OCR | H | Jun '25 | P5

1 Work out.

(a) -3.5×-4

(a) (+) 14 ✓ ..... [1]

(b) $0.1 \div 0.4$

$\frac{0.1}{0.4} = \frac{1}{4}$

or 0.25 ✓

(b) ..... [1]

2 An examination has two parts.
A student scores 10 out of 15 marks on Part 1.
They score 4 out of 10 marks on Part 2.

To pass the examination the student needs to score 54% of the total marks.

Show that the student passes the examination. **[3]**

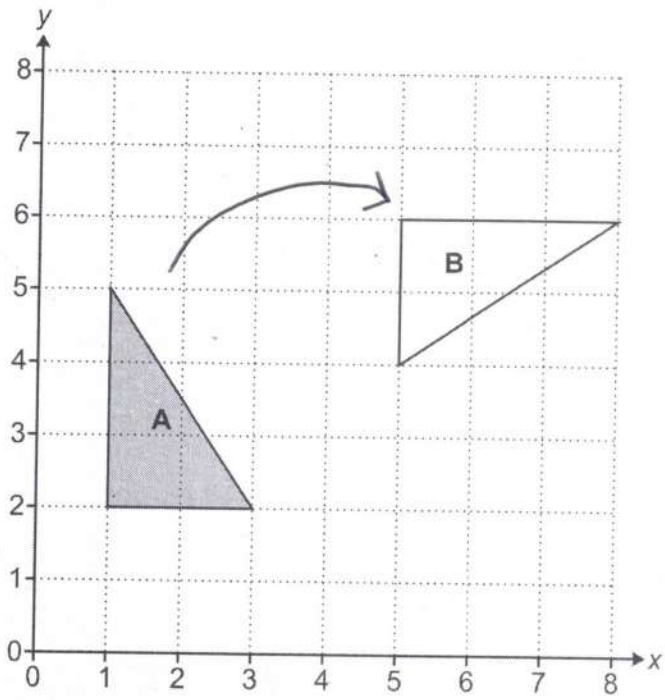
Total = $\frac{14}{25}$ = $\frac{56}{100}$ = 56%

✓ ✓OE ✓

>54% hence passes

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3 Triangle **A** and triangle **B** are drawn on the coordinate grid.



Describe fully the **single** transformation that maps triangle **A** onto triangle **B**.

Rotation 90° About (5,2)
clockwise

[3]

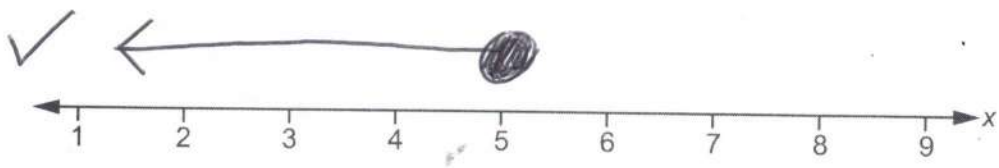
4 **(a)** Solve.

$4x \leqslant 20$

$x \leqslant \frac{20}{4}$

(a) $x \leqslant 5$ [1]

(b) Show your solution to part **(a)** on the number line.



[2]

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5 $1\frac{1}{5}+\frac{22}{d}=1\frac{3}{4}$

Find the value of d.

$\frac{7}{4}-\frac{6}{5}=\frac{22}{d}$ ✓

$\frac{35}{20}-\frac{24}{20}=\frac{22}{d}$

$\frac{11}{20}=\frac{22}{d}$ ✓

$d =$ 40 ✓ [3]

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6 Sara and Tom both make a sequence of numbers.
The first term in both sequences is 10.

The term-to-term rule for Sara's sequence is add 14.
The term-to-term rule for Tom's sequence is add 35.

14 35

7 2 7 5

Each sequence stops when a term reaches or goes above 500.

(a) Find the **number of terms** that are the same in both Sara's and Tom's sequence.
You must show your working.

LCM = 7 x 5 x 2 = 70 ✓

10, 80, 150, 220, 290, ✓
360, 430, 500. ✓

8 ✓

(a) ..... **[4]**

(b) Find an expression for the *n*th term of Sara's sequence. +14

10, 24, 38
14, 28, 42

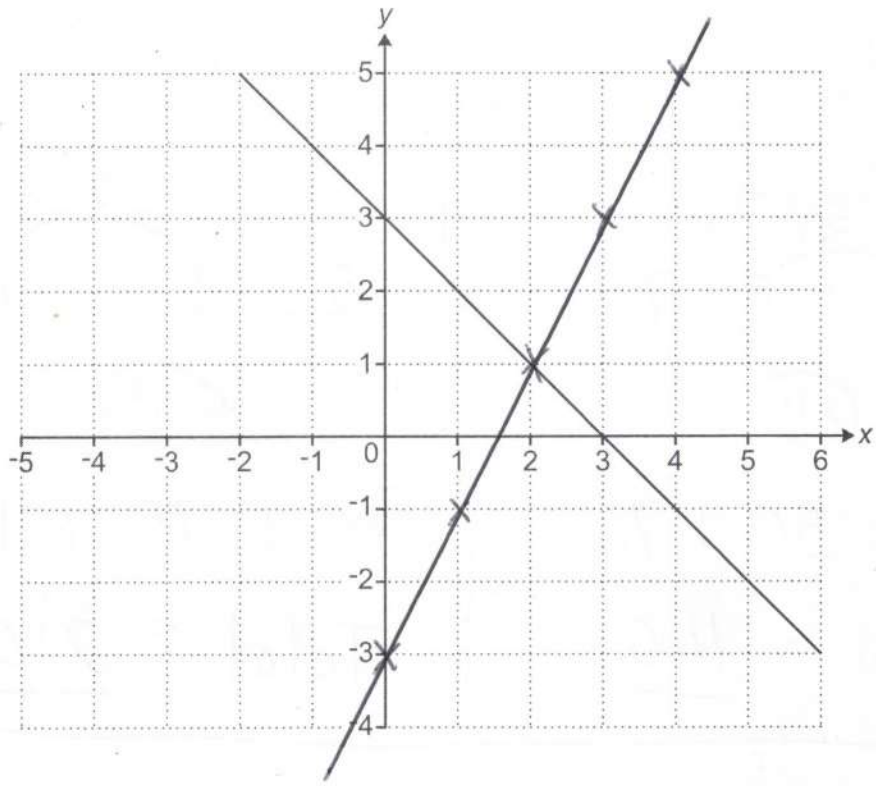
14n - 4

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

✓ ✓

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7 The graph of the line $x + y = 3$ is shown on this grid.



(a) By drawing a suitable line on the grid, solve these simultaneous equations.

$x + y = 3$ and $y = 2x - 3$

$m = 2, c = -3$ ✓✓

(a) $x =$ 2 ✓

$y =$ 1 ✓

[4]

(b) Umi says,

The simultaneous equations $y = 2x + 3$ and $2y - 4x = 7$ will have no solutions.

Is Umi correct?
Explain how you decide.

$2y = 4x + 7$

$y = 2x + 3.5$ ✓

Umi is correct because parallel / same gradient

etc ✓

[2]

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8 Three lengths of wood are in the ratio 2 : 5 : 7.
The difference in size between two of the lengths of wood is 30 cm.

Kofi says,

The sum of the three lengths of wood **must be** at least 120 cm.

Is Kofi correct?
Show how you decide.

3
2 : 5 : 7
×10
20 : 50 : 70
Total = 140

2
2 : 5 : 7
×15
30 : 75 : 105
Total = 210 ✓✓

5
2 : 5 : 7
×6
12 : 30 : 42
Total = 84 ✓

Kofi is incorrect because 84 is a possible total. ✓ [5]

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9 A school has three terms, Autumn, Spring and Summer.

In class A there were 90 absences in the Autumn term, 120 absences in the Spring term and 40 absences in the Summer term.

Compared to class A, class B had:

- $\frac{3}{10}$ fewer absences in the Autumn term
- 5% more absences in the Spring term
- 7 more absences in the Summer term.

Design and complete a two-way table to show this information. **[6]**

Headings ✓✓

	Au	Sp	Su
A	90	120	40
B	63	126	47

✓ 3 by 2 oe

✓✓✓

$\frac{7}{10} \times 90 = \frac{63}{1}$

10% of 120 = 12

5% = 6

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10 Heidi is x years old.
Finley is 5 years younger than Heidi.
Zayn is 4 times Finley's age.

Find an expression in terms of x for the **total** age of Heidi, Finley and Zayn.
Write your answer as simply as possible.

H F Z

$x + x-5 + 4x-20$

✓ ft ✓✓

$6x-25$ ✓

..... **[4]**

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11 A solid steel cube has a mass of 1.05 kg.
The density of the steel is 7.9 g/cm^3.

Orla says,

The length of one side of the cube is approximately 10 cm.

Use estimation to decide if Orla's statement is reasonable.
Show how you decide.

$M \approx 1000g$ ✓

$D \approx 8g/cm^3$ ✓

$V = \frac{M}{D} = \frac{1000}{8} = 125\,cm^3$ ✓

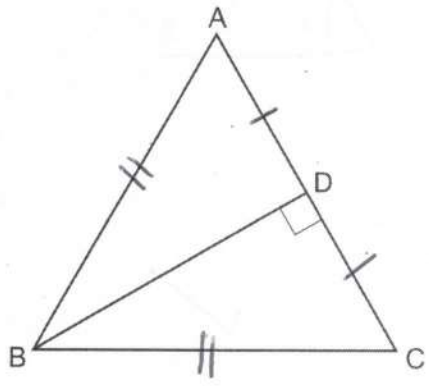
$side = \sqrt[3]{125} = 5$ ✓

Orla's statement is unreasonable because actual length is approx. half of Orla's claim ✓

[5]

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12



Not to scale

ABC is an equilateral triangle.
BD is perpendicular to AC.

Prove that triangle ABD is congruent to triangle CBD.

BD is common ✓

AB = BC as sides of equilateral triangle ✓
(hypotenuse)

$\angle ADB = \angle BDC = 90$ (etc) ✓
or

$\angle BAD = \angle BCD = 60$

SAS or RHS

hence $\triangle BDC$ and $\triangle BAD$ ✓
are congruent

.....

.....

.....

.....

..... [4]

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13 p is directly proportional to the square root of m.
$p = 15$ when $m = 25$.

Find the value of p when $m = 81$.

$p = K \times \sqrt{m}$ ✓

$15 = K \times 5$

$3 = K$ ✓

$p = 3 \times \sqrt{81}$

$p = 3 \times 9$

$p =$ 27 ✓ **[3]**

14 **(a)** Find the value of $4^{\frac{5}{2}}$.

$\sqrt{4}^{5}$ ✓

$= 2^5$

32 ✓

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

(b) Simplify.

$(3x^2)^{-3} \times 9x^8$

$\frac{1}{27} x^{-6} \times 9x^8$ ✓✓

$\frac{9}{27} x^2$ ✓

$\frac{1}{3} x^2$ ✓

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

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15 **(a)** Write $x^2 - 6x + 5$ in the form $(x - a)^2 - b$.

$(x-3)^2 - 9 + 5$ ✓

(a) $(x-3)^2 - 4$ ✓✓ **[3]**

(b) Write down the coordinates of the turning point of $y = x^2 - 6x + 5$.

(b) (3 , -4) ✓ft ✓ **[2]**

16 Rearrange this formula to make a the subject.

$$p = \frac{a + 2b}{3 - a}$$

$p(3-a) = a + 2b$ ✓

$3p - ap = a + 2b$ ✓

$3p - 2b = a + ap$ ✓

$3p - 2b = a(1 + p)$

$a = \frac{3p - 2b}{1 + p}$ ✓OE

[4]

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17 The mass of some parcels are recorded.
The table and the histogram each show part of this information.

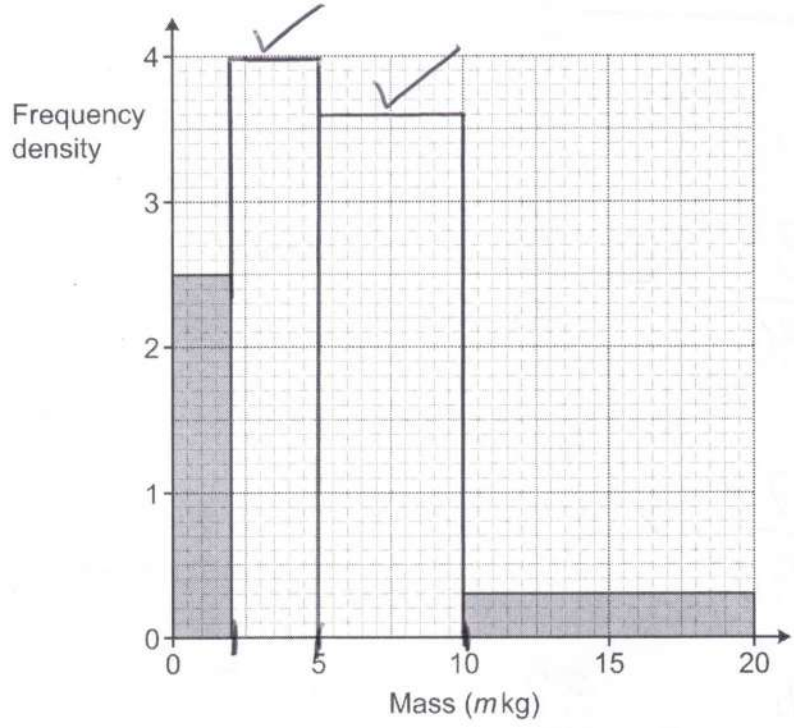
Mass (m kg)	$0 < m \leqslant 2$	$2 < m \leqslant 5$	$5 < m \leqslant 10$	$10 < m \leqslant 20$
Frequency	5	12	18	3

2 × 2·5 ↑

12 ÷ 3 = 4 ↓

10 × 0·3 ↑

18 ÷ 5 = 3 3/5 = 3·6



(a) Complete the table and the histogram. **[4]**

(b) The heaviest parcel is 19.5 kg.

Complete the inequality to represent the range, R kg, of the masses of the parcels.

Biggest range possible is 19·5 − almost 0 = < 19·5
Smallest " " " 19·5 − 2 = 17·5

(b) 17·5 ≤ R < 19·5 **[2]**

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18 Work out.

$1.4\dot{2} \div 0.\dot{2}$

$0.\dot{2} = \frac{2}{9}$ ✓

Give your answer as a mixed number in its simplest form.
You must show your working.

$x = 0.4\dot{2}$

$10x = 4.\dot{2}$

$100x = 42.\dot{2}$

$90x = 38$

$x = \frac{38}{90}$ ✓

$\left|\frac{38}{90} \div \frac{2}{9}\right.$

✓ $= \frac{\overset{64}{\cancel{128}}}{\cancel{90}_{1}} \times \frac{\cancel{9}}{\cancel{2}_{1}}$

$= \frac{64}{10} = \frac{32}{5}$

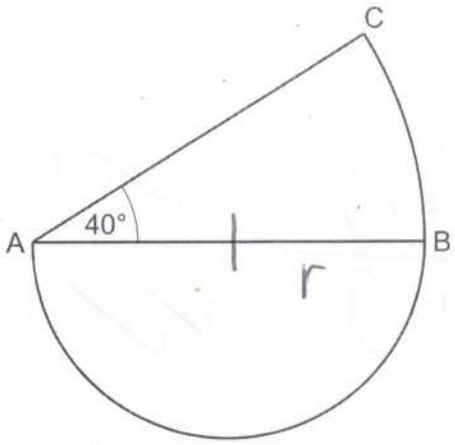
✓

$= 6\frac{2}{5}$ ✓

..... [5]

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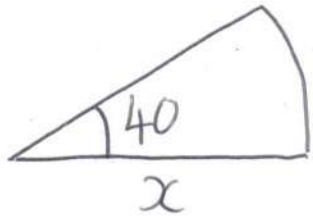
19 The diagram shows a shape formed by a semicircle joined to a sector of a circle, BAC, along a common length AB.



Not to scale

The area of the sector BAC is $16\pi\,\text{cm}^2$.

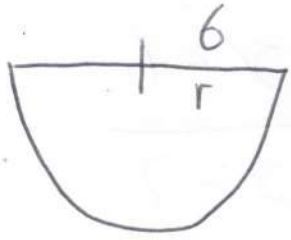
Work out the total area of the shape.
Give your answer in terms of π.
You must show your working.



$16\pi = \frac{40}{360} \times \pi \times x^2$ ✓

$144 = x^2$

$12 = x$ ✓



$\text{Area} = \frac{1}{2} \times \pi \times 6^2$ ✓

$= 18\pi$

✓

$18\pi + 16\pi$

34π ✓

..... cm^2 **[5]**

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20 Simplify.

$$\frac{x^2 - 36}{x^2 - x - 42}$$

$$\frac{(x-6)(x+6)}{(x-7)(x+6)}$$ ✓ ✓✓

$$\frac{x-6}{x-7}$$ ✓

..... **[4]**

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21 There are 10 sweets in a bag.
4 of the sweets are red, 4 are green and 2 are yellow.

(a) Charlie says,

The probability of picking the two yellow sweets at random from the bag can be found by working out $\frac{2}{10} \times \frac{2}{10}$.

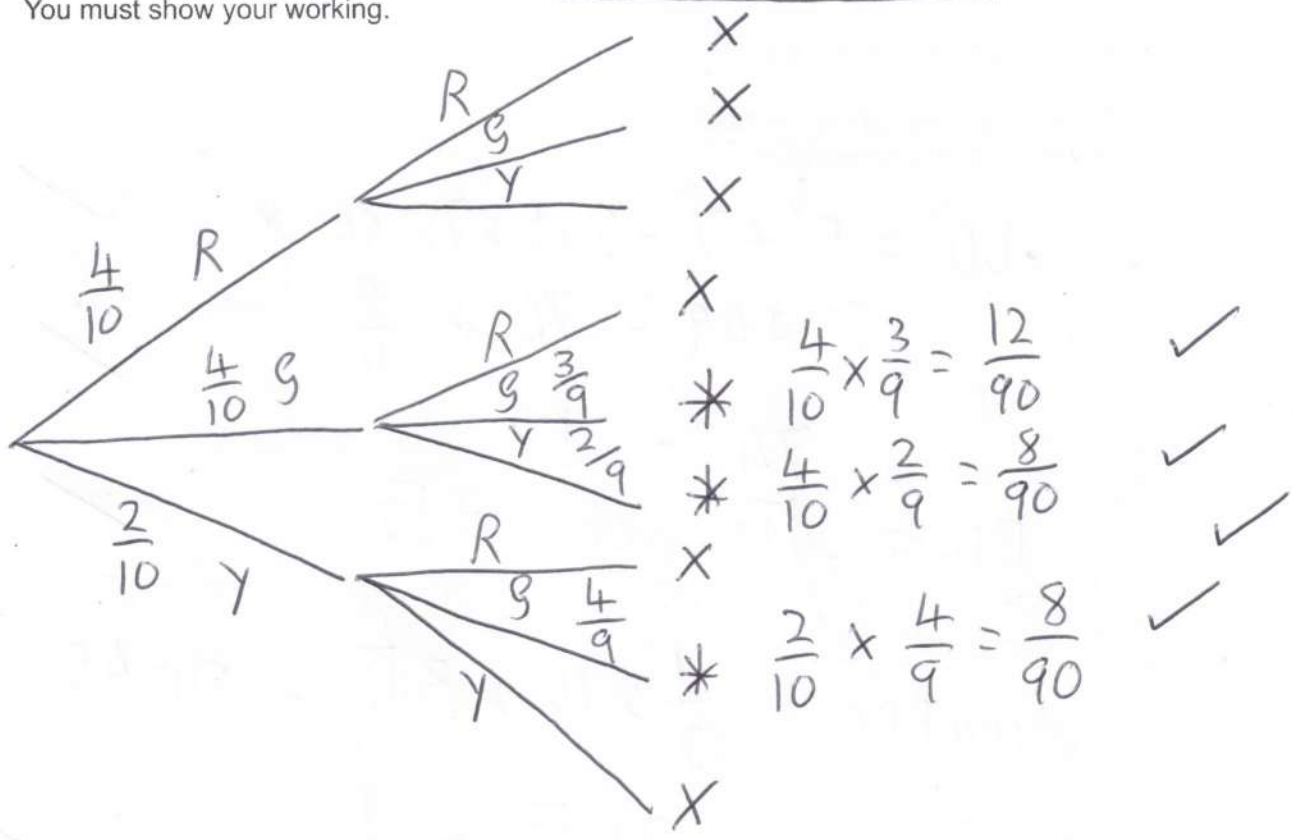
Write down the assumption that Charlie has made.

1st sweet is replaced ✓etc

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

(b) Mia takes one of the 10 sweets from the bag at random and eats it.
Ben then takes a sweet from the bag and eats it.

Find the probability that the bag now holds more red sweets than green sweets.
You must show your working.

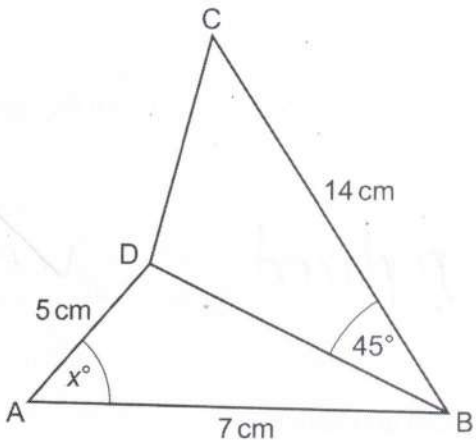


$= \frac{28}{90}$ ✓OE

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

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22 The diagram shows a quadrilateral ABCD.
DB is a diagonal of the quadrilateral.



Not to scale

AD = 5 cm, AB = 7 cm and BC = 14 cm.
Angle DAB = $x°$ and angle DBC = 45°.

$\cos x° = 0.8$ and $\sin x° = 0.6$.

Work out the area of triangle BDC.
You must show your working.

$BD^2 = 5^2 + 7^2 - 2 \times 5 \times 7 \times \cos x$ ✓

$= 25 + 49 - 70 \times \frac{8}{10}$ ✓

$= 74 - 56$

$BD = \sqrt{18}$ or $3\sqrt{2}$ ✓

Area BDC $= \frac{1}{2} \times 14 \times 3\sqrt{2} \times \sin 45$ ✓

$= 21\sqrt{2} \times \frac{1}{\sqrt{2}}$ ✓

$= 21$ ✓

..... cm^2 **[6]**

END OF QUESTION PAPER

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