OCR | F | Nov '24 | P2 - NC

1 **(a)** Write down a multiple of 9 between 30 and 40.

(a) 36 ✓ ..... **[1]**

(b) Write down a factor of 100 between 11 and 30.

(b) 20 / 25 ✓ ..... **[1]**

2 Work out.

(a) $7 + -5$

(a) 2 ✓ ..... **[1]**

(b) 26×6

$$\begin{array}{r} 26 \\ \times\ 6 \\ \hline 156 \\ \hline \end{array}$$

(b) 156 ✓ ..... **[1]**

(c) $1648 \div 8$

$$8\overline{)1648} = 206$$

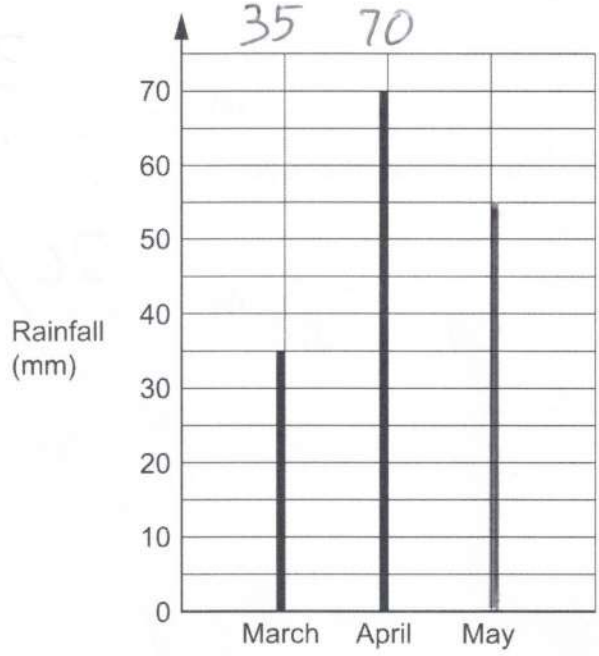
(c) 206 ✓ ..... **[1]**

(d) $4.78 + 5.3$

$$\begin{array}{r} 5.30 \\ +\ 4.78 \\ \hline 10.08 \\ \hline \end{array}$$

(d) 10.08 ✓ ..... **[1]**

3 The vertical line chart shows the rainfall, in millimetres (mm), in March and April.



(a) Write down the rainfall in March.

35

(a) ..... mm **[1]**

(b) In May there was 55 mm of rainfall.

Complete the vertical line chart for May. **[1]**

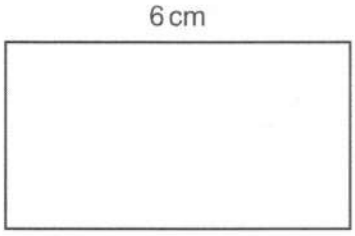
(c) Work out the **total** rainfall for March, April and May.

55
35
+ 70
160

160

(c) ..... mm **[2]**

4 Here is a rectangle.



Not to scale

6 × 4 ✓

Work out the area of the rectangle.

24 ✓

..... cm^2 **[2]**

5 **(a)** Complete each statement.

(i) 35 kilograms = 35000 grams. **[1]**

(ii) 203 millilitres = 0.203 litres. **[1]**

(iii) 4 square centimetres = 400 square millimetres. **[1]**

(b) A train travels 90 km at an average speed of 40 km/h.

Work out the time taken for this journey.
Give your answer in hours and minutes.

$S \frac{D}{(T)}$ $T = \frac{90}{40} = \frac{9}{4} = 2\frac{1}{4}$ hr.

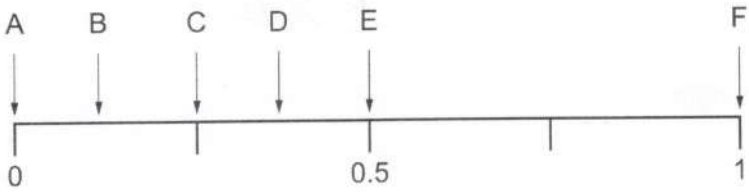
✓ ✓

(b) 2 hours 15 minutes ✓ **[3]**

6 There are 16 coins in a bag.

- Six 5p coins.
- Two 10p coins.
- Eight 20p coins.

(a) The diagram shows a probability scale.



One coin is taken at random from the bag.

Which arrow shows the probability that the coin:

(i) has a value of less than £1,

F ✓

(a)(i) ..... **[1]**

(ii) is a 20p coin,

E ✓

(ii) ..... **[1]**

(iii) is a 50p coin?

A ✓

(iii) ..... **[1]**

(b) More coins are added to the 16 coins already in the bag.
One coin is taken at random from the bag.

The probability of the coin being a 5p, a 10p or a 20p coin are now all equal.

Find the **minimum** number of coins that must be in the bag.

5p 10p 20p
6 2 8
↓ ↓ ↓
8 + 8 + 8

24 ✓

(b) ..... **[2]**

7 **(a)** Work out.

$\frac{1}{3}+\frac{2}{7}$

$= \frac{7}{21} + \frac{6}{21}$ ✓

$\frac{13}{21}$ ✓

(a) ..... **[2]**

(b) Work out.

$\frac{5}{8}\times\frac{7}{10}$

Give your answer in its simplest form.

$= \frac{35}{80}$ ✓

$\frac{7}{16}$ ✓

(b) ..... **[2]**

8 **(a)** A sequence is generated using the rule:

- multiply the previous term by 3
- then subtract 1.

The **2nd** term of the sequence is 20.

(i) Find the **3rd** term of the sequence.

$20 \times 3 = 60$

$60 - 1 = 59$

(a)(i) ..... **[1]**

(ii) Find the **1st** term of the sequence.

$20 + 1 = 21$

$= 7$

(ii) ..... **[2]**

(b) Here are the first four terms of a different sequence.

5 10 15 20

Find the *n*th term of the sequence.

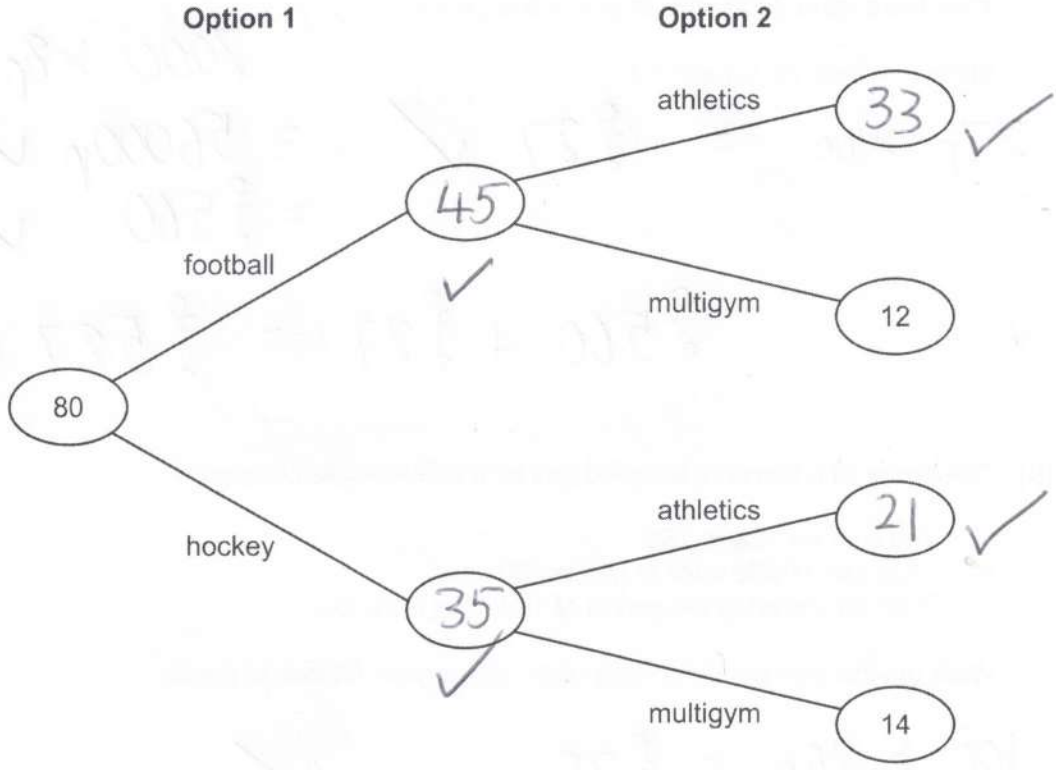
$5n$

(b) ..... **[1]**

9 80 students each chose two activities, one from Option 1 and one from Option 2.

Option	Activity
1	football or hockey
2	athletics or multigym

This frequency tree shows the number of students choosing some of the activities.



(a) How many more students chose hockey and multigym rather than football and multigym?

14 - 12

(a) = 2 ..... **[1]**

(b) Ten more students chose football rather than hockey.

Complete the frequency tree. **[4]**

10 (a) The table shows charges made by a gas company to its customers.

Cost per day	27p
PLUS	
Cost per unit of gas used	8p

The owner of a flat receives a gas bill covering a period of 100 days.
They have used 7000 units of gas in this period.

Show that their bill is for £587. **[4]**

27p × 100 = £27 ✓ 7000 × 8p = 56000p ✓ = £560 ✓

£560 + £27 = £587 ✓

(b) The owner of a house is supplied gas by a different gas company.

- The cost per day is 25p.
- They use 10 000 units of gas in 100 days.
- Their bill covering the period of 100 days is £975.

Work out the cost per unit of gas used, giving your answer in pence.

100 × 25p = £25 ✓

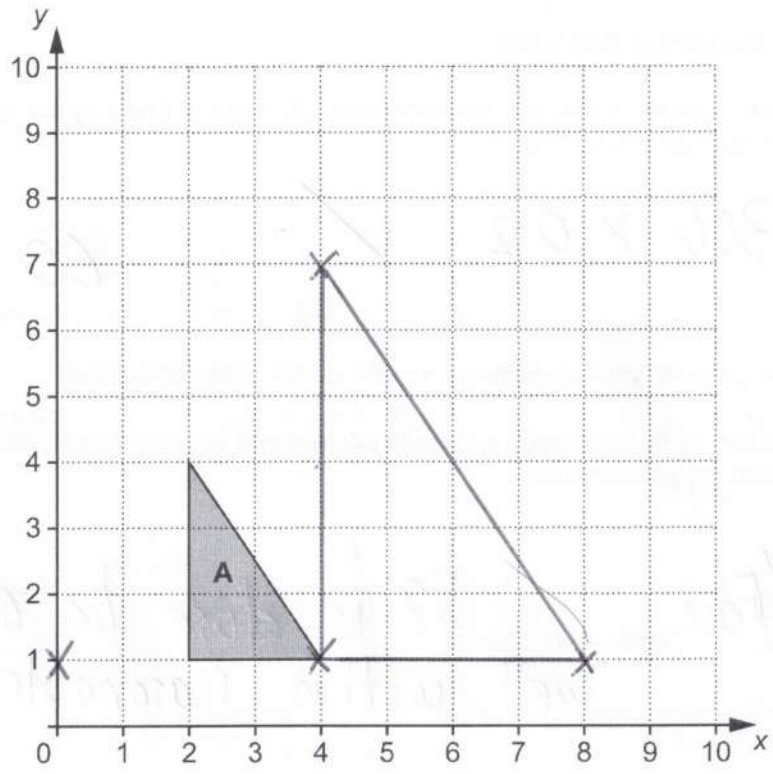
975 − 25 = £950 = 95000p ✓✓

$\frac{95000}{10000} = \frac{95}{10}$

= 9.5 ✓

(b) ..... p **[4]**

11 Triangle **A** is drawn on the grid below.



✓✓sf = 2

✓ position

(a) Enlarge triangle **A** by scale factor 2 with centre of enlargement (0, 1).
Label the image **B**. **[3]**

(b) Complete the description of the **single** transformation that maps triangle **B** back to triangle **A**.

Enlargement by scale factor $\frac{1}{2}$ with centre of enlargement (0, 1) **[2]**

12 A spinner has five sides numbered 1 to 5.
If the spinner is fair, the probability that it lands on the number 1 is 0.2.

A student spins the spinner 300 times.

(a) Assuming the spinner is fair, use the information to work out how many times the spinner is expected to land on the number 1.

300 × 0·2 ✓ 60 ✓

(a) ..... **[2]**

(b) The spinner actually landed on the number 1 on 58 of the 300 spins.

Decide whether or not the result suggests this spinner is likely to be a fair spinner?
Give a reason for your answer.

Yes/Fair because 58 is close to 60 so well within reasonable expectations ✓

..... **[1]**

13 **(a)** Find the value of:

(i) 2^5. $2 \times 2 \times 2 \times 2 \times 2$

$4, 8, 16 \rightarrow 32$ ✓

(a)(i) ..... **[2]**

(ii) $\sqrt[3]{1000}$.

(ii) 10 ✓ ..... **[1]**

(b) Simplify.

$y^{12} \div y^4$ y^{12-4}

(b) y^8 ✓ ..... **[1]**

(c) $5^p \times 5 = \frac{1}{5}$

Find the value of p.

$5^p \times 5^1 = 5^{-1}$ ✓

so $p + 1 = -1$

(c) $p =$ -2 ✓ ..... **[2]**

14 Rosa is thinking of a fraction.

The numerator is a cube number less than 100. → 1, (8), 27, 64 ✓

The denominator is a square number less than 100.

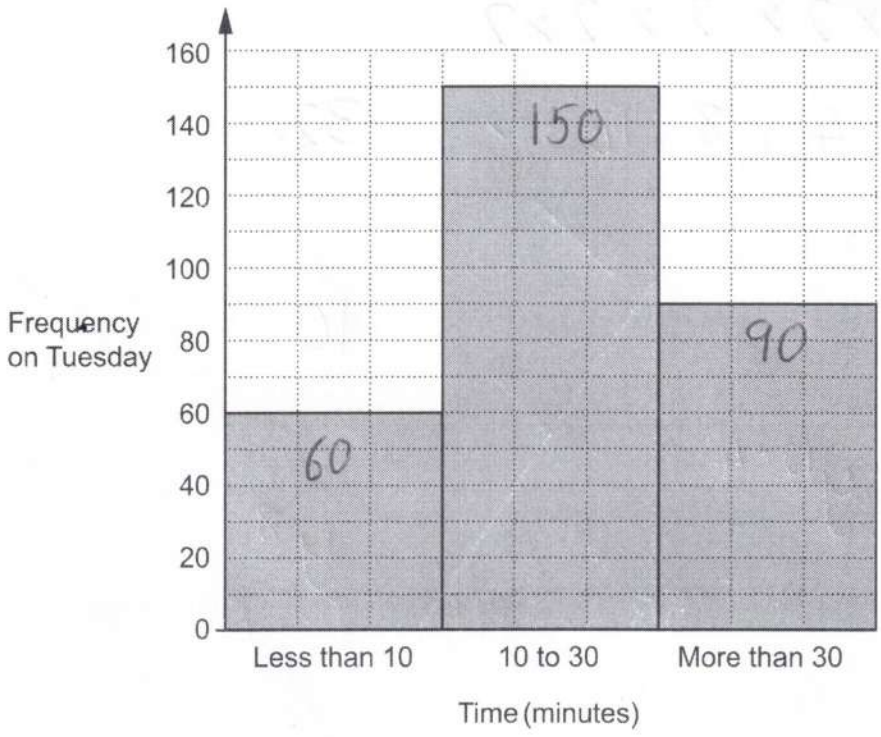
The fraction is equivalent to $\frac{1}{8}$. ↓

Find the fraction that Rosa is thinking of. 1, 4, 9, 16, 25, 36, 49, (64), 81 ✓

$\frac{8}{64}$ ✓

..... **[3]**

15 The graph shows the time, in minutes, taken by some pupils to travel to school on **Tuesday**.



150
90
+ 60
300 ✓

(a) Find the percentage of these pupils that took more than 30 minutes to travel to school.

$\frac{90}{300} \times 100 = \frac{90}{3}$ ✓

30 ✓

(a) ..... % **[3]**

(b) On **Tuesday** the number of pupils taking 10 to 30 minutes to travel to school was 25% less than on Monday.

Find the number of pupils taking 10 to 30 minutes to travel to school on **Monday**.

÷3 (75% = 150) ÷3 ✓
x4 (25% = 50) x4 ✓
Mon 100% = 200

200 ✓

(b) ..... **[3]**

16 An electrician charges £30 per visit plus £22 per hour.

Write an expression for the cost, in £, charged by the electrician for one visit lasting n hours.

$30 + 22n$ ✓ ✓

£ ..... **[2]**

17 Anika has a shelf 79.6 cm long.
She has many books, each of width 3.4 cm.
Anika puts two paperweights, each of width 5 cm, and the maximum possible number of books on the shelf.

Work out the amount of space on the shelf that is left over.
You must show your working.

$79.6 - 10 = 69.6$ ✓

$69.6 \div 3.4$ ✓

$= 696 \div 34$

$34\overline{)696}$ $\begin{array}{r} 020 \\ \text{etc} \end{array}$ $\Rightarrow$ 20 books ✓

$34 \times 20 = 68\text{ cm}$

Space $= 79.6 - 68 - 10$ ✓

$= 1.6$ ✓

..... cm **[5]**

18 Jack has ten cards numbered 11 to 20.
He picks a card at random.

Jack says,

In these ten cards, there are two multiples of 5 and five even numbers.
Therefore, the probability that I pick a card that is a multiple of 5 or an even number is $\frac{2}{10}+\frac{5}{10}=\frac{7}{10}$.

Describe the error in Jack's method and give the correct answer.

The error is he's included '20' twice ✓

6/10 ✓

The correct answer is ..... **[2]**

19 Felix makes craft figures at a constant rate.
He can make 5 craft figures in 40 minutes.

(a) Find the number of craft figures Felix can make in 4 hours. = 240 mins

×6 ↓ 5cf = 40m ↓ ×6
30cf = 240m ✓✓

(a) 30 ✓ **[3]**

(b) Darcie makes craft figures 10% quicker than Felix.

Work out how long Darcie takes to make 15 craft figures.

×3 ↓ 5cf = 36mins ✓
15cf = 36 ✓
× 1 3
1 0 8

(b) 108 ✓ minutes **[3]**

20 Here is a question and an incorrect answer.

Question:

Expand the brackets and simplify fully.

$3(a + 2b) + a$

Answer:

$a4 + 6 \times b$

Explain why the answer is **not** correct.

a 4 should be 4a

6 x b should be 6b

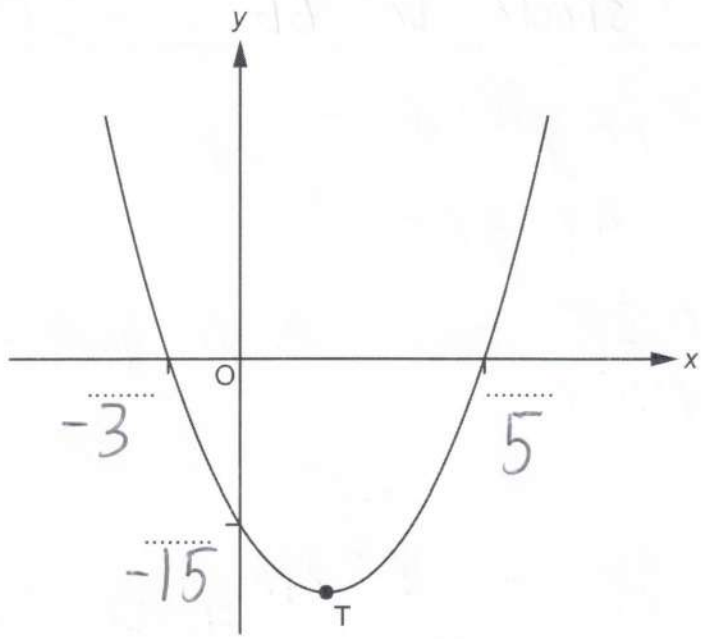
[2]

21 (a) Show that $(x+3)(x-5) = x^2 - 2x - 15$. **[1]**

$= x^2 - 5x + 3x - 15$ ✓ all 4 seen

$= x^2 - 2x - 15$

(b) The diagram shows a sketch of the graph $y = (x+3)(x-5)$.



✓ ✓

Complete the diagram by adding the values of the **three** intercepts with the axes. **[2]**

(c) The minimum point on the graph is marked T.

Write down the coordinates of the point T.

$\frac{-3+5}{2} = +1$

$y = (+1)^2 - 2(+1) - 15$.

$= 1 - 2 - 15$

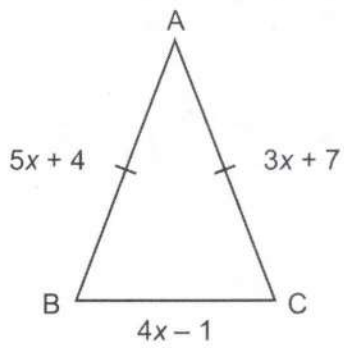
$= -16$

(c) (+1, -16) **[2]**

✓ ✓

22 In this question, all lengths are in centimetres.

The diagram shows an isosceles triangle ABC.
AB = AC.



Not to scale

Find the perimeter of the triangle.
You must show your working.

$5x + 4 = 3x + 7$ ✓

$2x = 3$ ✓

$x = 1.5$ ✓

$3x + 7 = 3 \times 1.5 + 7$

$= 4.5 + 7 = 11.5$

$4x - 1 = 4 \times 1.5 - 1$

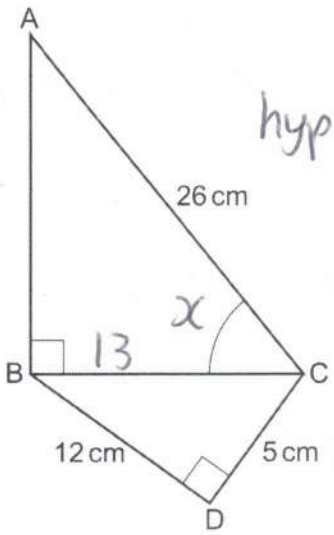
$= 6 - 1 = 5$ ✓

Per $= 11.5 \times 2 + 5$ ✓

$= 23 + 5 = 28$ ✓

..... cm **[6]**

23 The diagram shows two right-angled triangles, ABC and BDC, joined at BC.



hyp

Not to scale

opp

BC = adj

Work out angle BCA.
You must show your working.

$BC = \sqrt{12^2 + 5^2}$ ✓✓

$= \sqrt{144 + 25} = \sqrt{169} = 13$ ✓

SOH CAH

$\cos x = \frac{13}{26} = \frac{1}{2}$ ✓

60 ✓

..... ° **[5]**

END OF QUESTION PAPER