Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						1	3	8	0	/	4	H	Signature	

Paper Reference(s)

1380/4H

Examiner's use only

Team Leader's use only

Edexcel GCSE

Mathematics (Linear) – 1380

Paper 4 (Calculator)

Higher Tier

Friday 11 June 2010 – Morning

Time: 1 hour 45 minutes

Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Items included with question papers

Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
You must NOT write on the formulae page.
Anything you write on the formulae page will gain NO credit.
If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 27 questions in this question paper. The total mark for this paper is 100.
There are 24 pages in this question paper. Any blank pages are indicated.
Calculators may be used.
If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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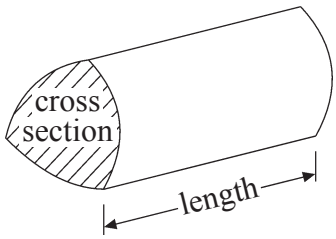
GCSE Mathematics (Linear) 1380

Formulae: Higher Tier

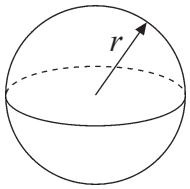
You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of a prism = area of cross section × length



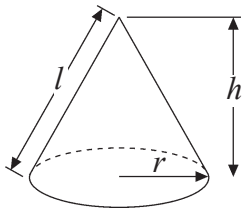
Volume of sphere $= \frac{4}{3}\pi r^3$

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

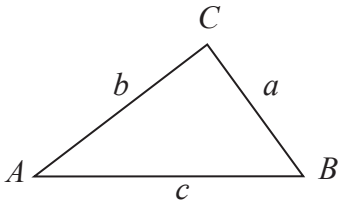


Volume of cone $= \frac{1}{3}\pi r^2 h$

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



In any triangle ABC



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

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

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

The Quadratic Equation

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

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

Leave blank

Answer ALL TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1. Here is a list of ingredients for making a trifle for 4 people.

Trifle for 4 people	
120 g	of raspberry jelly
8	sponge fingers
420 m*l*	of custard
180 g	of tinned fruit

Rob is going to make a trifle for 6 people.
Work out the amount of each ingredient he needs.

6 people is half again as much as 4 so multiply all quantities by 1.5

120 × 1.5 = 180
8 × 1.5 = 12
420 × 1.5 = 630
180 × 1.5 = 270

180 ..... g of raspberry jelly

12 ..... sponge fingers

630 ..... m*l* of custard

270 ..... g of tinned fruit

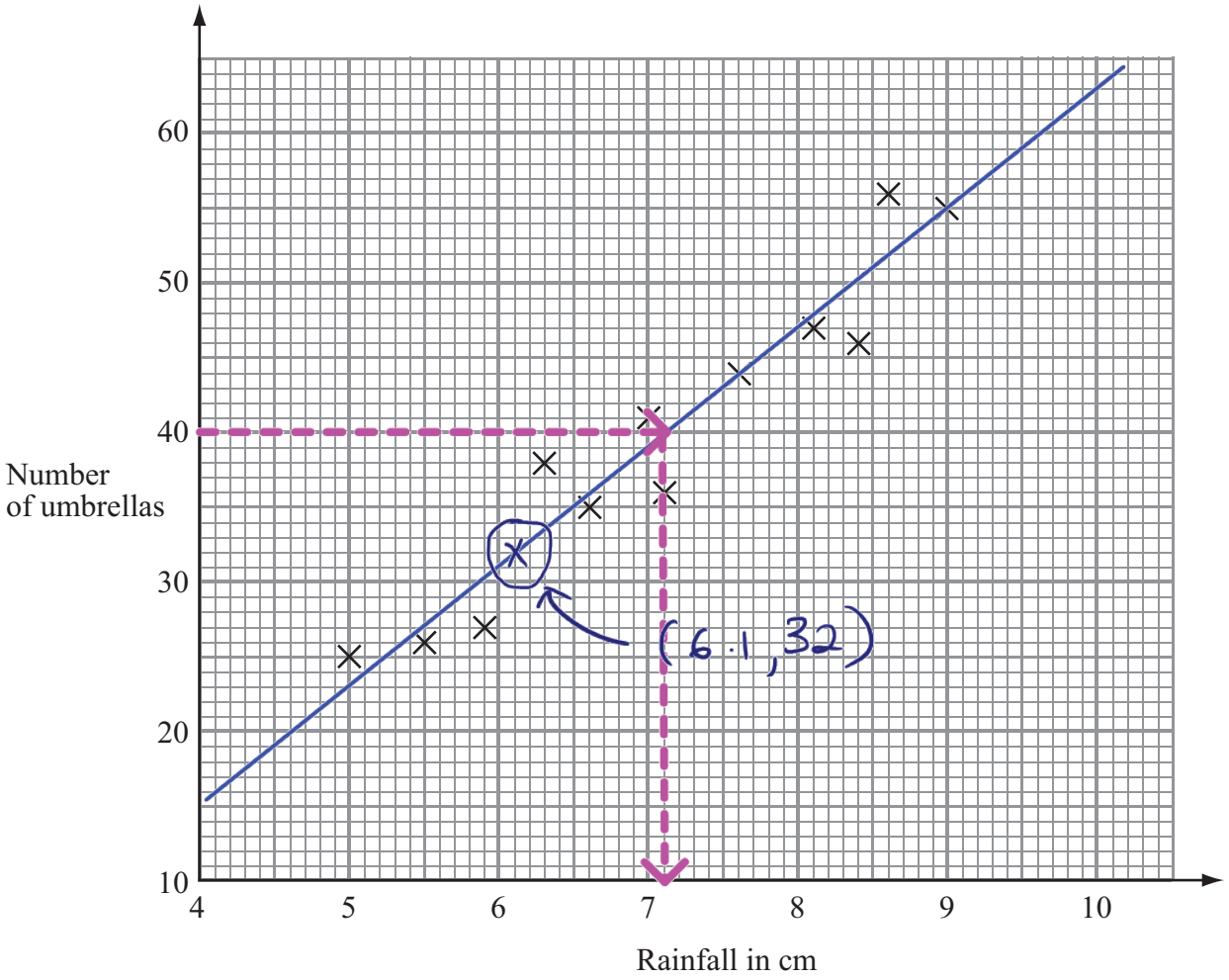
Q1

(Total 3 marks)

Leave blank

2. Mr Wither sells umbrellas.

The scatter graph shows some information about the number of umbrellas he sold and the rainfall, in cm, each month last year.



In January of this year, the rainfall was 6.1 cm.
During January, Mr Wither sold 32 umbrellas.

(a) Show this information on the scatter graph.

(1)

(b) What type of correlation does this scatter graph show?

Positive (sales increase as rainfall increases)

(1)

In February of this year, Mr Wither sold 40 umbrellas.

(c) Estimate the rainfall for February.

(always add a LINE OF BEST FIT to a scattergraph)

7.1 cm

(2)

(Total 4 marks)

Q2

Leave blank

3. 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 (€).

Price in euros

£620 × €1.25 = €775

€ 775

(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 (£).

Price in London = £42

Price in Milan (£) = €50 ÷ 1.25
= £40

The difference in price is £2.

£ 2

(3)

(Total 5 marks)

Q3

Leave blank

4. (a) Complete the table of values for $y = 3x + 4$

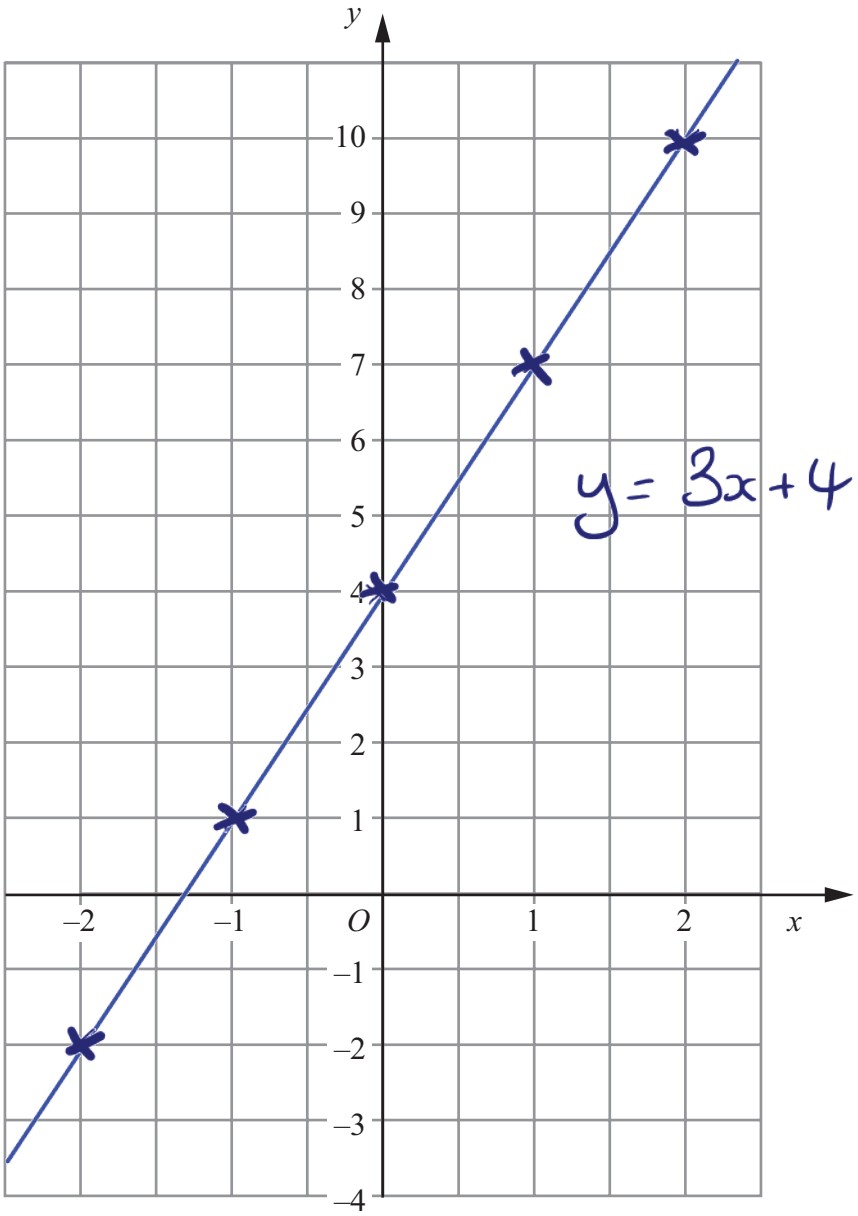
x	–2	–1	0	1	2
y	–2	1	4	7	10

(2)

3x -6 -3 0 3 6

3x+4 -2 1 4 7 10

(b) On the grid, draw the graph of $y = 3x + 4$



(2)

Q4

(Total 4 marks)

Leave blank

5.

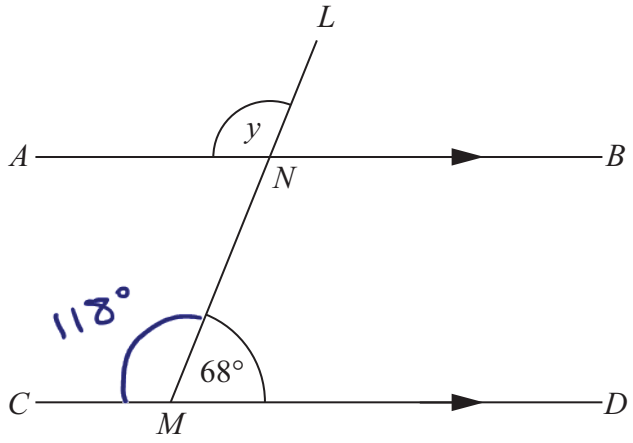


Diagram **NOT** accurately drawn

180°
− 62°
118°

ANB is parallel to *CMD*.
LNM is a straight line.
Angle *LMD* = 68°

(i) Work out the size of the angle marked *y*.

118° .....

(ii) Give reasons for your answer.

Angles on a straight line add to 180°

y is the corresponding angle to 118°

(Total 3 marks)

Q5

6. (a) Use your calculator to work out $\frac{2}{1.5+2.45}$

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

0.506329113924

(2)

(b) Write your answer to part (a) correct to 2 decimal places.

0.506329113924 = 0.51 (2dp) 0.51 (2dp)

(1)

Q6

(Total 3 marks)

Leave blank

7. A circle has a diameter of 12 cm.

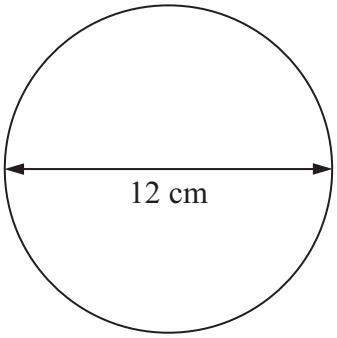


Diagram **NOT** accurately drawn

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

Circumference
$= \pi d$
$= 12\pi$

$12\pi = 37.699\,111\,84$
$= 37.7$ cm (3sf)

37.7 cm

Q7

(Total 2 marks)

8. The equation

$$x^3 + 10x = 25$$

has a solution between 1 and 2

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	x^3	$10x$	$x^3 + 10x$	too big / too small
1	1	10	11	too small
2	8	20	28	too big
1.5	3.375	15	18.375	too small
1.7	4.913	17	21.913	too small
1.9	6.859	19	25.859	too big
1.8	5.832	18	23.832	too small
1.85	6.331625	18.5	24.831625	too small

1.8 — 1.85 — 1.9

23.832 — 24.831625 — 25 — 25.859

$x =$ 1.9

Q8

(Total 4 marks)

Leave blank

9. Work out £84 as a percentage of £350

Percentage of an amount

$$\frac{\text{amount}}{\text{total}} \times 100\% = \frac{84}{350} \times 100\% = 24\%$$

24 %

(Total 2 marks)

Q9

10. There are some ribbons in a box.
The ribbons are green or red or yellow or white.

The table shows each of the probabilities that a ribbon chosen at random will be green or red or white.

Colour	Green	Red	Yellow	White
Probability	0.15	0.30	0.20	0.35

(a) Work out the probability that a ribbon chosen at random will be yellow.

0.15
0.30
0.35
0.80
1

1.00
−0.80
0.20

0.20

(2)

There are 500 ribbons in the box.

(b) Work out the number of red ribbons.

0.3 × 500 = 150

P(Red)

150

(2)

(Total 4 marks)

Q10

Leave blank

11.

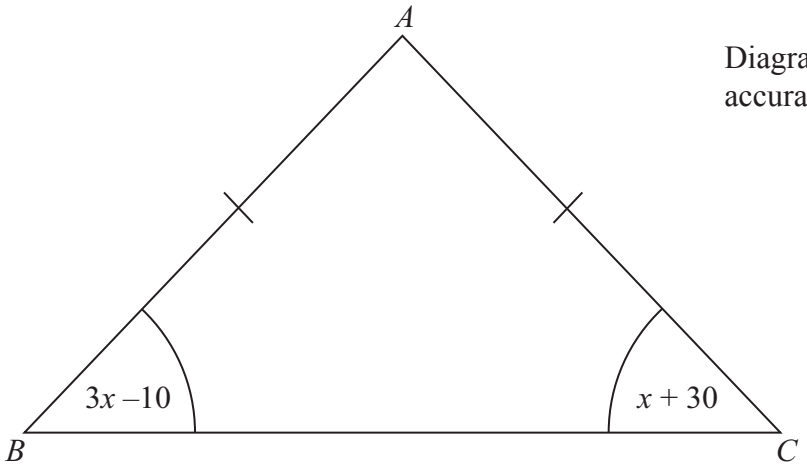


Diagram **NOT** accurately drawn

ABC is an isosceles triangle.
AB = *AC*.

(a) Explain why $3x - 10 = x + 30$

The angles at base of the two equal sides in an isosceles triangle are equal.

(1)

(b) Solve $3x - 10 = x + 30$

$(-x)$ $2x - 10 = 30$

$(+10)$ $2x = 40$

$(\div 2)$ $x = 20$

$x =$ 20

(2)

(Total 3 marks)

Q11

Leave blank

12.

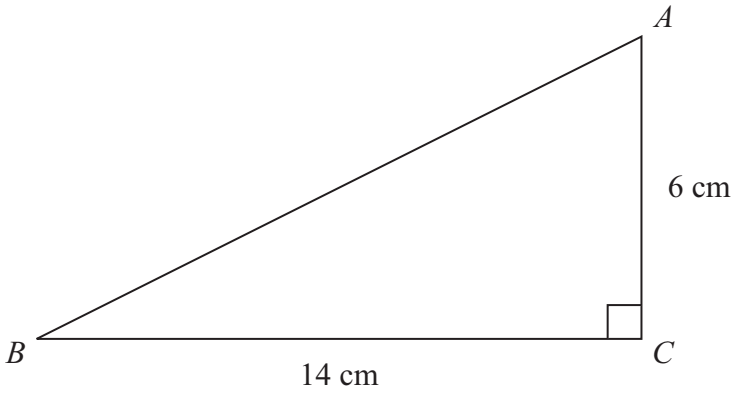


Diagram **NOT** accurately drawn

ABC is a right-angled triangle.
AC = 6 cm.
BC = 14 cm.

(a) Work out the area of triangle *ABC*.

Area of triangle = $\frac{1}{2} \times b \times h$

$= \frac{1}{2} \times 14 \times 6$

$= 42$

42 ..... cm^2

(2)

(b) Calculate the length of *AB*.
Give your answer correct to 2 decimal places.

Use PYTHAGORAS

$c^2 = a^2 + b^2$

$c^2 = 14^2 + 6^2$

$c^2 = 196 + 36$

$c^2 = 232$

$c = \sqrt{232} = 15.23$ (2dp) cm

15.23 ..... cm

(3)

Q12

(Total 5 marks)

Leave blank

13. The diagram shows a solid prism.

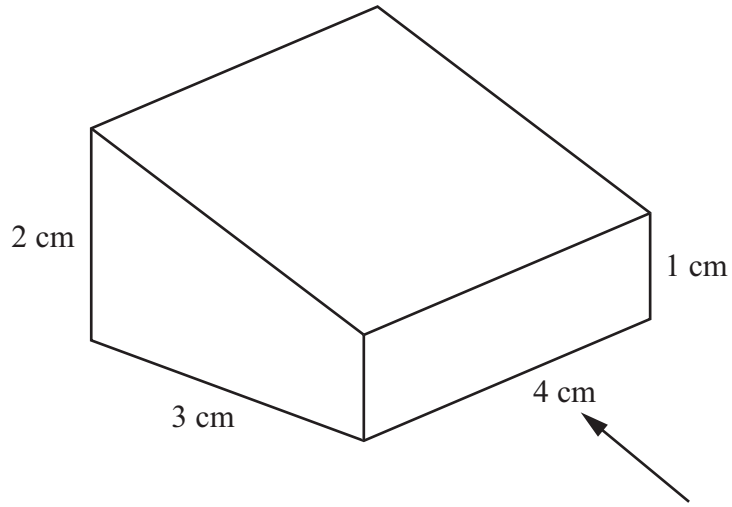
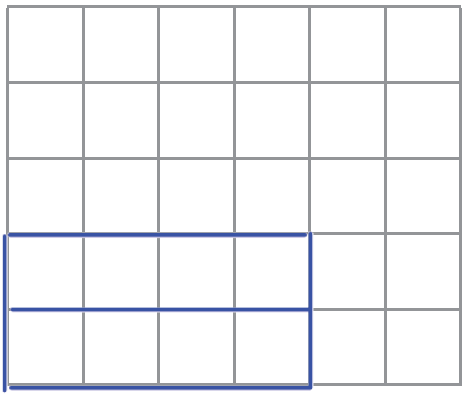


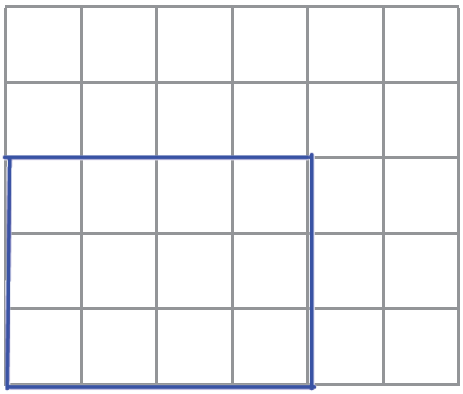
Diagram **NOT** accurately drawn

(a) On the grid below, draw the front elevation of the prism from the direction of the arrow.



(2)

(b) On the grid below, draw the plan of the prism.



(2)

Q13

(Total 4 marks)

Leave blank

14. The table gives information about the number of CDs sold in a shop during each of the last 30 weeks.

Number of CDs (n)	Frequency	midpoint	midpoint × freq
$0 < n \leqslant 40$	3	20	60
$40 < n \leqslant 80$	5	60	300
$80 < n \leqslant 120$	12	100	1200
$120 < n \leqslant 160$	7	140	980
$160 < n \leqslant 200$	3	180	540
	30		3080

Calculate an estimate for the mean number of CDs sold each week.
Give your answer correct to 1 decimal place.

estimate of mean $= \frac{3080}{30} = 102.6$

102.6

Q14

(Total 4 marks)

15. $-4 < n \leqslant 1$
n is an integer.

(a) Write down all the possible values of n.

-3, -2, -1, 0, 1

(2)

(b) Solve $3x - 2 > x + 7$

$(-x)$ $2x - 2 > 7$
$(+2)$ $2x > 9$
$(\div 2)$ $x > 4.5$

$x > 4.5$

(2)

Q15

(Total 4 marks)

Leave blank

16. Draw the locus of all points which are equidistant from the lines *AB* **and** *AC*.

Q16

(Total 2 marks)

Leave blank

17. Make A the subject of the formula

$$r = \sqrt{\frac{A}{3}}$$

(square both sides) $r^2 = \frac{A}{3}$

$(\times 3)$ $3r^2 = A$

$A = 3r^2$

$A =$ $3r^2$

(Total 2 marks)

Q17

18. (a) Write 15 500 in standard form.

15.500

15.5×10^3

(1)

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

0.002.48

0.00248

(1)

(c) Work out the value of

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

Give your answer in standard form.

$24500 = 2.45 \times 10^4$

$$\frac{2.45 \times 10^4}{1.25 \times 10^{-4}} = \frac{2.45}{1.25} \times \frac{10^4}{10^{-4}} = 1.96 \times 10^{4--4}$$

$= 1.96 \times 10^8$

(2)

Q18

(Total 4 marks)

Leave blank

19. (a) Factorise $x^2 - 7x + 10$ = $(x-2)(x-5)$

$-2 \times -5 = 10$

$-2 + -5 = -7$

$(x-2)(x-5)$

.....

(2)

(b) Solve $x^2 - 7x + 10 = 0$

$x =$ 2 .....

or $x =$ 5 .....

(1)

Q19

(Total 3 marks)

20.

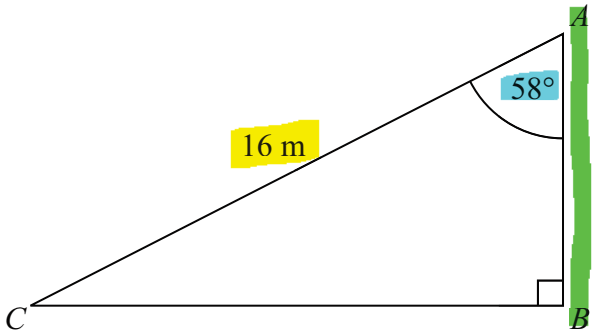


Diagram **NOT** accurately drawn

SOH CAH TOA

use cosine

ABC is a right-angled triangle.
AC = 16 m.
Angle *CAB* = 58°

Calculate the length of *AB*.
Give your answer correct to 3 significant figures.

$AB = 16\text{cm} \times \cos 58°$

$= 8.478708228$

$= 8.48$ m (3sf)

8.48 ..... m

Q20

(Total 3 marks)

Leave blank

21 A field is in the shape of a rectangle.
The width of the field is 28 metres, measured to the nearest metre.

(a) Work out the upper bound of the width of the field.

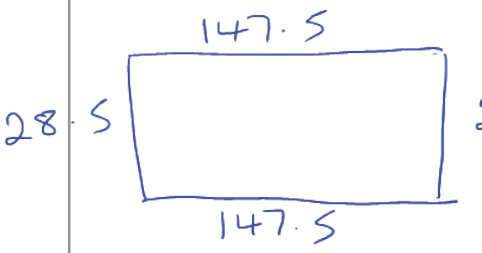
accuracy = 1m
tolerance = 0.5m
UB = 28 + 0.5
= 28.5

28.5 ..... metres
(1)

The length of the field is 145 metres, measured to the nearest 5 metres.

(b) Work out the upper bound for the perimeter of the field.

accuracy = 5
tolerance = 2.5
UB = 145 + 2.5 = 147.5



28.5
147.5
28.5
147.5
352.0

352 ..... metres
(3)

(Total 4 marks)

Q21

22. (a) Simplify $p^5 \times p^4$ $= p^{5+4} = p^9$

p^9 .....
(1)

(b) Simplify $q^5 \div q^2$ $= q^{5-2} = q^3$

q^3 .....
(1)

(c) Simplify $12tu^6 \div 6tu^5$

$12 \div 6 = 2$ $t \div t = 1$ $u^6 \div u^5 = u$

$2u$ .....
(2)

(d) Simplify $(9w^2y^6)^{\frac{1}{2}}$

$\sqrt{9} = 3$ $\sqrt{w^2} = w$ $\sqrt{y^6} = y^3$

$3wy^3$ .....
(2)

(e) For $x > 1$, write the following expressions in order of size.
Start with the expression with the least value.

use 2

x^0 x^2 x x^{-2} $x^{\frac{1}{2}}$

$x^0 = 1$
$x^2 = 4$
$x = 2$

$x^{-2} = \frac{1}{x^2} = \frac{1}{4}$

$x^{\frac{1}{2}} = \sqrt{2} = 1.41$

x^{-2}, x^0, $x^{\frac{1}{2}}$, x, x^2
(2)

(Total 8 marks)

Q22

Leave blank

23. **A** and **B** are two solid shapes which are mathematically similar.
The shapes are made from the same material.

A

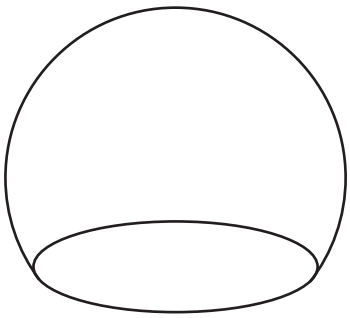
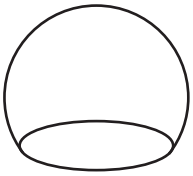


Diagram **NOT** accurately drawn

B



The surface area of **A** is 50 cm^2.
The surface area of **B** is 18 cm^2.

The mass of **A** is 500 grams.

Calculate the mass of **B**.

Area SF = $\frac{18}{50} = \frac{9}{25}$

SF = $\sqrt{\text{Area SF}} = \frac{3}{5}$

Vol SF = $SF^3 = \frac{27}{125}$

mass of B = $\frac{27}{125} \times 500 = 108$ grams

108 ..... grams

Q23

(Total 4 marks)

Leave blank

24. (a) Explain what is meant by a random sample.

Items selected from a population completely by chance

(1)

Chris collects stamps from different countries.
He has 245 stamps from France.

He wants to take a random sample of 10 of his stamps from France.

(b) Describe a method that Chris could use.

Put all of the stamps in a hat and pick out 10 of them without looking.

(1)

The table shows information about Chris' collection of 662 stamps.

Country	France	Germany	Spain	Italy	Total
Number of stamps	245	184	138	95	662

Chris takes a sample of 50 stamps stratified by country.

(c) Work out the number of stamps from Italy in this sample.

There are $\frac{92}{662}$ stamps from Italy.

$50 \times \frac{92}{662} = 6.948640483$

$= 7$ stamps (to nearest stamp)

7

(2)

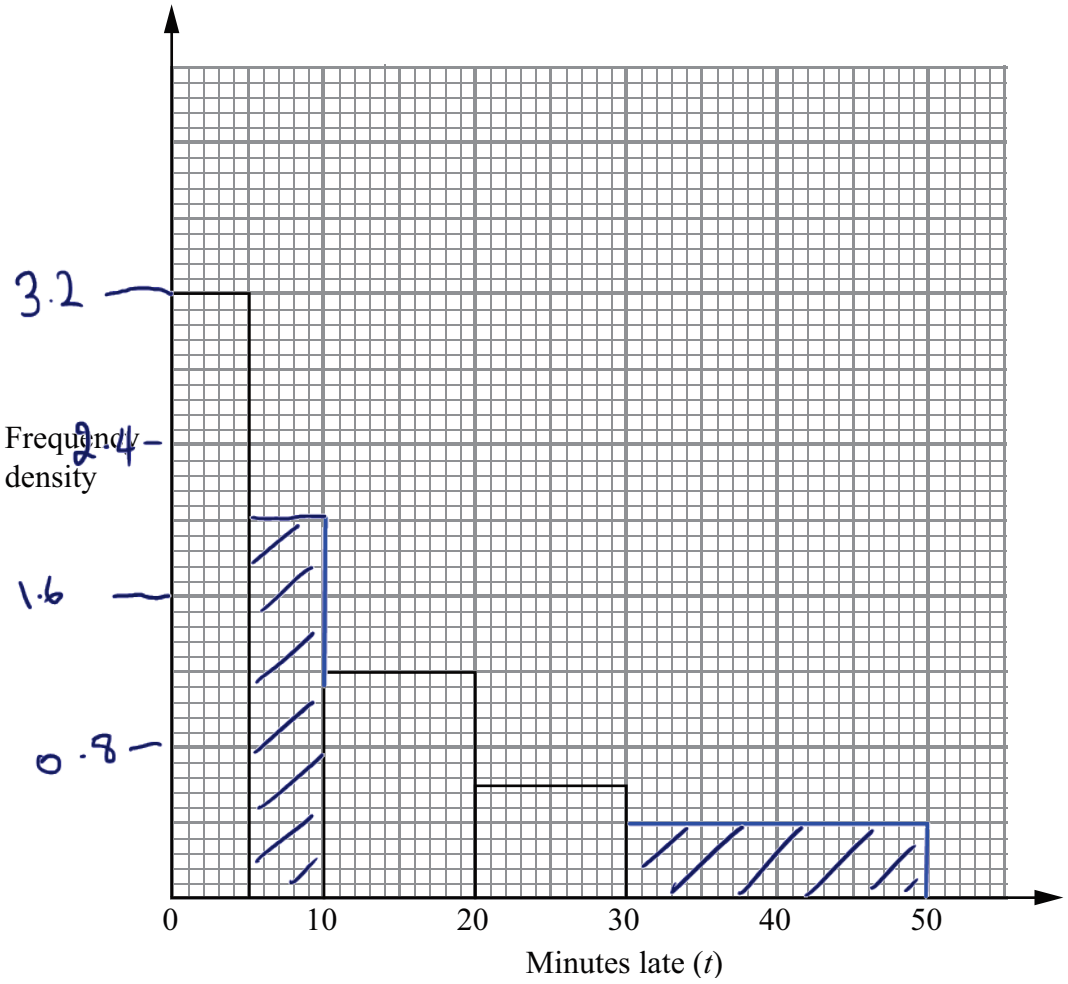
(Total 4 marks)

Q24

Leave blank

25. Some trains from Manchester to London were late.
The incomplete table and histogram gives some information about how late the trains were.

Minutes late (t)	Frequency
$0 < t \leqslant 5$	16
$5 < t \leqslant 10$	10
$10 < t \leqslant 20$	12
$20 < t \leqslant 30$	6
$30 < t \leqslant 50$	8



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

(2)

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

(2) **Q25**

(Total 4 marks)

Leave blank

26. The diagram shows a sector of a circle with centre O.
The radius of the circle is 8 cm.

PRS is an arc of the circle.
PS is a chord of the circle.
Angle $POS = 40°$

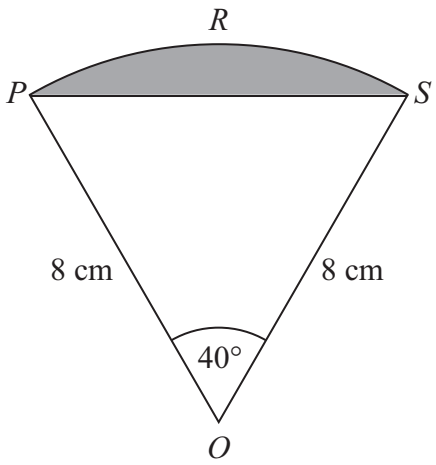


Diagram **NOT** accurately drawn

Calculate the area of the shaded segment.
Give your answer correct to 3 significant figures.

Area of circle $= \pi r^2 = 64\pi$

Area of sector $= \frac{40}{360} \times 64\pi = \frac{1}{9} \times 64\pi$

$= \frac{64\pi}{9}$

Area of triangle $= \frac{1}{2}ab\sin C$ ← (formula sheet)

$= \frac{1}{2} \times 8 \times 8 \times \sin 40°$

$= 20.56920351$

Shaded area $= \frac{64\pi}{9} - 20.56920351$

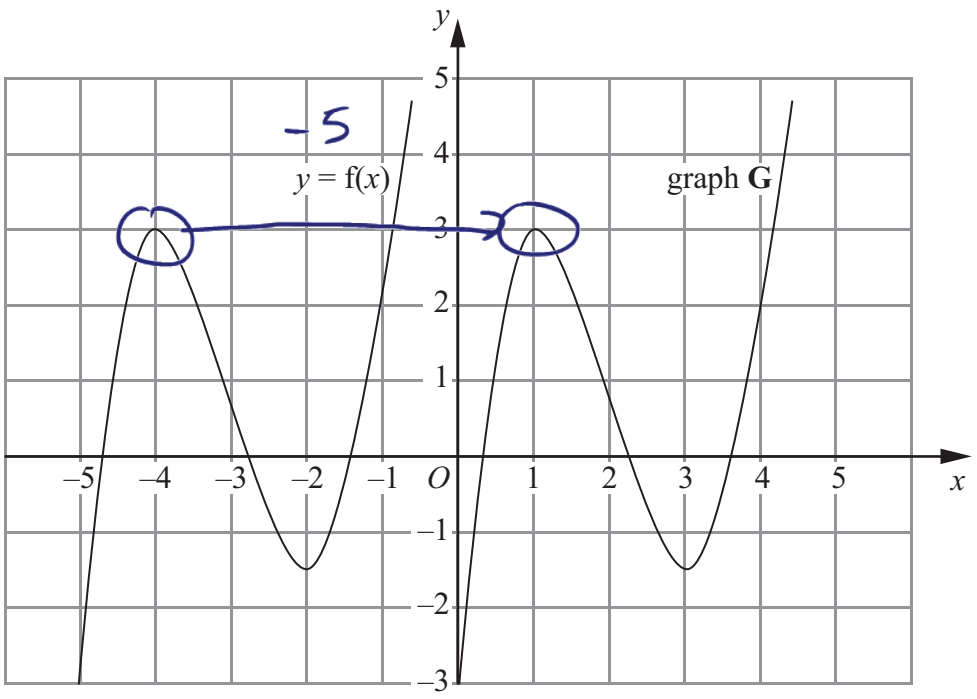
$= 1.771010916 =$ 1.77 (3sf) ..... cm^2

Q26

(Total 5 marks)

Leave blank

27. The graph of $y = f(x)$ is shown on the grid.



The graph **G** is a translation of the graph of $y = f(x)$.

(a) Write down, in terms of f, the equation of graph **G**.

graph G = f(x − 5)

$y =$ f(x − 5)

(1)

The graph of $y = f(x)$ has a maximum point at $(-4, 3)$.

(b) Write down the coordinates of the maximum point of the graph of $y = f(-x)$.

To get the biggest number returned by the function the value −4 has to be put in so for f(−x) the value of x returning the largest value is 4.

(4 , 3)

(2)

(Total 3 marks)

Q27

TOTAL FOR PAPER: 100 MARKS

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