Name: Solutions

GCSE Maths Practice Paper
CCEA Unit M4
Set B
Calculator Paper

Corbettmaths

Equipment

1. A black ink ball-point pen.
2. A pencil.
3. An eraser.
4. A ruler.
5. A pair of compasses.
6. A protractor.
7. A calculator

Guidance

1. Read each question carefully.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Information

1. Time: 2 hours
2. The maximum mark for this paper is 100.
3. The marks for questions are shown in brackets
4. You may use tracing paper.

Question	Mark	Available
1		3
2		4
3		5
4		4
5		4
6		6
7		4
8		2
9		4
10		4
11		4
12		4
13		4
14		3
15		4
16		3
17		4
18		5
19		4
20		3
21		4
22		4
23		5
24		5
25		4
Total		100

1. A website had 140,000 views in March.
It had 198,800 views in April.

Work out the percentage increase in views.

$\frac{58800}{140000} \times 100$

42 %

(3)

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2. Fiona leaves £1600 in the bank for three years.
It earns compound interest of 1.4% each year.

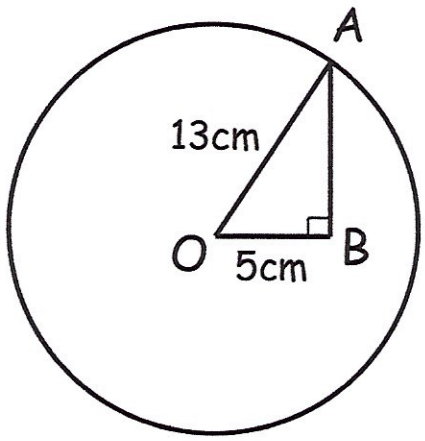
Calculate the total amount Fiona has in the bank at the end of the three years.

1600×1.014^3

£ 1668.14 or 1668.15

(4)

3. Shown below is a circle with centre O.



OA is the radius of the circle.

(a) Find the area of the circle.
Give your answer to 1 decimal place.

$\pi \times 13^2$

530.9 cm²

(2)

OAB is a right angled triangle.

(b) Find the perimeter of OAB

$AB^2 + 5^2 = 13^2$

$AB^2 = 169 - 25$

$AB^2 = 144$

$AB = 12$

$12 + 5 + 13 = 30$

30 cm

(3)

4. Solve

$$3w + 9 = 2(1 + 5w) - (8 - 3w)$$

$3w + 9 = 2 + 10w - 8 + 3w$

$15 = 10w$

$w = 1.5$

$w = 1.5$

(4)

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5. Dino rolls a fair six-sided dice 30 times. He records the results in a table, however misses two of the frequencies.

The mean result is 3.5

Number	Frequency	fx
1	6	6
2	3	6
3	5	15
4	x (8)	$4x$
5	$10 - x$ (2)	$50 - 5x$
6	6	31
	30	$113 - x$

Work out the two missing numbers.

$30 \times 3.5 = 105$

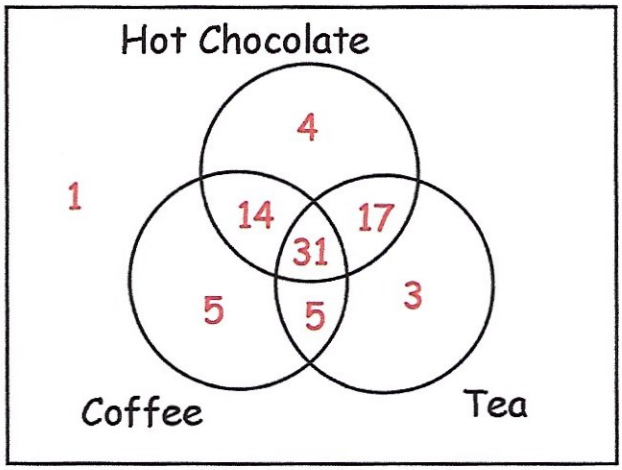
$113 - x = 105$

$8 = x$

$10 - x = 2$

(4)

6. Jennifer asked 80 people which drinks they like from tea, coffee and hot chocolate.



(a) How many people like all three drinks?

31

(1)

(b) How many people did not like any of the drinks?

1

(1)

(c) How many people like hot chocolate and coffee but not tea?

14

(2)

(d) Work out which drink is enjoyed by the most number of people?

Coffee $5 + 14 + 31 + 5 = 55$

Hot Chocolate $14 + 31 + 17 + 4 = 66$

Tea $5 + 3 + 31 + 17 = 56$

Hot Chocolate

(2)

7. Material A has a density of 5.8g/cm³.
Material B has a density of 4.1g/cm³.

d m v

377g of Material A and 1.64kg of Material B form Material C.

Work out the density of Material C.

(A) $v = \frac{m}{d}$ $\frac{377}{5.8} = 65\text{cm}^3$

(B) $v = \frac{m}{d}$ $\frac{1640}{4.1} = 400\text{cm}^3$

(C) $d = \frac{2017}{465}$

4.3376 g/cm³

(4)

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8. There are 1500 people at an ice hockey match.

The announcer says that this is exactly 30% more people than the previous match.

Explain why the announcer is wrong.

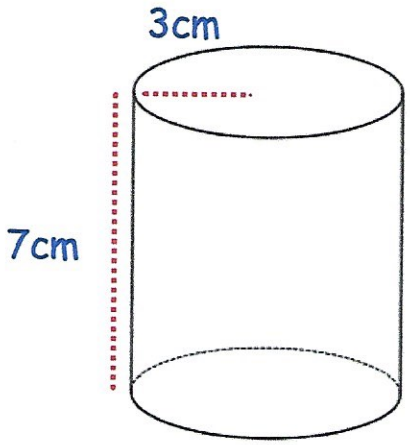
$y \times 1.3 = 1500$

$y = \frac{1500}{1.3} = 1153.846154$

As the announcer said "exactly", that would mean 1153.846154 people attended, which is not possible.

(2)

9. Timothy is filling cups with orange juice.
Each cup is a cylinder with radius 3cm and height 7cm.



Timothy has 2 litres of orange juice. $2000cm^3$

How many cups can be filled?

$\pi \times 3^2 \times 7 = 197.920...$

$2000 \div 197.920... = 10.105...$

10 cups

(4)

10. To make an omelette, Emily uses three eggs and two cheese slices.

A carton of 10 eggs £1.95
A pack of 8 cheese slices £1.30

Emily wants to buy enough eggs and cheese to make **at least** 70 omelettes.
She does not want any eggs or cheese slices left over.

Work out the least amount of money Emily can spend.

minimum number of eggs with no waste = 30
= 10 omelettes, 3 cartons

minimum number of cheese slices with no waste = 8
= 4 omelettes, 1 packet

∴ minimum number of omelettes = lowest multiple of 4 AND 10 over 70

∴ 80 omelettes.

need 240 eggs = 24 cartons $24 \times 1.95 = £46.80$

need 160 cheese slices = 20 packs $20 \times 1.30 = £26$

£ 72.80

(4)

11. Solve the equation

$$\frac{10x - 3}{3} + \frac{5x + 2}{4} = 5$$

$$\frac{40x - 12}{12} + \frac{15x + 6}{12} = 5$$

$$55x - 6 = 60$$

$$55x = 66$$

$$x = \frac{66}{55}$$

$x = \frac{6}{5}$ or 1·2

(4)

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12. Victor is y years old.
His brother Fred is four years old than Victor.

The product of their ages is 780.

(a) Set up an equation to represent this information.

$$y(y + 4) = 780$$

$$y^2 + 4y - 780 = 0$$

[redacted]

$y^2 + 4y - 780 = 0$

(2)

(b) Solve your equation from (a) to find Victor's age.

$$(y - 26)(y + 30) = 0$$

$y = 26$ or $y = -30$

$y = 26$

26

(2)

13. The lengths of time taken for 4 people to complete a puzzle are listed below.
Each time is given to one decimal place.

20.8 seconds	35.1 seconds
19.7 seconds	41.3 seconds

(a) Work out the greatest possible range

$41.35 - 19.65$

21.7 seconds

(2)

(b) Work out the smallest possible mean.

$20.75 + 35.05 + 19.65 + 41.25 = 116.7$

$116.7 \div 4$

29.175 seconds

(2)

14. (a) Factorise $x^2 - 25$

$(x-5)(x+5)$

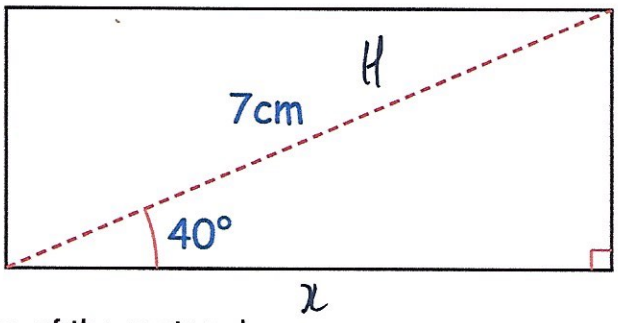
(1)

(b) Factorise $y^2 - 12y - 64$

$(y-16)(y+4)$

(2)

15.



H

O

4.4995...

Work out the area of the rectangle

5 O H

$\sin(40) \times 7 = 4.4995...$ cm

$4.4995...^2 + x^2 = 7^2$

$x^2 = 28.754...$

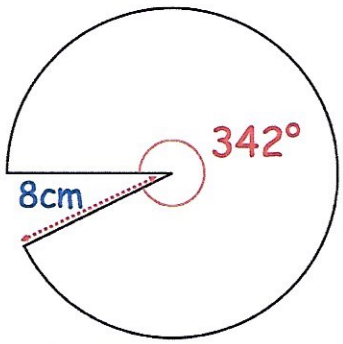
$x = 5.362311102$

$4.4995... \times 5.362... =$

24.13 cm²

(4)

16.



Find the area of the sector above.
Give your answer to 2 decimal places.

$\frac{342}{360} \times \pi \times 8^2$

191.01 .....cm²

(3)

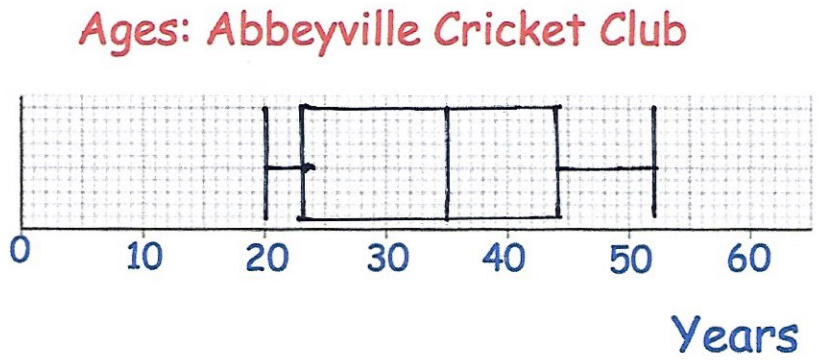
17. The table shows information about the ages of cricketers at Abbeyville Cricket Club.

Youngest	20
Median	35
Upper Quartile	44
Range	32
Interquartile Range	21

$20 + 32 = 52$ (highest)

$44 - 21 = 23$

(a) Draw a box plot for this information



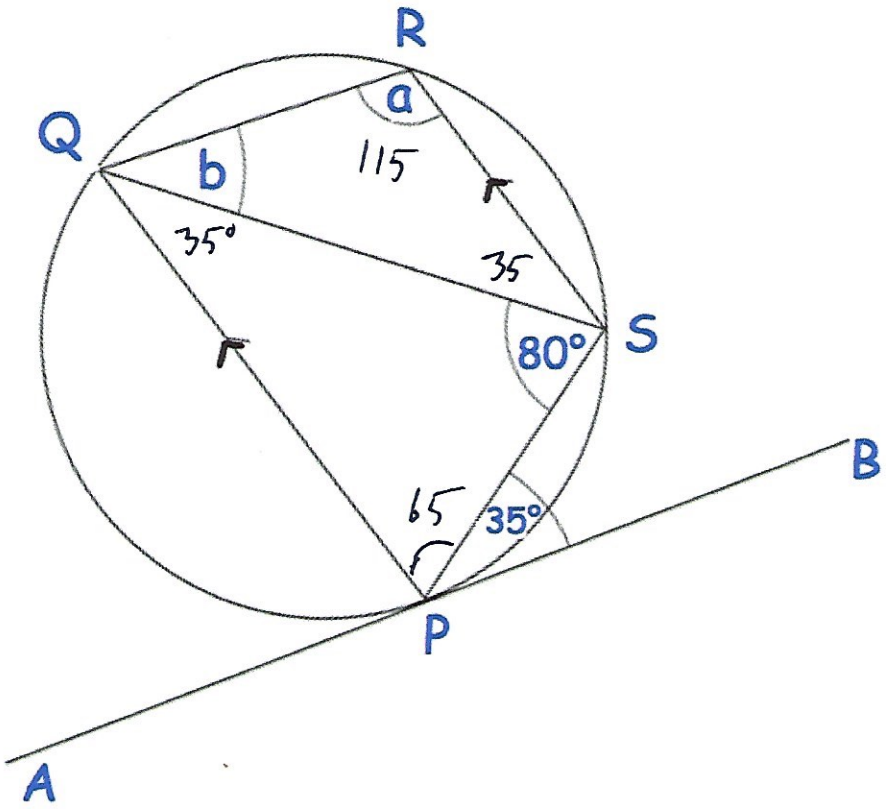
(3)

(b) What percentage of data in a distribution is greater than the lower quartile?

75 ....%

(1)

18. PQRS is a cyclic quadrilateral.
APB is a tangent to the circle at P.
PQ is parallel to SR.
Angle SPB = 35° and angle PSQ = 80°



(a) Work out the size of angle QRS.

35 + 80 = 115

180 - 115 = 65

180 - 65

115 .....°

(3)

(b) Work out the size of angle RQS.

115 + 35 = 150

180 - 150 = 30

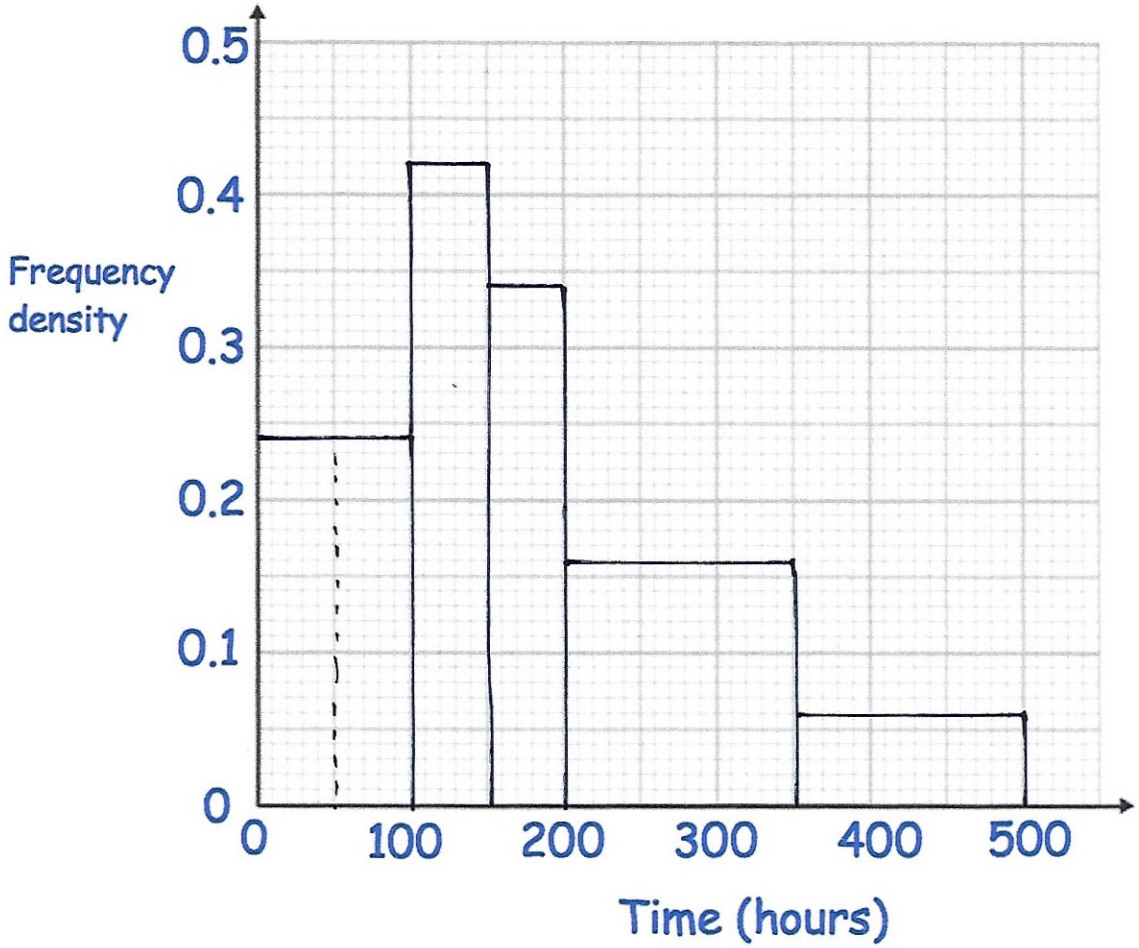
30 .....°

(2)

19. The table gives information about the hours Easyair pilots have spent flying, t hours.

Time (t hours)	Frequency		fd
$0 < t \leq 100$	24	$\div 100$	0.24
$100 < t \leq 150$	21	$\div 50$	0.42
$150 < t \leq 200$	17	$\div 50$	0.34
$200 < t \leq 350$	24	$\div 150$	0.16
$350 < t \leq 500$	9	$\div 150$	0.06

(a) Draw a histogram to show this information.



(3)

(b) Estimate the number of Easyair pilots who have flown under 50 hours.

12

(1)

20. A tennis club has 300 members.
A stratified sample of members is taken, by age group.

Some information is given in the table.

	Junior	18 - 40	41 - 60	Senior
Number of members	40	110	115	35
Number in sample	8	22	23	7

Complete the table.

(3)

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21. Solve $4x^2 - 9 = 2x^2 + 4x$

Give your answers to 1 decimal place.

$2x^2 - 4x - 9 = 0$

$a = 2$
$b = -4$
$c = -9$

$$x = \frac{4 \pm \sqrt{16 - 4 \times 2 \times (-9)}}{4}$$

$$x = \frac{4 \pm \sqrt{88}}{4}$$

$x = 3.3$ or $x = -1.3$

.....

(4)

22. Simplify

$$\frac{9x^2 - 1}{3x^2 - 13x + 4}$$

$$\frac{(3x - 1)(3x + 1)}{(3x - 1)(x - 4)}$$

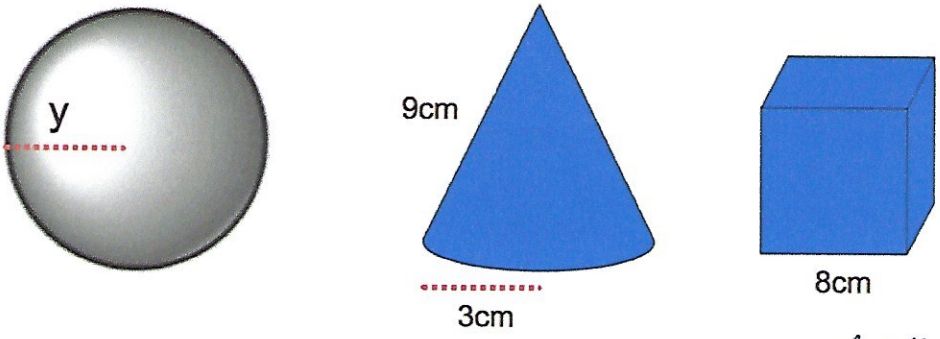
$$\frac{3x+1}{x-4}$$

.....

(4)

23. Shown below is a sphere, cone and cube.

The surface area of the sphere is equal to
the sum the surface areas of the cone and cube.



Find the radius of the sphere, y.

$8 \times 8 = 64$

$64 \times 6 = 384 \text{ cm}^2$

$\pi r^2 + \pi r l$

$\pi \times 3^2 + \pi \times 3 \times 9$

$= 113.0973... \text{ cm}^2$

SA of Cone e cube $= 497.097... \text{ cm}^2$

$\therefore$ SA of sphere $= 497.097...$

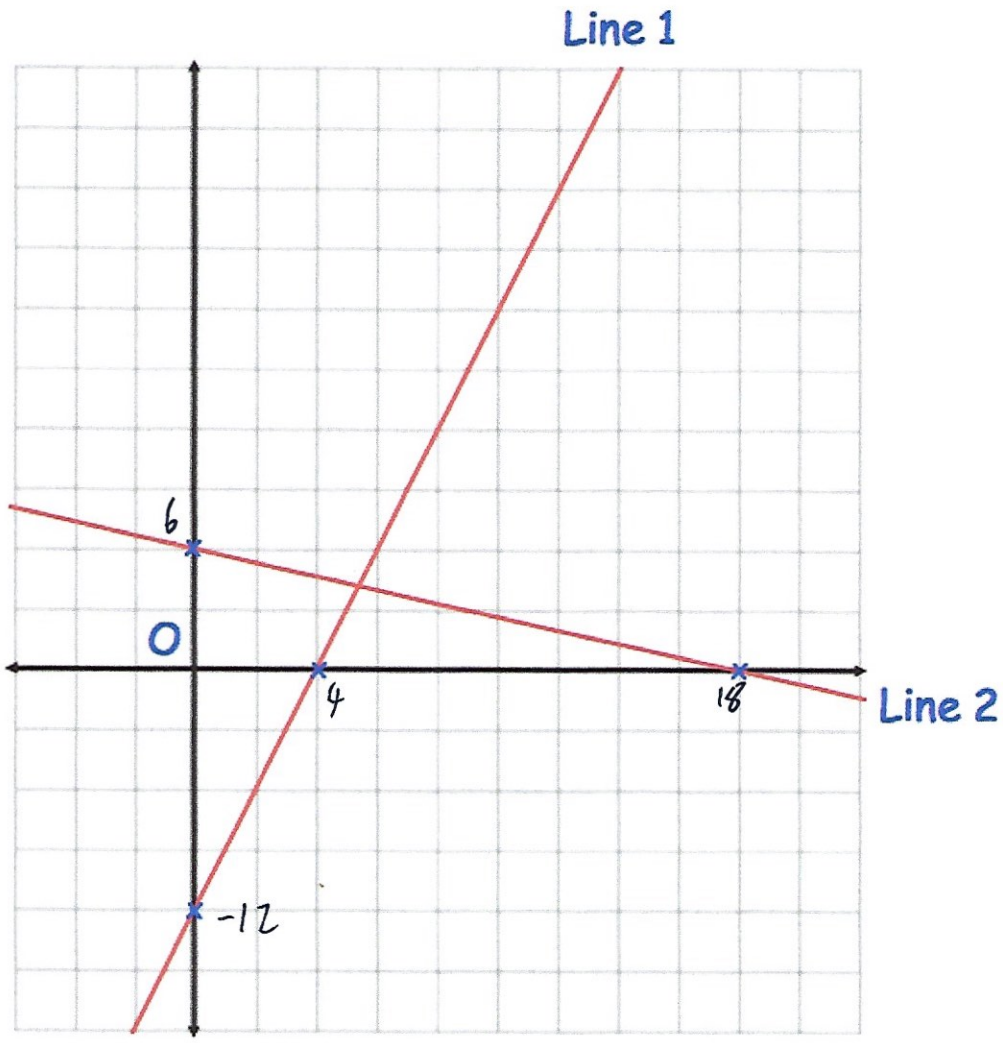
$4\pi r^2 = 497.097...$

$r^2 = 39.5577...$

6.289 cm

(5)

24. Shown are two straight lines drawn on the grid.



Line 1 has equation $y = 3x - 12$

(a) Find the equation of Line 2

$y = -\frac{1}{3}x + 6$

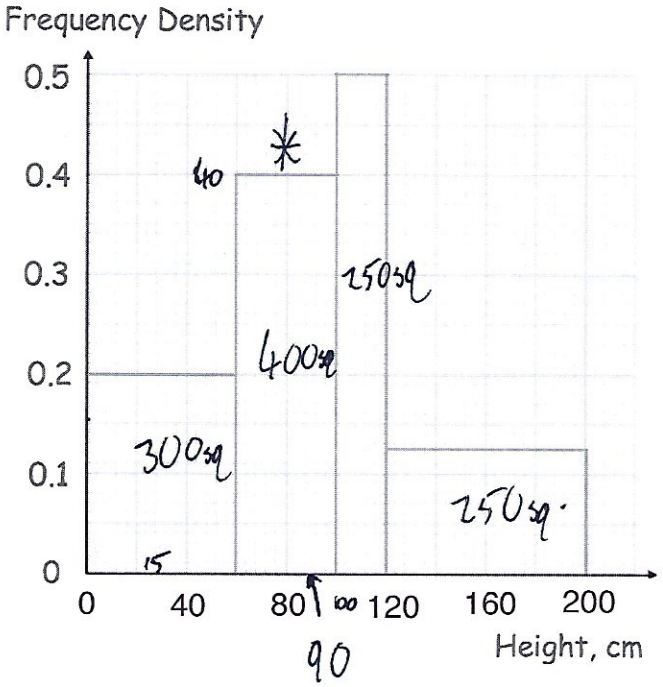
(4)

(b) Are the two lines perpendicular?
Explain your answer.

yes $-\frac{1}{3} \times 3 = -1$ $\therefore$ perpendicular.

(1)

25. The heights of some sunflowers are represented in a histogram.



Find an estimate of the median.

Method 1 (squares)

1200 squares ÷ 2 = 600sq.

600 - 300 = 300

300 ÷ 40 = 7.5

Method 2 (table/interpolation)

Height	frequency
0 - 60	12
* 60 - 100	16
100 - 120	10
120 - 200	10
	48

24th value

$60 + \frac{12}{16} \times 40 = 90$

90 .....cm **(4)**