 81 to 1 significant figure.

8 ↓ 80

④ Complete the calculation using the rounded values.

$$\frac{7.77 \times 79}{81} \approx \frac{8 \times 80}{80}$$
$$\approx \frac{640}{80}$$
$$\approx 8$$

**Question 65** 

x =8.5cm

① Find an algebraic expression for the perimeter.

(3x-6) + (4x) + (2x-1)+ (2x+1) + (4x-9)= 15x - 15

② Equate this expression to 112.5 then solve.

#### **Question 66**

x = 10

 Set up an equation.

Lucy thinks of a number.	x
She subtracts <sup>4</sup>	x - 4
and then divides the result by $6$	$\frac{x-4}{6}$
The answer is 1	$\frac{x-4}{6} = 1$

② Solve.

$$\frac{x-4}{6} = 1$$

$$\times 6 \downarrow \qquad \downarrow \qquad \times 6$$

$$x-4 = 6$$

$$+4 \downarrow \qquad \downarrow \qquad +4$$

$$x = 10$$

#### **Question 67**

30000

① Find the digit in the thousands place.

2 <u>9</u>622

② If the next digit is 5 or more, round the 9 up.

2 <u>9</u> 622 so round up ↓ 30



③ Add zeros to maintain the place value of the number.

 $30\ 000$ 

The rounded value is 30000

## **Question 68**

4300000

① Find the digit in the hundred thousands place.

4 <u>3</u>34820

2 If the next digit is 5 or more, round the 3 up.

4 <u>3</u> 34820 so keep 3 ↓ 43

③ Add zeros to maintain the place value of the number.

43 00000

4 The rounded value is 4300000

## **Question 69**

7

(1)  $7 \times 2 = 14$  so 7 is a factor of 14.

## **Question 70**

1, 2, 3, 4, 6, 8, 12, 24

① Find all the numbers that go into 24 exactly.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 24

## **Question 71**

*x* =123 °

1 Angles on a straight line sum to 180°.

$$x = 180 - 57$$
  
= 123°



*y* =218 °

Add the two angles.

52 + 90 = 142

<sup>(2)</sup> Angles about a point sum to  $360^{\circ}$ .

$$y = 360 - 142$$
  
= 218°

## **Question 73**

*y* =126 °

① Vertically opposite angles are equal.

$$y = 126^{\circ}$$

# **Question 74**

Type of transport	Frequency	Angle ( °)
cycle	24	108
walk	17	77
train	20	90
bus	11	50
other	8	36

angle =  $\frac{\text{frequency}}{\text{total frequency}} \times 360$ 

Type of transport Frequency			Angle				
cycle	24	$\frac{24}{80}$	×	360	=	108	
walk	17	$\frac{17}{80}$	×	360	=	77	
train	20	$\frac{20}{80}$	×	360	=	90	
bus	11	$\frac{11}{80}$	×	360	=	50	
other	8	$\frac{8}{80}$	×	360	=	36	

 $3.93 \times 10^{5}$ 

① Identify the digit that will be in the ones place value for standard form.

<u>3</u> 93000

② Use this information to write down the structure for the standard form.

 $393000 = 3.93 \times 10^{\square}$ 

③ Count the number of multiplications by 10 needed to reach 393000 from 3.93

④ Write the answer.

 $393000 = \underline{3}.93 \times 10^5$ 

#### **Question 76**

0.000496

Interpret the power of 10.

$$4.96 \times 10^{-4} = 4.96 \times \frac{1}{10^4}$$
$$= 4.96 \times \frac{1}{10000}$$
$$= 4.96 \div 10000$$

<sup>②</sup> Complete the calculation.

 $4.96 \div 10000 = 0.000496$ 

**Question 77** 

① Put the negative numbers in order.

-19 < -12 < -8 < -6

<sup>②</sup> Put the positive numbers in order.

-19 < -12 < -8 < -6 < 1

#### **Question 78**

## **Question 79**

Evens

## **Question 80**

$$a = \frac{8}{20}, b = \frac{12}{20}, c = \frac{8}{20}, d = \frac{12}{20}, e = \frac{8}{20}, f = \frac{12}{20}$$

There are 8 black socks out of 20 socks therefore  $a = \frac{8}{20}$ 

There are 12 socks that are not black out of 20 socks therefore  $b = \frac{12}{20}$ 

As Aisling puts the black sock back, the probabilities remain the same the second time she picks a sock.



#### **Question 81**

41

#### **Question 82**

29 120

 $5 \times 5 \times 5$ 

#### **Question 84**

8

## **Question 85**

 $\frac{3}{7}$ 

## **Question 86**

10:27:53

① Find equivalent fractions to  $\frac{1}{9}$  and  $\frac{3}{10}$  with the same denominator.

Find the Lowest Common Denominator of 9 and 10.

LCD = 90

Write down the equivalent fractions with a denominator of 90

Beth: 
$$\frac{1}{9} \times \frac{10}{10} = \frac{10}{90}$$
  
Ahmed:  $\frac{3}{10} \times \frac{9}{9} = \frac{27}{90}$ 

<sup>②</sup> Find the missing fraction.

 $1 - \left(\frac{10}{90} + \frac{27}{90}\right) = \frac{53}{90}$ 

③ Write down the numerator of each fraction as a ratio.

```
Beth : Ahmed : Juan
10 : 27 : 53
```

## **Question 87**

Lower bound =2350 Upper bound =2450

To find the lower bound you can subtract half the accuracy, 50, from the rounded number.



To find the upper bound you add half the accuracy.

Lower bound = 2400 - 50 = 2350

Upper bound = 2400 + 50 = 2450

## **Question 88**

	Physics	Chemistry	Biology	Total
Воу	7	5	19	31
Girl	5	2	12	19
Total	12	7	31	50

## **Question 89**

0

① Find the digit in the units place.

<u>0</u>.386

 $\ensuremath{\textcircled{}}$  If the next digit is 5 or more, round the 0 up.

<u>0</u>. 3 86 so keep 0

③ Write the answer.

0

## **Question 90**

12.3

① Find the digit in the hundredths place.

12.2 <u>9</u>5

0 If the next digit is 5 or more, round the 9 up.

12.29 5 so round up

③ Write the answer.

12.3

140

Divide by 2 to find 50%.

 $280 \div 2 = 140$ 

#### **Question 92**

6.7

Divide by 100 to find 1%.

 $670 \div 100 = 6.7$ 

#### **Question 93**

24

## **Question 94**

 $b \geq 11$ 

 $\begin{array}{rrrr} 20 & \leq b+9 \\ _{-9} \downarrow & \downarrow _{-9} \\ 11 & \leq b \\ \therefore & b & \geq 11 \end{array}$ 

## **Question 95**

А

## **Question 96**

-4, -3, -2, -1, 0, 1, 2, 3, 4, 5

## **Question 97**

£621.91

0 Calculate the decimal multiplier equivalent to an increase of  $\ 3.25$  %

$$\frac{100+3.25}{100} = 1.0325$$

 $\ensuremath{\textcircled{O}}$  Use the formula for compound interest to calculate the final amount.

$$530 \times 1.0325^{5} = 621.908 \dots$$
  
 $\approx pound 621.91$ 

£22.91

## **Question 99**

(1,-4)

 $\bigcirc$  Draw an arrow from the point to the *x* axis to find the *x* coordinate.



O Draw an arrow from the point to the *y* axis to find the *y* coordinate.



③ Put the two coordinate parts together.

$$(1,-4) \to (1,-4)$$



Count the number of units right and the number of units down from Q to R.



<sup>(2)</sup> Count the same number of units right and the same number of units down from P to find S.



0.3

1 Divide by 100.

 $30 \div 100 = 0.3$ 

## **Question 102**

75%

① Multiply by 100.

 $0.75 \times 100 = 75\%$ 

## **Question 103**

9

1 Find  $\frac{1}{2}$  of 18 by dividing by 2.

$$\frac{1}{2} \text{ of } 18 = 18 \div 2$$
  
= 9

# **Question 104**

5

① Find  $\frac{1}{12}$  of 60 by dividing by 12.



$$\frac{1}{12}$$
 of 60 = 60 ÷ 12  
= 5

1.24