| 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 $\pi$ button, take the value of $\pi$ 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.



*Turn over*

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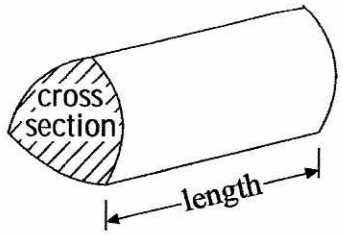
**GCSE Mathematics (Linear) 1380**

Formulae: Higher Tier

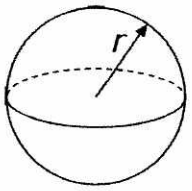
**You must not write on this formulae page.**
**Anything you write on this formulae page will gain NO credit.**

**Volume of a prism** = area of cross section × length



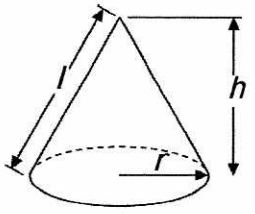

**Volume of sphere** $= \frac{4}{3}\pi r^3$

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

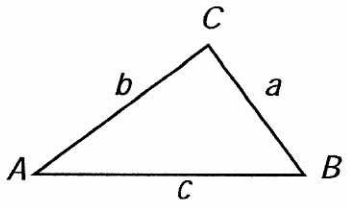



**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**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/ 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.

4 → 6
×1.5

120 × 1.5

8 × 1.5

420 × 1.5

180 × 1.5

180 ..... g of raspberry jelly

12 ..... sponge fingers

630 ..... m/ of custard

270 ..... g of tinned fruit

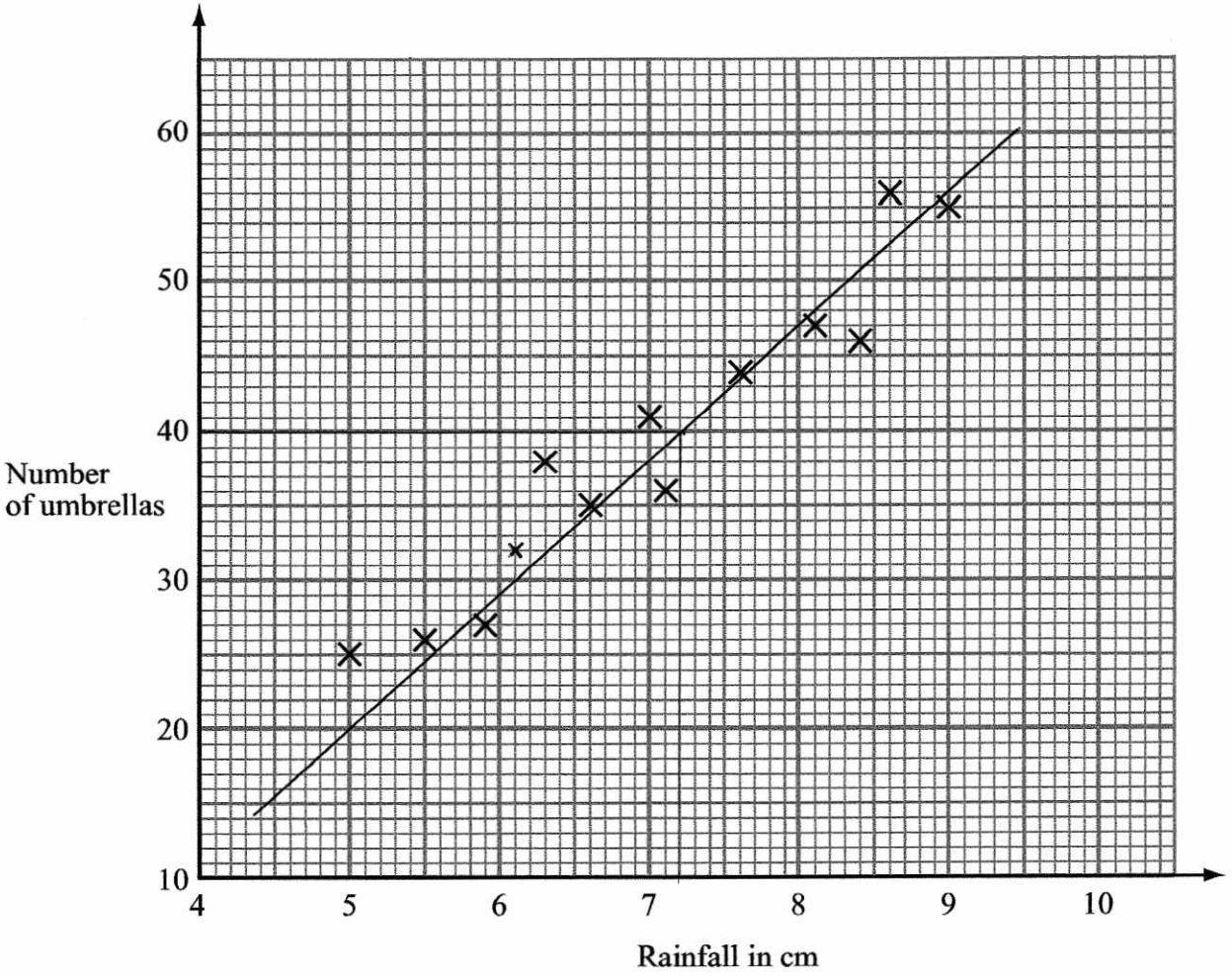
**Q1**

**(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

**(1)**

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

(c) Estimate the rainfall for February.

7.2 cm
(6.6 – 7.6)

**(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 (€).

620 × 1.25

€ 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 (£).

Italy: 50 ÷ 1.25 = 40

£40

£42 − £40

£ 2
**(3)**

**(Total 5 marks)**

Q3

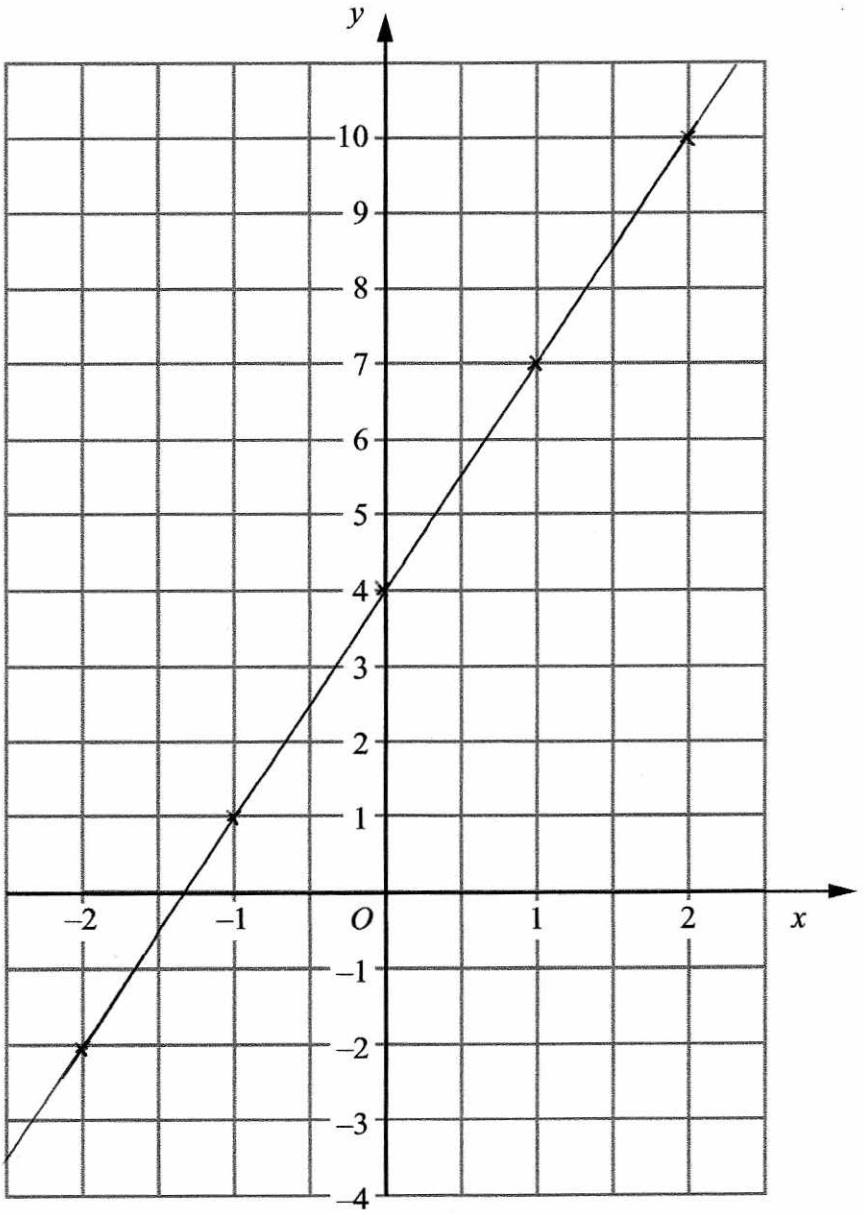
Leave blank

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

| $x$ | –2 | –1 | 0 | 1 | 2 |
|---|---|---|---|---|---|
| $y$ | −2 | 1 | 4 | 7 | 10 |

**(2)**

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




**(2)**

**Q4**

**(Total 4 marks)**

Leave blank

**5.**

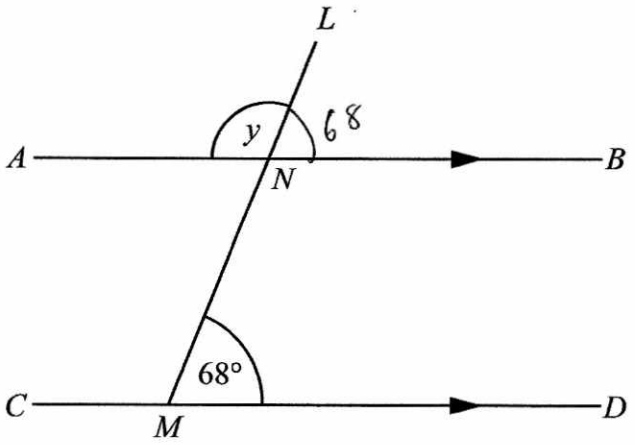



Diagram **NOT** accurately drawn

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

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

112 °

(ii) Give reasons for your answer.

corresponding angles are equal
angles on a straight line sum to 180°

Q5

**(Total 3 marks)**

**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.

0.5063291139

**(2)**

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

0.51

**(1)**

Q6

**(Total 3 marks)**

Leave blank

**7.** A circle has a diameter of 12 cm.

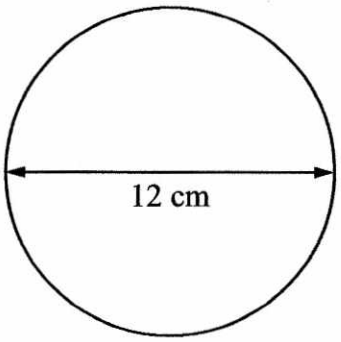



Diagram **NOT** accurately drawn

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

$\pi \times 12 = 37.69911184$

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.

| $x$ | $(x)^3 + 10(x)$ | comment |
|---|---|---|
| 1.5 | $(1.5)^3 + 10(1.5)$ $= 18.375$ | too low |
| 1.7 | $(1.7)^3 + 10(1.7)$ $= 21.913$ | too low |
| 1.8 | $(1.8)^3 + 10(1.8)$ $= 23.832$ | too low |
| 1.9 | $(1.9)^3 + 10(1.9)$ $= 25.859$ | too high |
| 1.85 | $(1.85)^3 + 10(1.85)$ $= 24.831625$ | too low |

$x =$ 1.9

**Q8**

**(Total 4 marks)**

Leave blank

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

$\frac{84}{350} \times 100$

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 | | 0.35 |

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

$0.15 + 0.30 + 0.35 = 0.8$

$1 - 0.8$

0.2

**(2)**

There are 500 ribbons in the box.

(b) Work out the number of red ribbons.

$0.3 \times 500$

150

**(2)**

**(Total 4 marks)**

Q10

Leave blank

**11.**

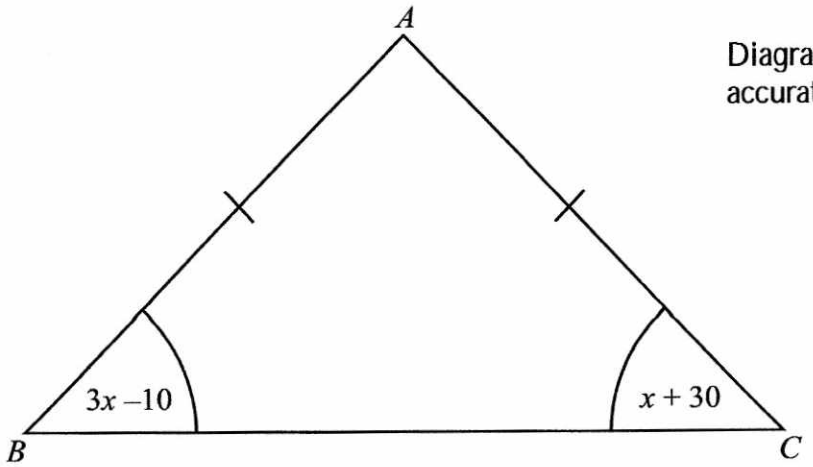



Diagram **NOT** accurately drawn

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

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

Angles at the base of an isosceles triangle are equal **(1)**

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

$-x \quad -x$

$2x - 10 = 30$

$+10 \quad +10$

$2x = 40$

$x = 20$

$x =$ 20 **(2)**

**(Total 3 marks)**

Q11

Leave blank

**12.**

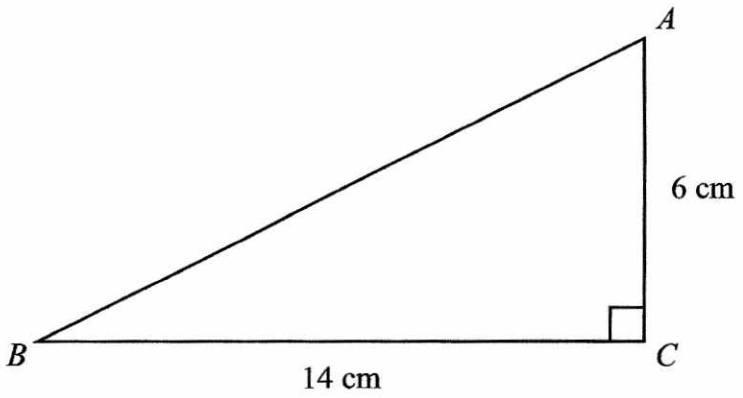



Diagram **NOT** accurately drawn

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

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

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

42 ..... cm²
**(2)**

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

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

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

$232 = c^2$

$c = \sqrt{232}$

$= 15.231546\,21$

15.23 ..... cm
**(3)**

**Q12**

**(Total 5 marks)**

Leave blank

**13.** The diagram shows a solid prism.

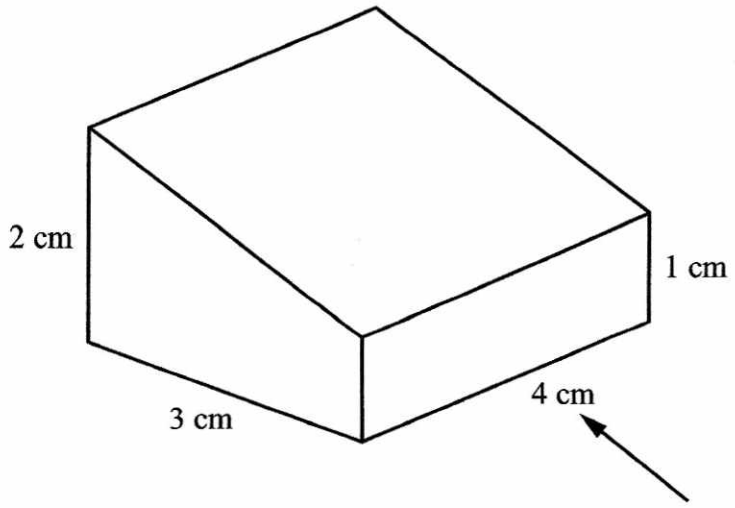
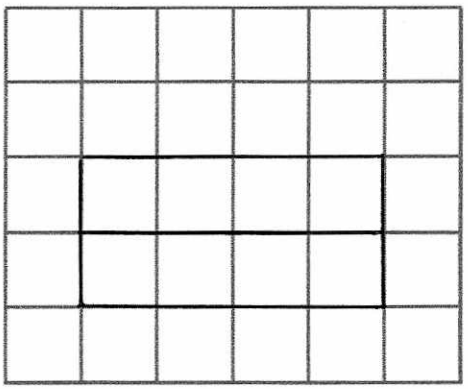


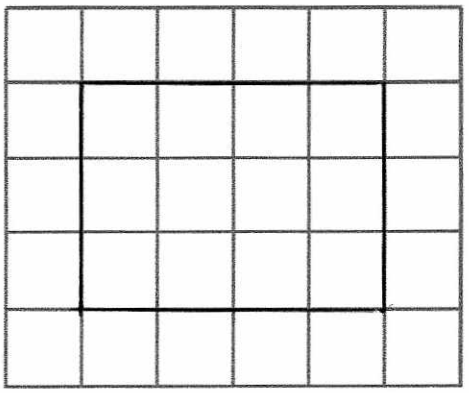

Diagram **NOT** accurately drawn

(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 | Mid point | Midpoint × f. |
|---|---|---|---|
| $0 < n \leqslant 40$ | 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 |

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

3080 = 102.6666
~~3680~~
30
~~122.6666~~

102.7
~~122.7~~

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 $3x - 2 > x + 7$

$-x \quad -x$
$2x - 2 > 7$
$+2 \quad +2$
$2x > 9$
$x > 9/2$

$x > 4.5$

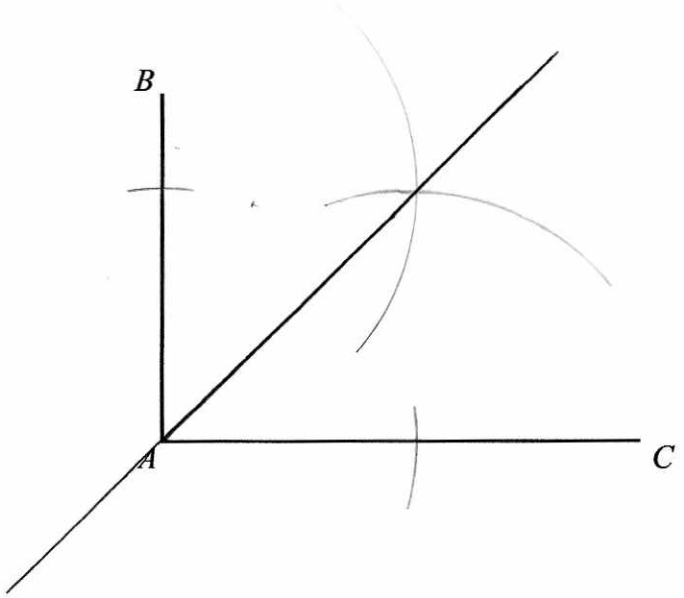
**(2)**

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

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

$r^2 = \frac{A}{3}$

$3r^2 = A$

$A =$ $3r^2$

**Q17**

**(Total 2 marks)**

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

$1.55 \times 10^4$

**(1)**

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

0.00248

**(1)**

(c) Work out the value of

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

Give your answer in standard form.

$\frac{24500}{1.25 \times 10^{-4}} = 196000000$

$1.96 \times 10^8$

**(2)**

**Q18**

**(Total 4 marks)**

Leave blank

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

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

**(2)**

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

$x =$ 2

or $x =$ 5

**(1)**

**(Total 3 marks)**

Q19

**20.**

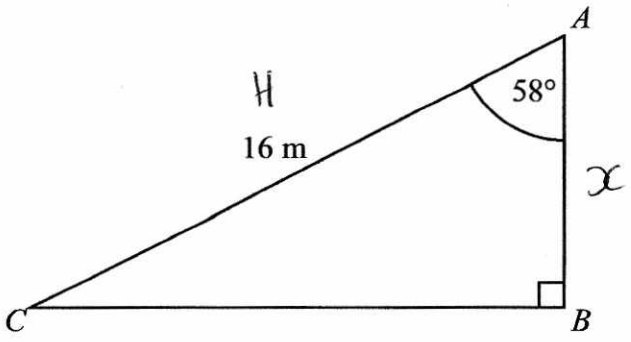



Diagram **NOT** accurately drawn

A

*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.

$\cos\theta = \frac{A}{H}$

$\cos(58) = \frac{x}{16}$

$16\cos(58) = x$

$x = 8.478708228$

8.48 m

**(Total 3 marks)**

Q20

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.

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.

upper length = 147.5m

~~2(147~~
2(147.5) + 2(28.5)

352 metres
**(3)**

**Q21**

**(Total 4 marks)**

**22.** (a) Simplify $p^5 \times p^4$

$p^9$
**(1)**

(b) Simplify $q^5 \div q^2$

$q^3$
**(1)**

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

$\frac{2 \cancel{12} \cancel{t} u^6}{\cancel{6} \cancel{t} u^5}$

$2u$
**(2)**

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

$3wy^3$
**(2)**

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

| | $x^0$ | $x^2$ | $x$ | $x^{-2}$ | $x^{\frac{1}{2}}$ |
|---|---|---|---|---|---|
| If $x = 4$ | 1 | 16 | 4 | $\frac{1}{16}$ | 2 |

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

**Q22**

**(Total 8 marks)**

Leave blank

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

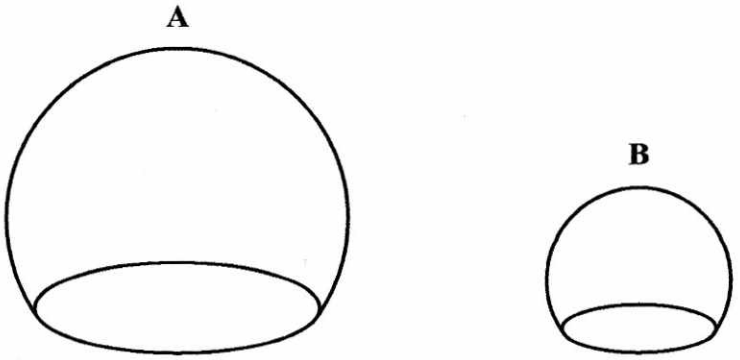



Diagram **NOT** accurately drawn

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 scale factor $\times \frac{50}{18} \left(\frac{25}{9}\right)$

$\sqrt{\frac{25}{9}} = \frac{5}{3}$

Length scale factor $\times \frac{5}{3}$

$\left(\frac{5}{3}\right)^3 = \frac{125}{27}$

Volume scale factor $\times \frac{125}{27}$

$500 \div \frac{125}{27} = 108$

.....108..... grams

**(Total 4 marks)**

Q23

Leave blank

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

Every one has an equal chance of getting selected

**(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.

pick them out of a hat

**(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.

$\frac{95}{662} \times 50 = 7.175226586$

7

**(2)**

**(Total 4 marks)**

Q24

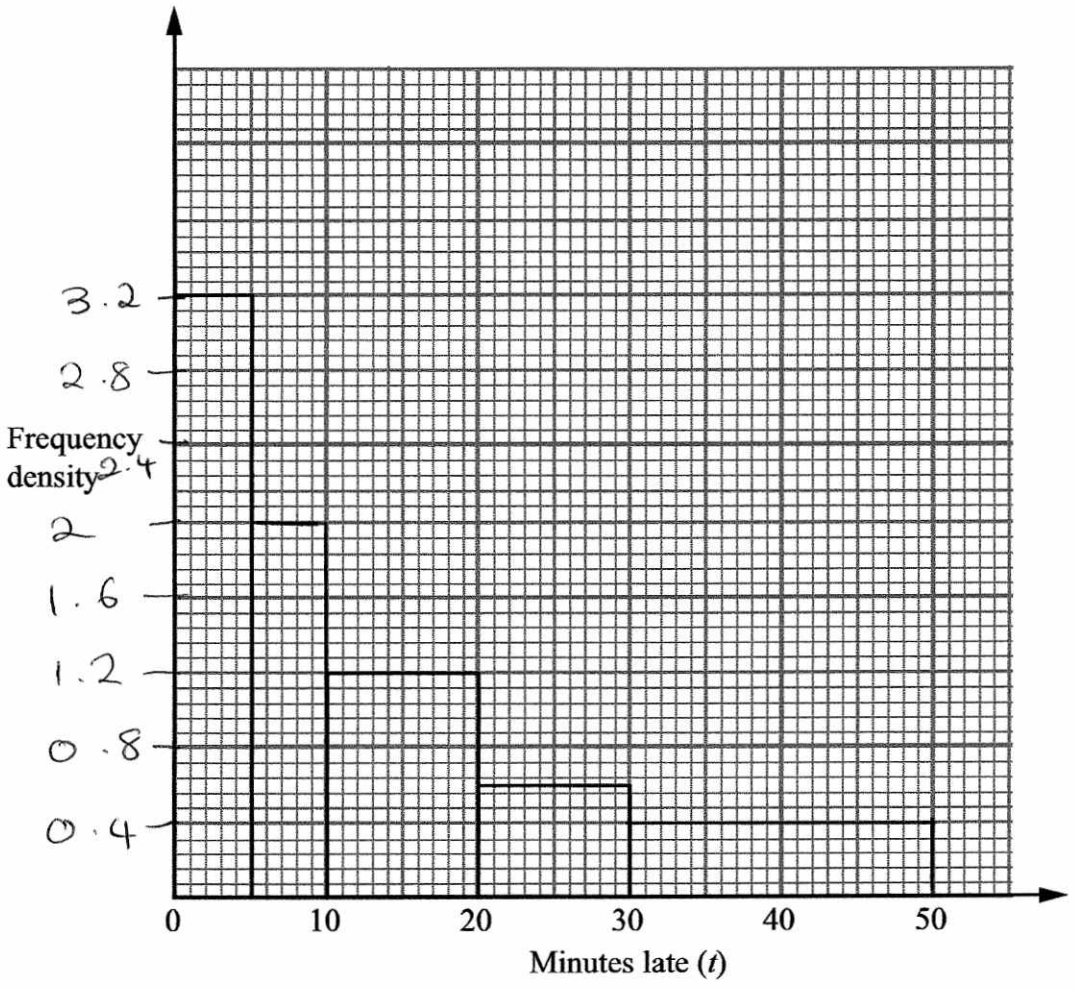
Leave blank

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

F.d = Freq / width

Freq = F.d × width

| Minutes late ($t$) | Frequency | F.d |
|---|---|---|
| $0 < t \leqslant 5$ | 16 | 3.2 |
| $5 < t \leqslant 10$ | 10 | 2 |
| $10 < t \leqslant 20$ | 12 | 1.2 |
| $20 < t \leqslant 30$ | 6 | 0.6 |
| $30 < t \leqslant 50$ | 8 | 0.4 |




(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°

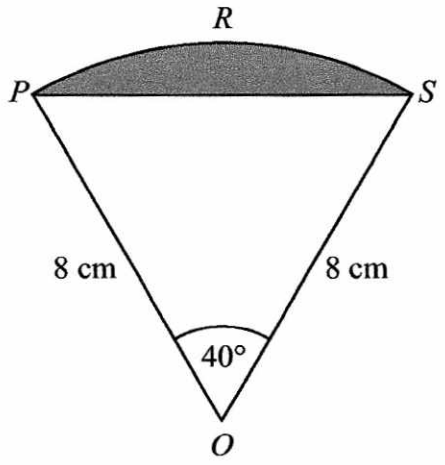



Diagram **NOT** accurately drawn

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

Area of sector $= \frac{40}{360} \times \pi (8)^2$

$= 22.34021443$

Area of triangle $= \frac{1}{2}(8)(8)\sin(40)$

$= 20.56920351$

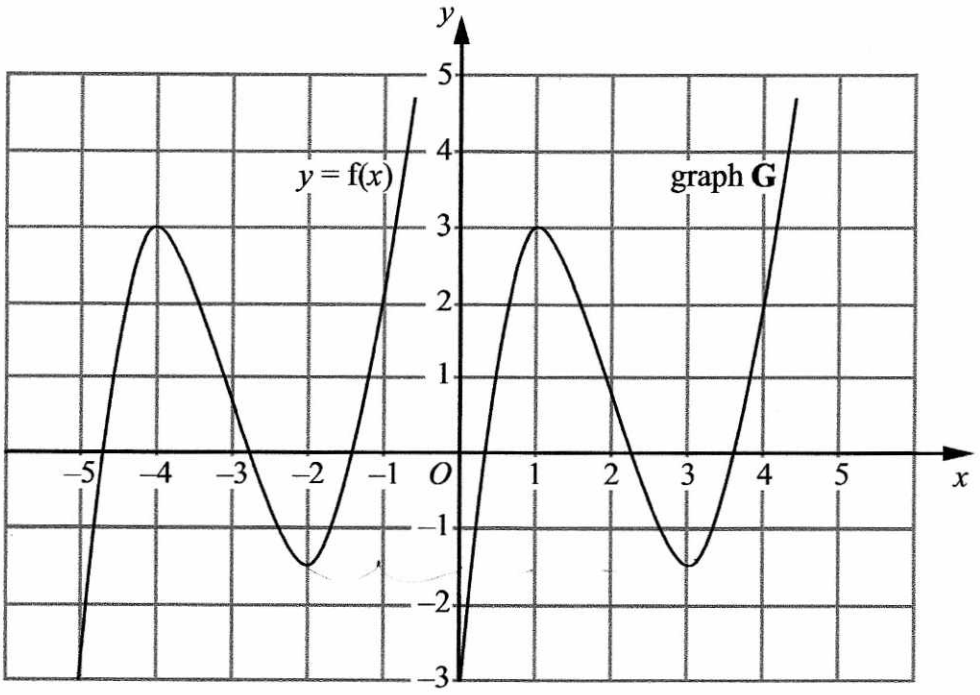
$- = 1.771010916$

1.77 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**.

$y =$ 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 $y = f(-x)$.

( 4 , 3 )

**(2)**

Q27

**(Total 3 marks)**

**TOTAL FOR PAPER: 100 MARKS**

**END**