OCR-F | Summer '25 | 1

1 **(a)** Write down an odd number between 10 and 20.

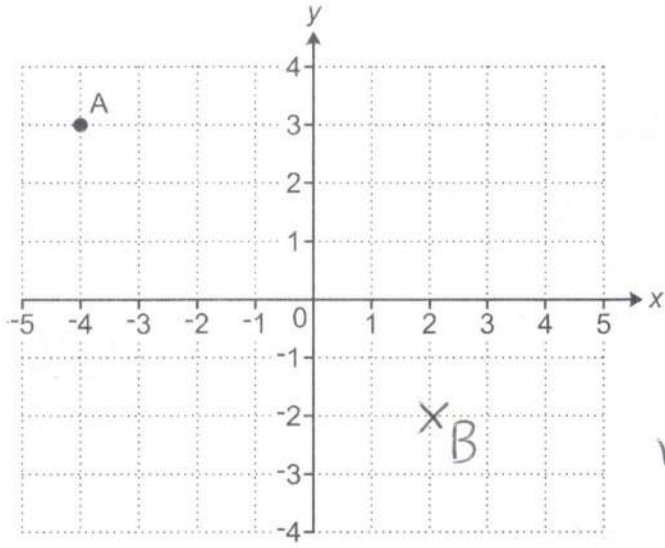
11, 13, 15, 17 or 19 ✓

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

(b) Write down **two** cube numbers less than 10.

(b) 1 ✓ and 8 ✓ **[2]**

2 Point A is shown on this grid.



✓

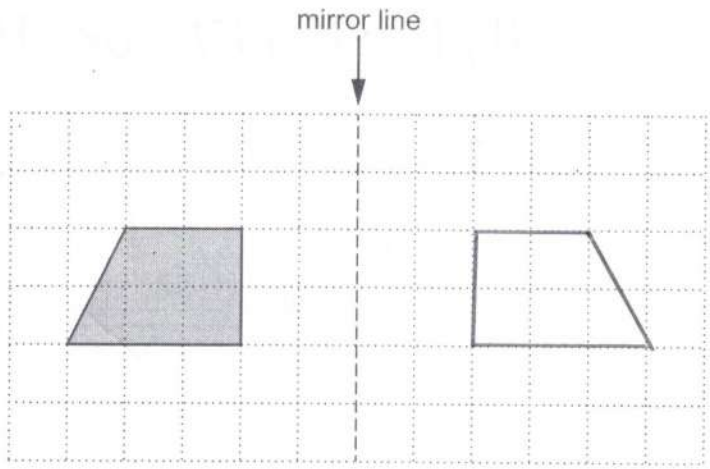
(a) Write down the coordinates of point A.

(a) (-4 , 3) ✓ **[1]**

(b) Plot point B on the grid at (2, ⁻2) **[1]**

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3 Reflect the trapezium in the mirror line.



[2]

4 Here is a list of numbers.

34 42 17 26 34 12 27

(a) Write down the mode.

(a) 34 ✓ ..... **[1]**

(b) A student says,

The median is 26 as it is the middle number.

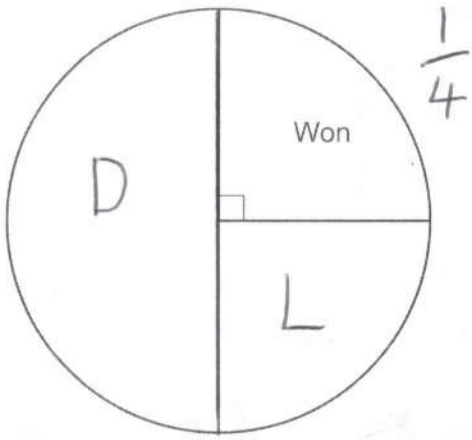
Explain why the student is **not** correct.

The list is not in order ✓

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

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5 The pie chart shows the proportion of games won by a sports team.



(a) The sports team won 9 games.

Work out how many games the sports team played.

9 x 4

36 ✓ ✓

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

(b) The ratio of the number of games drawn by the sports team to the number of games lost by the sports team was 2 : 1.

Complete the pie chart above. **[2]**

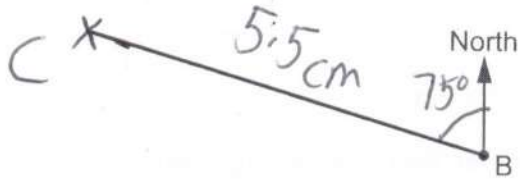
D : L
2 : 1
180 : 90 ✓

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6 The scale drawing shows the positions of ship A and ship B.

Scale: 1 cm represents 6 km





(±0.2)
(±2°)

(a) Find the actual distance between ship A and ship B.

7cm x6
(±0.2)

(a) 42 km **[2]**

(b) Ship C is 33 km from ship B on a bearing of 285°.

On the scale drawing, mark and label the position of ship C with a cross. **[2]**

33÷6 = 5.5cm

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7 **(a)** Simplify.

(i) $a \times a \times a \times a \times a \times a \times a$

(a)(i) a^7 ✓ ..... **[1]**

(ii) $4b \times 5b^2$

(ii) $20b^3$ ✓✓ ..... **[2]**

(b) Solve.

$6k - 3 = 177$

$6K = 180$ ✓

$K = \frac{180}{6}$

(b) $k =$ 30 ✓ ..... **[2]**

8 Write a number in each box to make each statement true.

(a) $\boxed{-27} + 12 = -15$ ✓ **[1]**

(b) $\frac{5}{\boxed{14}} \times 2 = \frac{5}{7}$ ✓ **[1]**

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9 **(a)** Here are all the factors of a number, A.

1 2 3 5 6 10 15 30

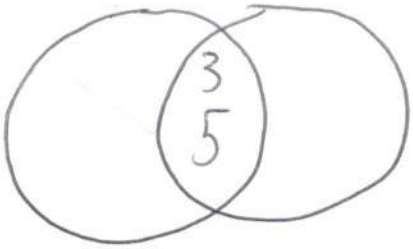
(i) Write down the value of A.

(a)(i) 30 ✓ ..... **[1]**

(ii) Here is a number, B, written as the product of its prime factors.

$B = 3 \times 5 \times 7$

Find the highest common factor (HCF) of A and B.



m ✓

(ii) 15 ✓ ..... **[2]**

(b) Find a number between 150 and 200 which has factors 7 and 8.

~~56~~, ~~112~~, 168, ~~224~~

m ✓

(b) 168 ✓ ..... **[2]**

10 Write the following numbers in order of size, smallest first.

$\frac{7}{19}$ 0.3685 $\frac{360}{1000}$ 36.8% = 0.368 ✓

$\frac{360}{1000}$ → 0.36

0.3684...

$\frac{360}{1000}$, 36.8% , $\frac{7}{19}$, 0.3685 ✓ ..... **[2]**

smallest

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11 Here is a list of three numbers.

8 15 10

A fourth number is added to the list.
The mean of the four numbers is 13.

Work out the fourth number.

$(13 \times 4) - (8 + 15 + 10)$ ✓✓

$52 - 33$

19 ✓

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

12 **(a)** Use the formula

$v = u + at$

to find the final velocity, when:

- the initial velocity is 8 m/s
- the acceleration is 6.5 m/s^2
- the time is 14 seconds.

$V = 8 + 6.5 \times 14$ ✓

$= 8 + 91$

99 ✓

(a) ..... m/s **[2]**

(b) Use the formula

$p = \frac{1}{2}qr$

to find the value of q when $p = 39$ and $r = 6$.

$39 = \frac{1}{2} \times 6 \times q$ ✓

$39 = 3q$

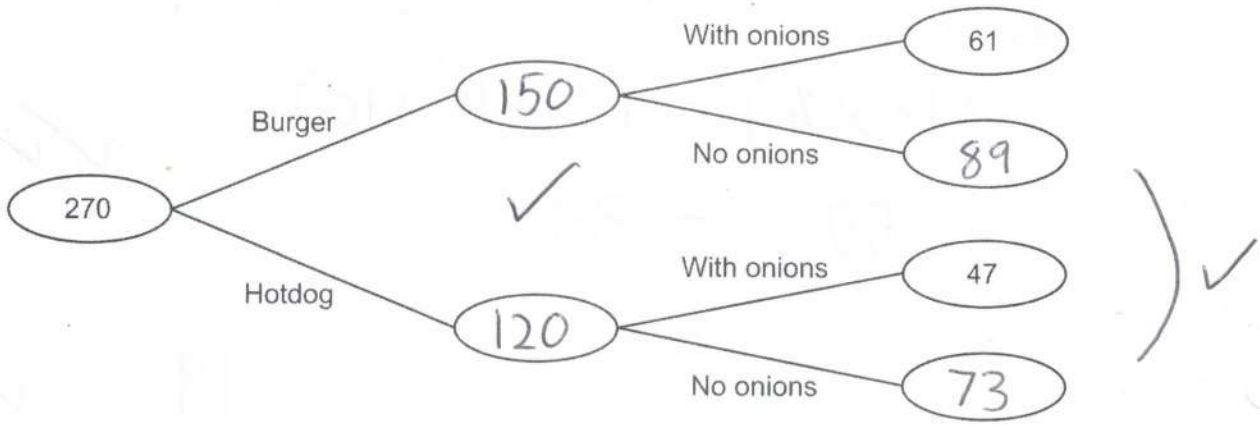
13 ✓

(b) $q =$ ..... **[2]**

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13 A food stall only sells burgers and hotdogs.
Each burger or hotdog is sold either with onions or with no onions.

The frequency tree below shows that one day a total of 270 burgers and hotdogs were sold.



(a) $\frac{5}{9}$ of the food sold on that day were burgers.

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

$\frac{5}{9} \times 270 = 150$ ✓✓

(b) Show that 40% of the food sold on that day were with onions. **[2]**

With = 61 + 47 = 108 ✓

$\% = \frac{108}{270} \times 100 = 40\%$

✓

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1500ml

14 A 1.5 litre carton of orange juice costs £1.30.
Gabi has £10 to spend on orange juice and buys the maximum possible number of cartons.

Each day Gabi drinks 350 millilitres of the orange juice she has just bought.

Work out how many days the orange juice will last Gabi.
You must show your working.

$10 \div 1.3 = 7.6_{111} = 7$ cartons ✓✓

✓ $\frac{7 \times 1500}{350} = 30$

✓

30 ✓

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

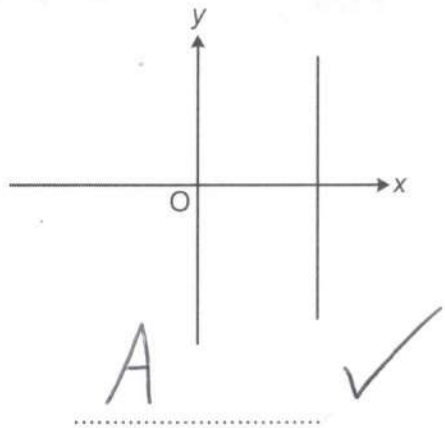
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15 For each graph below, select its possible equation from this list.

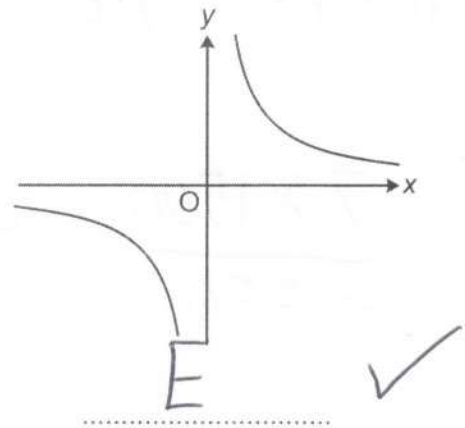
A $x = 4$ **B** $y = 4$ **C** $y = x$

D $y = x^2$ **E** $y = \frac{1}{x}$ **F** $y = x^3$

Write the letter of the equation beneath each graph.



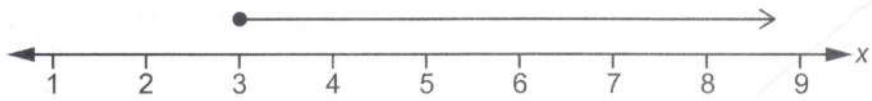
A ✓



E ✓

[2]

16 Write down the inequality shown on this number line.



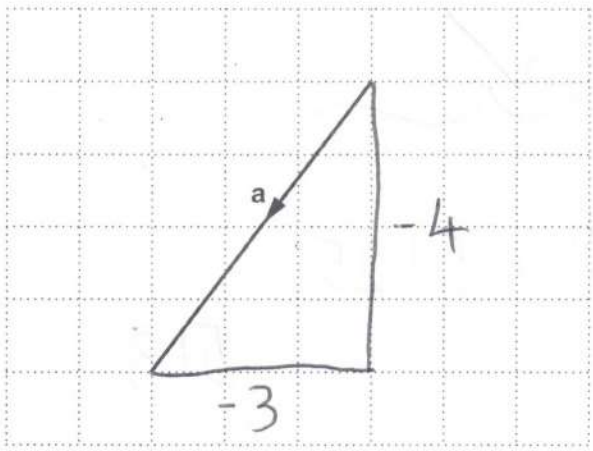
$x \geqslant 3$ ✓✓

[2]

(or $3 \leqslant x$)

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17 **(a)** Vector **a** is drawn on this grid.



Write vector **a** as a column vector.

(a) $\begin{pmatrix} -3 \\ -4 \end{pmatrix}$ ✓ ✓ ..... **[2]**

(b) Work out.

$\begin{pmatrix} 2 \\ 4 \end{pmatrix} + \begin{pmatrix} 3 \\ -1 \end{pmatrix}$

(b) $\begin{pmatrix} 5 \\ 3 \end{pmatrix}$ ✓ ..... **[1]**

(c) $\overrightarrow{PQ} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$

Work out $3\overrightarrow{PQ}$.

(c) $\begin{pmatrix} 6 \\ 12 \end{pmatrix}$ ✓ ..... **[1]**

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18 Calculate.

$$\frac{4.5^3}{1.8} + \frac{3.6}{2.4^2}$$

Give your answer correct to **3** significant figures.

$\frac{405}{8} + \frac{5}{8} = \frac{205}{4} = 51.25$

51.3

..... **[2]**

19 The ratio 40 grams to 1 kilogram can be written in the form 1 : n.

Find the value of n.

40 : 1000

÷40

1 :

n = 25 ..... **[2]**

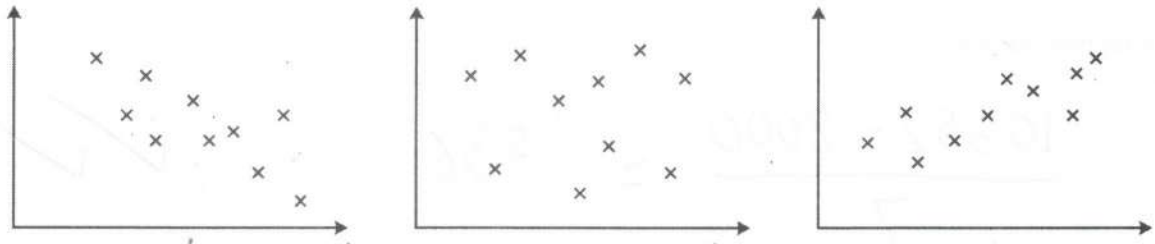
20 Complete each statement by writing the missing power in the box.

(a) $(4^3)^2 = 4^{\boxed{6}}$ **[1]**

(b) $\frac{1}{4} = 4^{\boxed{-1}}$ **[1]**

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21 **(a)** Describe the correlation shown in each of these scatter diagrams.



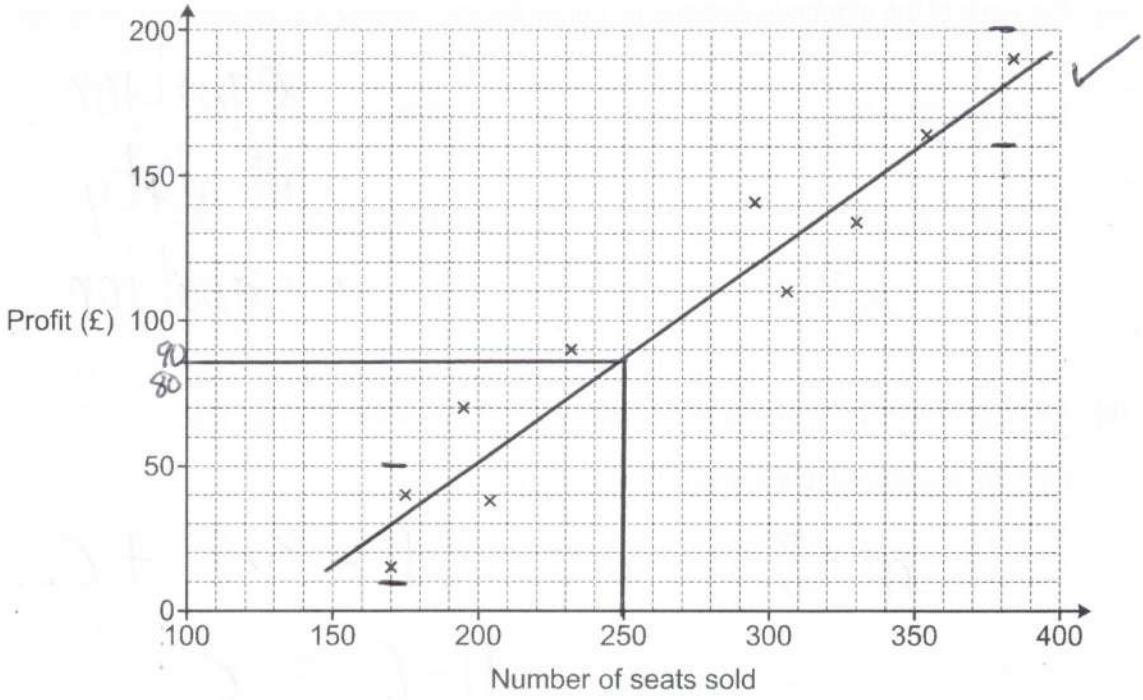
negative no correlation positive

etc

✓2 ✓3

[2]

(b) A theatre records the number of seats sold and the profit made for 10 performances. The scatter diagram shows these results.



By drawing a line of best fit, estimate the profit made when 250 seats are sold.

(b) £ 86 ✓ft **[2]**

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22 £8000 is invested at a rate of r% per year simple interest.
After 7 years the value of the investment is £10 352.

Find the value of r.

$\frac{10352 - 8000}{7} = 336$ ✓✓

$\frac{336}{8000} \times 100$ ✓ $= 4.2$ ✓

$r =$ ..... **[4]**

23 **(a)** For each of the algebraic statements below decide whether it is an equation or an identity.

$(x-1)(x-2) = 12$ is an equation

$(x-1)(x-2) = x^2 - 3x + 2$ is an identity ✓

$x^2 = 3x + 10$ is an equation

[1]

(b) A straight line is parallel to $y = 3x$ and passes through the point (2, 11).

Find the equation of the line in the form $y = mx + c$.

$m = 3$

$11 = 3 \times 2 + c$ ✓

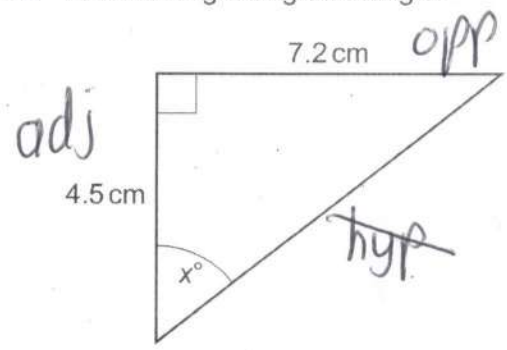
$11 - 6 = c$

$5 = c$ ✓

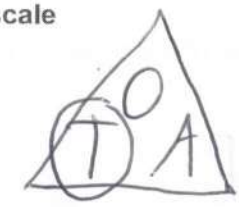
(b) $y = 3x + 5$ ✓ **[3]**

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24 Here is a right-angled triangle.



Not to scale



Use trigonometry to work out the value of x.

$x = \tan^{-1}\left(\frac{7.2}{4.5}\right) = 57.994...$

[57.9 → 58.03...]

$x =$ 58.0 **[3]**

25 A town council are going to do a survey on how people travel to work or school and for how long they travel.

One day their interviewer stands outside the town railway station and chooses 20 people at random to form their sample.

Make **three different** criticisms or suggestions for improving the council's method for selecting their sample.

1 Sample too small

2 Vary the time (day/date)

3 Vary location

or stratify by age/gender etc

[3]

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26 There are 483 counters in a bag.
The counters are blue, red or yellow.

The ratio of blue counters to red counters is 1 : 5.
The ratio of red counters to yellow counters is 4 : 9.

Work out the number of red counters in the bag.

B	R	Y
1	5	
4	20	45 ✓
	4	9

×4 ↓ ×5 ↑

$R = \frac{20}{69} \times 483$ ✓✓

140 ✓

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

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27 It takes 36 hours for 7 people to paint a fence.
Assume that all people paint at the same rate.

How long would it take 15 people to paint the same fence?
Give your answer in hours and minutes.

$36 \times 7 = 252$ hrs needed ✓

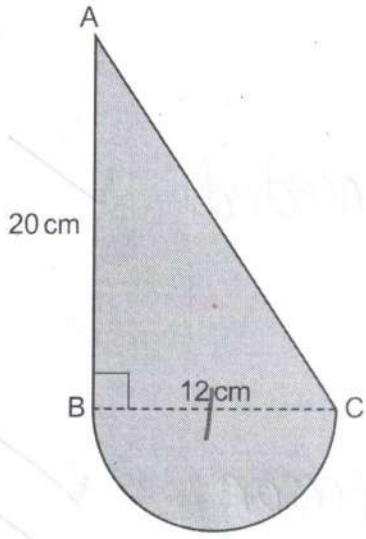
$\frac{252}{15} = 16{\cdot}8$ hrs p/person ✓✓

$0{\cdot}8 \times 60 = 48$ mins

16 hours 48 minutes ✓ **[4]**

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28 The shaded shape below is made from a right-angled triangle, ABC, and a semicircle. The length of AB is 20 cm and the diameter of the semicircle, BC, is of length 12 cm.



Not to scale

Calculate the perimeter of the shaded shape.
You must show your working.

$AC = \sqrt{20^2 + 12^2} = 4\sqrt{34}$ / 23.3...

arc BC $= \frac{1}{2} \times \pi \times 12 = 6\pi$

Perimeter $= 4\sqrt{34} + 6\pi + 20$

or

62.17 (ish)

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

Turn over for question 29

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29 **(a)** Write 0.0037 in standard form.

3.7×10^{-3} ✓

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

(b) A country consists of a south island and a north island.
The table below shows the population and area of each island in June 2023.

	Population	Area (km^2)
South island	1.2×10^6	1.5×10^5
North island	4.0×10^6	1.1×10^5

Work out the overall population density of the country in June 2023.

$\frac{\text{Total P}}{\text{Total A}} = \frac{5.2 \times 10^6}{2.6 \times 10^5}$ ✓ ✓

✓

20 ✓OE

(b) ..... people per km^2 **[4]**

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