

Name

Class

**Practice Paper 2**  
**June 2015**  
**Higher Tier**  
**Edexcel** Style

Calculator allowed

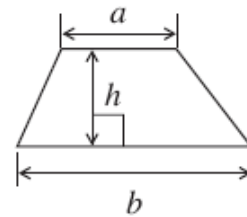
Time 1 Hour 45 minutes

Marks Available 100

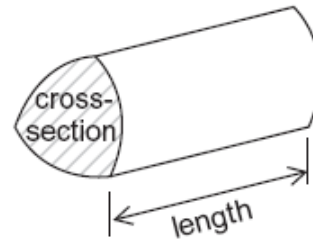
Commissioned by The PiXL Club Ltd.

## Formulae Sheet: Higher Tier

Area of trapezium =  $\frac{1}{2}(a+b)h$

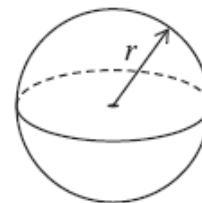


Volume of prism = area of cross-section  $\times$  length



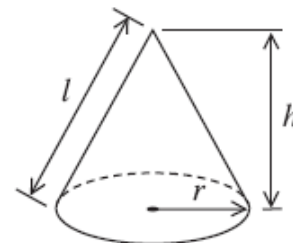
Volume of sphere =  $\frac{4}{3}\pi r^3$

Surface area of sphere =  $4\pi r^2$



Volume of cone =  $\frac{1}{3}\pi r^2 h$

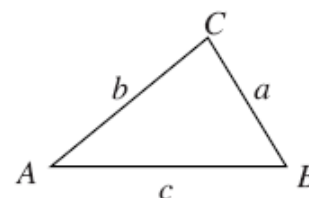
Curved surface area of cone =  $\pi r l$



In any triangle  $ABC$

Area of triangle =  $\frac{1}{2}ab \sin C$

Sine rule  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$



Cosine rule  $a^2 = b^2 + c^2 - 2bc \cos A$

### The Quadratic Equation

The solutions of  $ax^2 + bx + c = 0$ , where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Question 1**

Here is a list of ingredients to make melon sorbet for 6 people.

<b>Melon Sorbet</b>	
for 6 people	
800 g	melon
4	egg whites
$\frac{1}{2}$	lime
100 g	caster sugar

Terry makes melon sorbet for 18 people.

(a) Work out how much caster sugar he uses.

.....  
(2)

Hedley makes melon sorbet.  
He uses 2 limes.

(b) Work out how many people he makes melon sorbet for.

.....  
(2)

**(Total 4 marks)**

**Question 2**

In August 2008, Eddie hired a car in Italy.

The cost of hiring the car was £620

The exchange rate was £1 = €1.25

- (a) Work out the cost of hiring the car in euros (€).

€ .....  
(2)

Eddie bought some perfume in Italy.

The cost of the perfume in Italy was €50

The cost of the same perfume in London was £42

The exchange rate was still £1 = €1.25

- (b) Work out the difference between the cost of the perfume in Italy and the cost of the perfume in London.  
Give your answer in pounds (£).

£ .....  
(3)

**(Total 5 marks)**

**Question 3**

Use your calculator to work out

$$\frac{13.7 + 5.86}{2.54 \times 3.17}$$

Write down all the figures on your calculator display.  
You must give your answer as a decimal.

.....  
**(Total 2 marks)**

**Question 4**

The  $n$ th term of a number sequence is  $n^2 + 1$

Write down the first three terms of the sequence.

.....  
**(Total 2 marks)**

**Question 5**

A circle has a diameter of 12 cm.

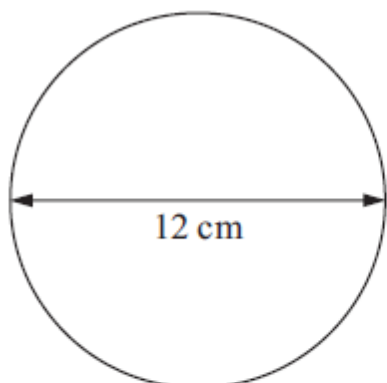


Diagram **NOT**  
accurately drawn

Work out the circumference of the circle.  
Give your answer correct to 3 significant figures.

..... cm

**(Total 2 marks)**

**Question 6**

The diagram shows the position of two boats, *P* and *Q*.



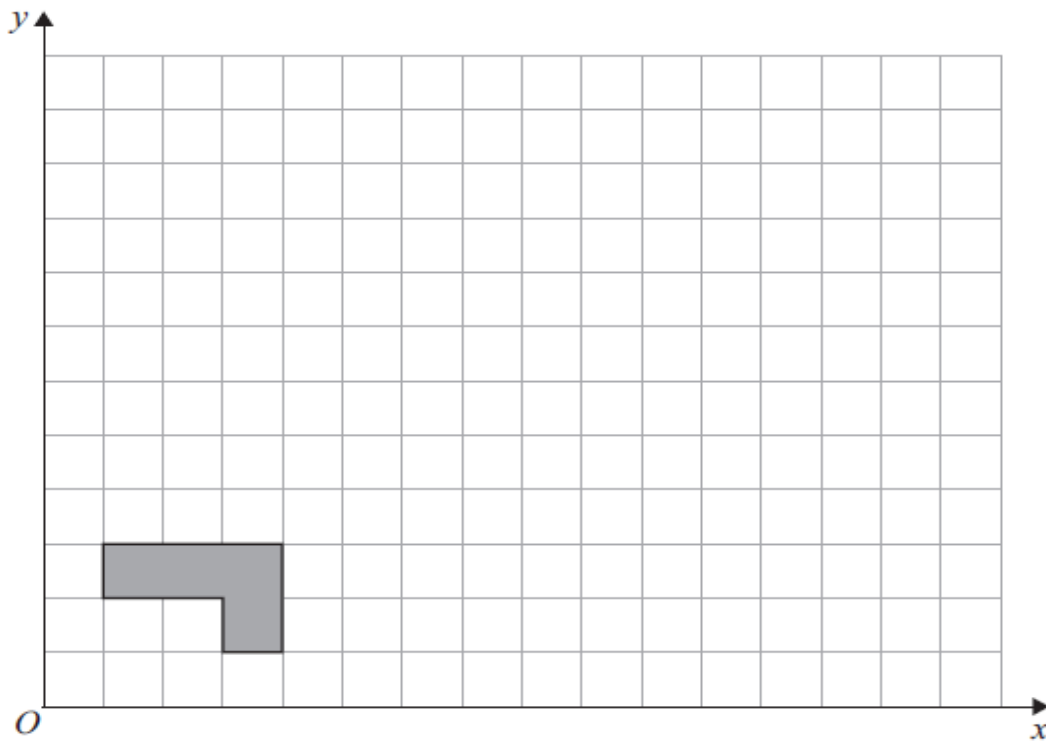
The bearing of a boat *R* from boat *P* is  $060^\circ$

The bearing of boat *R* from boat *Q* is  $310^\circ$

In the space above, draw an accurate diagram to show the position of boat *R*.  
Mark the position of boat *R* with a cross (×). Label it *R*.

**(Total 3 marks)**

**Question 7**



On the grid, enlarge the shaded shape by a scale factor of 3, centre  $O$ .

**(3)**

**(Total 3 marks)**



**Question 8**

The equation

$$x^3 + 20x = 71$$

has a solution between 2 and 3

Use a trial and improvement method to find this solution.

Give your answer correct to one decimal place.

You must show **ALL** your working.

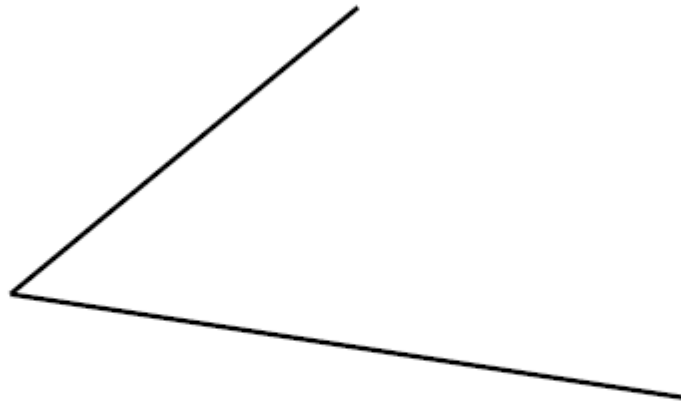
$x = \dots\dots\dots$

**(Total 4 marks)**

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**Question 9**

- Use ruler and compasses to **construct** the bisector of this angle.  
You must show all your construction lines.



**(Total 2 marks)**

---

**Question 10**

Sethina recorded the times, in minutes, taken to repair 80 car tyres.  
Information about these times is shown in the table.

Time ( $t$ minutes)	Frequency		
$0 < t \leq 6$	15		
$6 < t \leq 12$	25		
$12 < t \leq 18$	20		
$18 < t \leq 24$	12		
$24 < t \leq 30$	8		

Calculate an estimate for the mean time taken to repair each car tyre.

..... minutes

**(Total 4 marks)**

**Question 11**

(a)

Expand and simplify  $2(x - 4) + 3(x + 2)$

.....  
(2)

(b)

Expand and simplify  $(x + 4)(x - 3)$

.....  
(2)

**(Total 4 marks)**

**Question 12**

(a) Write 15 500 in standard form.

.....  
(1)

(b) Write  $2.48 \times 10^{-3}$  as an ordinary number.

.....  
(1)

(c) Work out the value of

$$24\,500 \div (1.25 \times 10^{-4})$$

Give your answer in standard form.

.....  
(2)

**(Total 4 marks)**

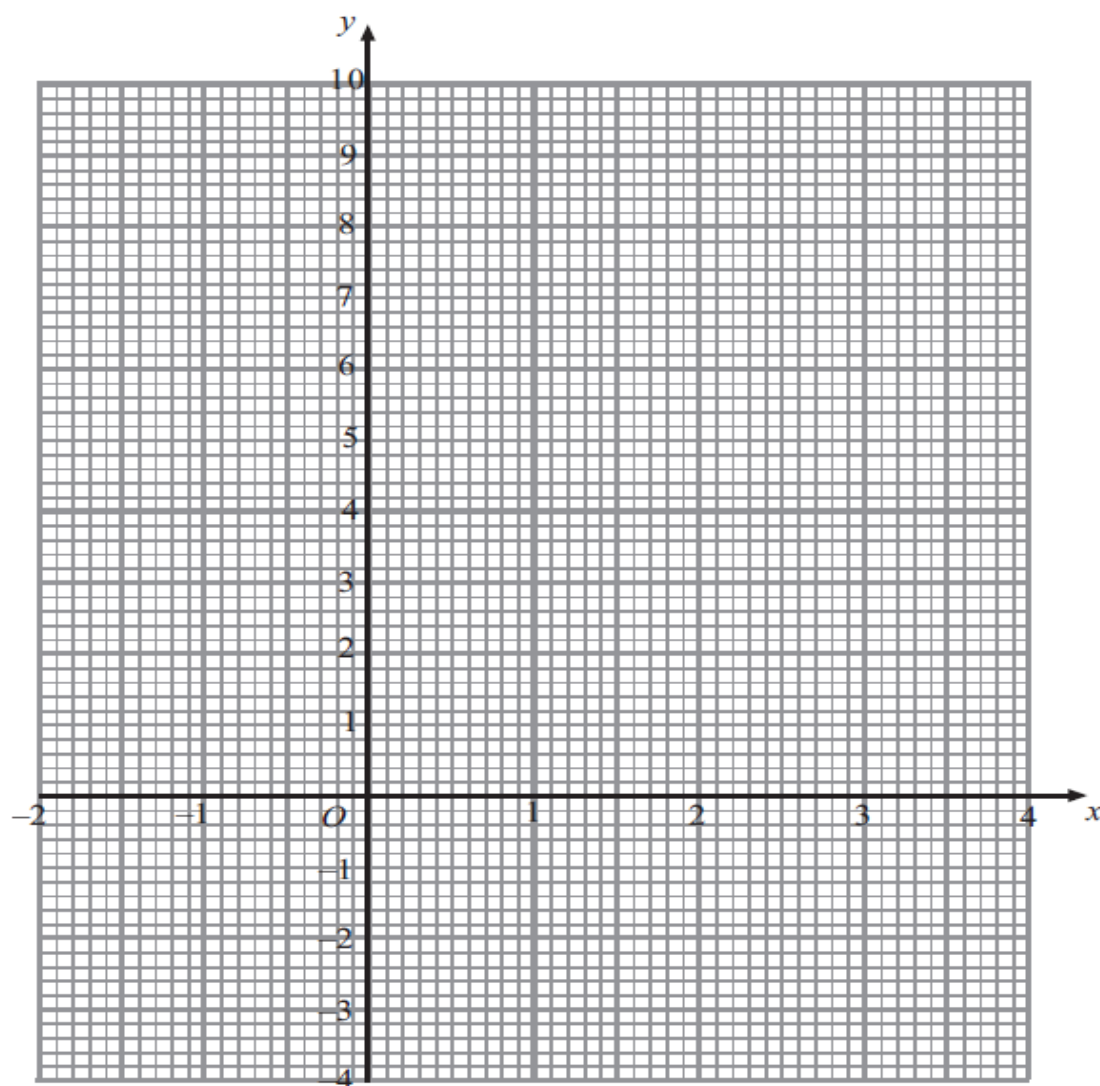
**Question 13**

(a) Complete the table of values for  $y = x^2 - 3x - 1$

$x$	-2	-1	0	1	2	3	4
$y$		3	-1	-3		-1	

(2)

(b) On the grid, draw the graph of  $y = x^2 - 3x - 1$  for values of  $x$  from -2 to 4



(2)

**(Total 4 marks)**

**Question 14**

Toby invested £4500 for 2 years in a savings account.  
He was paid 4% per annum compound interest.

(a) How much did Toby have in his savings account after 2 years?

£ .....  
(3)

Jaspir invested £2400 for  $n$  years in a savings account.  
He was paid 7.5% per annum compound interest.

At the end of the  $n$  years he had £3445.51 in the savings account.

(b) Work out the value of  $n$ .

.....  
(2)

**(Total 5 marks)**

**Question 15**

Solve the simultaneous equations.

$$2x + 3y = 0$$

$$x - 3y = 9$$

$x = \dots\dots\dots$  ,  $y = \dots\dots\dots$

**(Total 3 marks)**



**Question 16**

Solve  $9x^2 - 17x - 85 = 0$

Give your solutions correct to 3 significant figures.

$x = \dots\dots\dots$  or  $x = \dots\dots\dots$

**(Total 3 marks)**

**Question 17**

Here is a right-angled triangle.

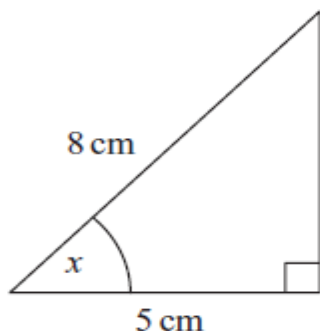


Diagram NOT accurately drawn

- (a) Calculate the size of the angle marked  $x$ .  
Give your answer correct to 1 decimal place.

$$x = \dots\dots\dots^\circ$$

**(3)**

Here is another right-angled triangle.

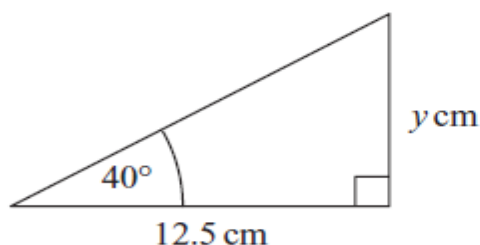


Diagram NOT accurately drawn

- (b) Calculate the value of  $y$ .  
Give your answer correct to 1 decimal place.

$$y = \dots\dots\dots$$

**(3)**

**(Total 6 marks)**

**Question 18**

In a sale, normal prices are reduced by 12%.  
The sale price of a digital camera is £132.88

Work out the normal price of the digital camera.

£ .....

**(Total 3 marks)**

**Question 19**

258 students each study one of three languages.  
The table shows information about these students.

	Language studied		
	German	French	Spanish
Male	45	52	26
Female	25	48	62

A sample, stratified by the language studied and by gender, of 50 of the 258 students is taken.

(a) Work out the number of male students studying Spanish in the sample.

.....  
(2)

(b) Work out the number of female students in the sample.

.....  
(2)

**(Total 4 marks)**

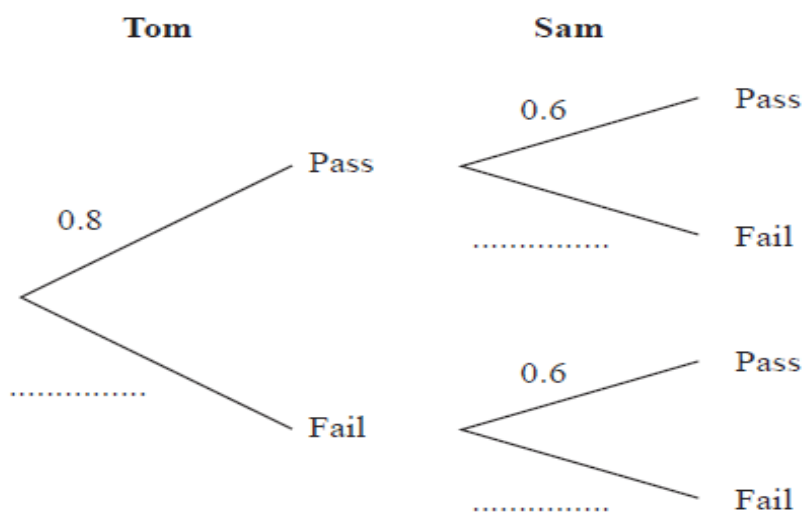
**Question 20**

Tom and Sam each take a driving test.

The probability that Tom will pass the driving test is 0.8

The probability that Sam will pass the driving test is 0.6

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that both Tom and Sam will pass the driving test.

.....  
(2)

**(Total 4 marks)**

**Question 21**

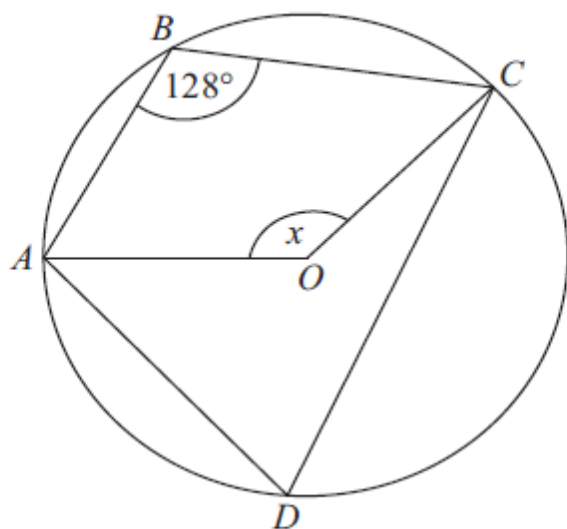


Diagram **NOT**  
accurately drawn

The diagram shows a circle, centre  $O$ .  
 $A$ ,  $B$ ,  $C$  and  $D$  are points on the circumference of the circle.

Angle  $ABC = 128^\circ$ .

Work out the size of the angle marked  $x$ .

.....  
o

**(Total 2 marks)**

**Question 22**

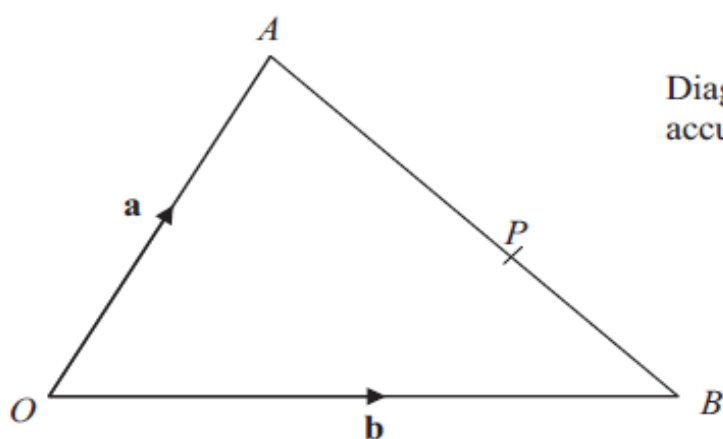


Diagram **NOT**  
accurately drawn

$OAB$  is a triangle.

$$\overrightarrow{OA} = \mathbf{a}$$

$$\overrightarrow{OB} = \mathbf{b}$$

(a) Find the vector  $\overrightarrow{AB}$  in terms of  $\mathbf{a}$  and  $\mathbf{b}$ .

$$\overrightarrow{AB} = \dots\dots\dots (1)$$

$P$  is the point on  $AB$  such that  $AP : PB = 3 : 2$

(b) Show that  $\overrightarrow{OP} = \frac{1}{5}(2\mathbf{a} + 3\mathbf{b})$

(3)

(Total 4 marks)

**Question 23**

$y$  is directly proportional to  $x$ .

When  $x = 500$ ,  $y = 10$

(a) Find a formula for  $y$  in terms of  $x$ .

$$y = \dots\dots\dots$$

**(3)**

(b) Calculate the value of  $y$  when  $x = 350$

$$y = \dots\dots\dots$$

**(1)**

**(Total 4 marks)**



**Question 24**

Solve  $\frac{4}{x+3} + \frac{3}{2x-1} = 1$

.....  
**(Total 5 marks)**

**Question 25**

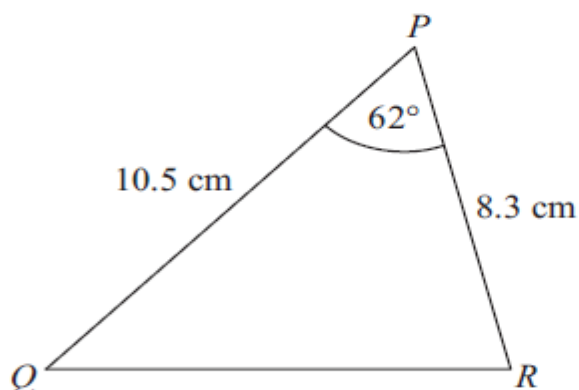


Diagram **NOT**  
accurately drawn

In triangle  $PQR$ ,

$PQ = 10.5$  cm,

$PR = 8.3$  cm.

angle  $QPR = 62^\circ$ .

- (a) Calculate the area of triangle  $PQR$ .  
Give your answer correct to 3 significant figures.

.....cm<sup>2</sup>  
(2)

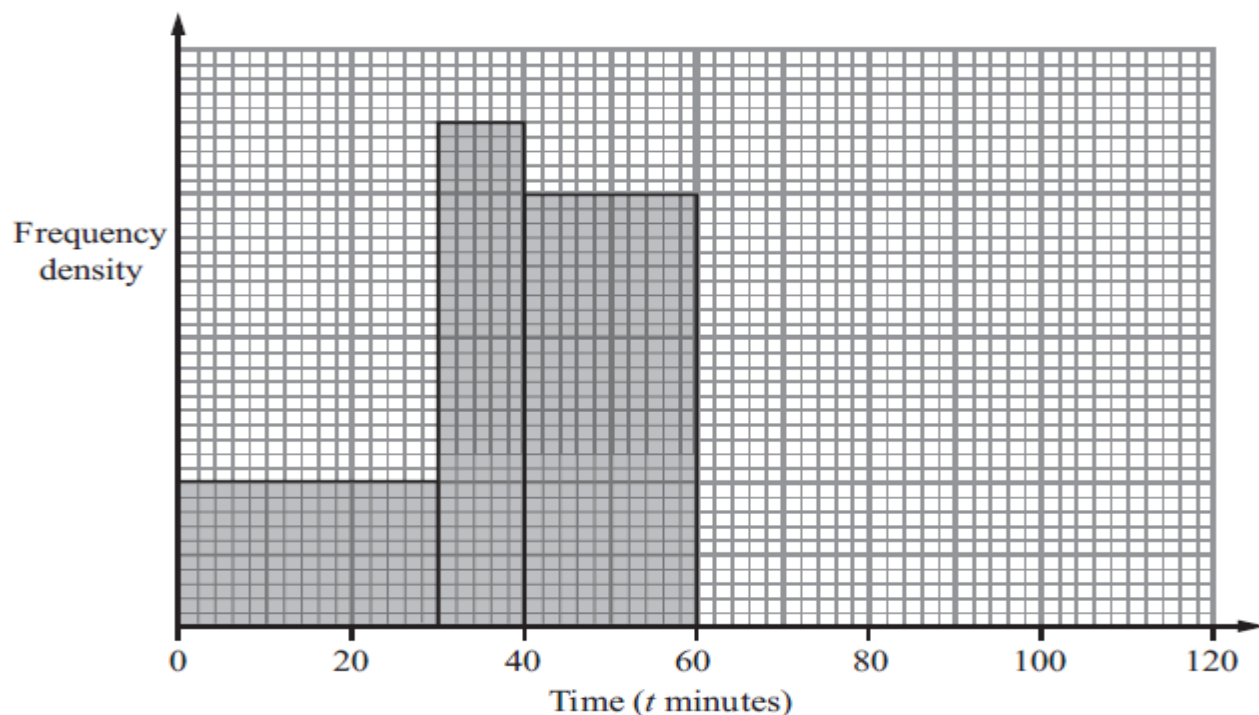
- (b) Calculate the length of  $QR$ .  
Give your answer correct to 3 significant figures.

..... cm  
(3)

**(Total 5 marks)**

**Question 26**

The incomplete histogram and table give some information about the times, in minutes, that cars were parked in a car park.



(a) Use the information in the histogram to complete the frequency table.

Time ( $t$ minutes)	Frequency
$0 < t \leq 30$	
$30 < t \leq 40$	35
$40 < t \leq 60$	
$60 < t \leq 80$	30
$80 < t \leq 120$	20

(2)

(b) Use the information in the table to complete the histogram.

(2)

**(Total 4 marks)**

**Question 27**

$$v = \sqrt{\frac{a}{b}}$$

$a = 6.43$  correct to 2 decimal places.

$b = 5.514$  correct to 3 decimal places.

By considering bounds, work out the value of  $v$  to a suitable degree of accuracy.

You must show all your working and give a reason for your final answer.

$v = \dots\dots\dots$

**(Total 5 marks)**