Leave blank

1 Sketches of six different types of diagram used in statistics are shown below.

Diagram A
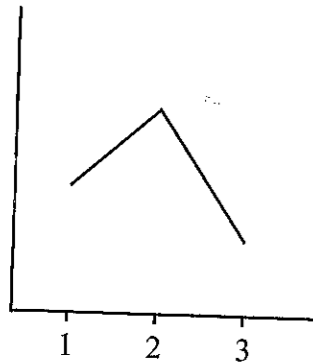
Diagram B
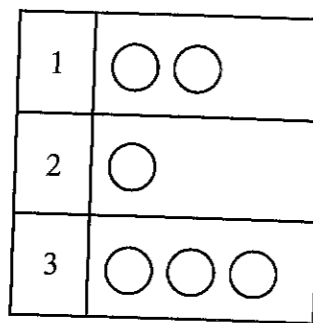
Diagram C
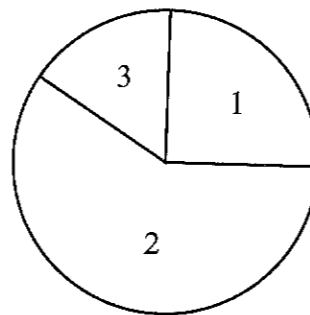
Diagram D

Diagram E

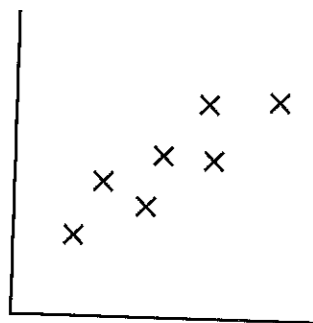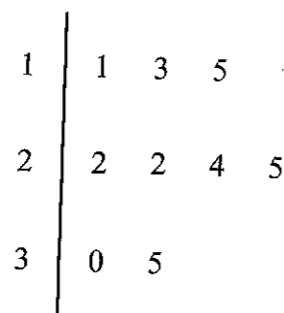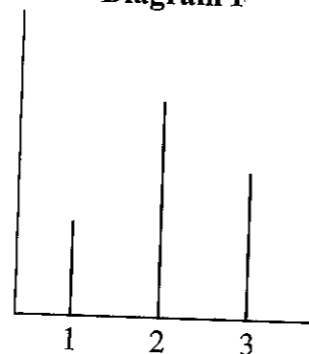| 1 | 1 | 3 | 5 | |
| 2 | 2 | 2 | 4 | 5 |
| 3 | 0 | 5 | | |

Diagram F

(a) Write the letter of the diagram which shows a vertical line graph.

F

[1]

(b) Write the letter of the diagram which shows a scatter graph.

D

[1]

(c) Write the letter of the diagram which shows a pictogram.

B

[1]

[Total 3 marks]

2 Fred, Guto and Julie each upload a video to a website.
The number of views received by each video in a week is shown in the table below.

Video uploader	Number of views
Fred	1173
Guto	1432
Julie	958

(a) Write the number 1432 in words.

one thousand four hundred thirty two

[1]

(b) Calculate the sum of the number of views received by all three videos.

1173+
1432+
958 ⇒ on a calculator

3563

[1]

(c) How many more views did Guto's video receive than Julie's?

1432 − 958

474

[1]

[Total 3 marks]

3 Kai works 42 hours each week. His rate of pay is £12.36 per hour.
Calculate how much Kai earns in a week.

42 × 12.36

£ 519.12

[Total 1 mark]

4 Use your calculator to work out the following. Give your answers to 3 significant figures.

(a) $\frac{11.5 + 31.2}{0.28}$

$152 \cdot 5$

........153........ [1]

(b) 16^4

$65,536$

........$65,500$........ [1]

(c) $\sqrt[3]{21.588}$

$= 2 \cdot 7844 \sim$

$= \ldots 2 \cdot 78 \ldots$ [1]

[Total 3 marks]

5 Latif is using a map. It has the following scale:

| 1 cm represents 250 m |

The route from his house to the bowling alley measures 13 cm on the map.

What is the real-life distance from Latif's house to the bowling alley?
Give your answer in kilometres.

$250 \times 13 = 3250$ ①

$3250 \div 1000$

........3.250........ km

[Total 2 marks]

6 Pupils in Year 9 at Springfield Academy have to study exactly one language.
The table below shows their choices.

French	German	Spanish
34	18	68

$68 + 18$
$+ 34$
$= 120$ ①

A pupil is selected at random. Work out the probability that they study Spanish.
Give your answer as a fraction in its simplest form.

$\frac{68}{120}$ (put in calculator to simplify)

........$\frac{17}{30}$........ ①

[Total 2 marks]

7 Solve:

(a) $x - 3 = 15$
$+3 \quad +3 \qquad x = 18$

$x = \ldots 18 \ldots$ [1]

(b) $\frac{y}{3} - 7 = -4$
$+7 \quad +7$

$3 \times \frac{y}{3} = 3 \times 3$ ①

$y = 9$

$y = \ldots 9 \ldots$ [2]

[Total 3 marks]

8 Points A and B have coordinates $(2, 5)$ and $(2, -1)$ respectively, as shown on the axes below.
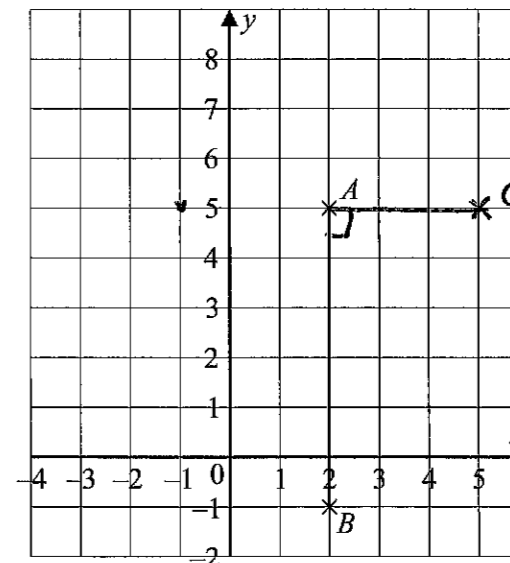
(a) Write down the length of line AB.

........6........ [1]

(b) Line AC is perpendicular to line AB and half the length of line AB.
Write down the two possible pairs of coordinates of point C.

$C = \ldots(5, 5)\ldots$ ① or $C = \ldots(-1, 5)\ldots$ ① [2]

[Total 3 marks]

9 Write the ratio 5:8 in the form 1:n, where n is a decimal.

$\div 5 \quad \div 5$

$8 \div 5$

.....1 : 1·6.....

10 Some common words used in algebra are shown in the box below.

~~term~~	~~expression~~	function	~~identity~~
~~inequality~~	root	sequence	solution

Complete the table below by writing a word from the box in each of the three spaces.

Algebra	Description
$3d$	term
$3d - 6$	expression ①
$3d - 6 < 12$	inequality ①
$3d - 6 \equiv 3(d - 2)$	identity ①

[Total 3 marks]

11 Here are four numbers:

2   5   7   13

(a) Which two numbers have a sum that is a prime number?

.....2..... and .....5.....
[1]

(b) Which two numbers have a difference that is a cube number?

.....13..... and .....5.....
[1]

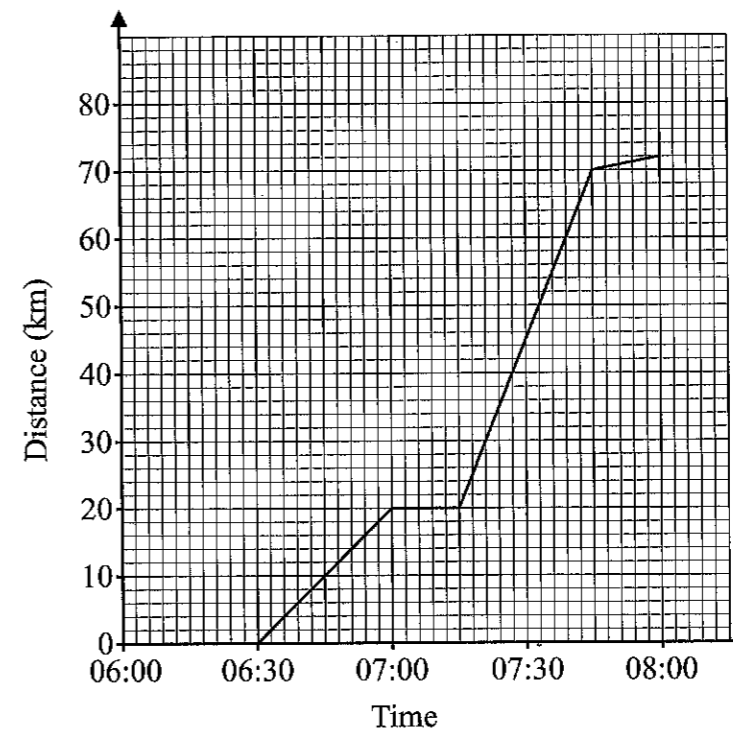(c) Which two numbers have a product that is a factor of 28?

.....2..... and .....7.....
[1]

[Total 3 marks]

12 Mike leaves his house at 6:30 am and rides his motorbike to the railway station.
He waits at the station and then catches a train to the city centre.
He then jogs to his place of work.
A distance-time graph of his complete journey is shown below.

(a) How far does Mike travel from his house to the railway station?

.....20..... km
[1]

(b) How long, in minutes, does Mike wait for his train at the station?

.....15..... minutes
[1]

(c) Explain how you can tell from the shape of the graph that the train is the fastest mode of transport that Mike uses during his journey.
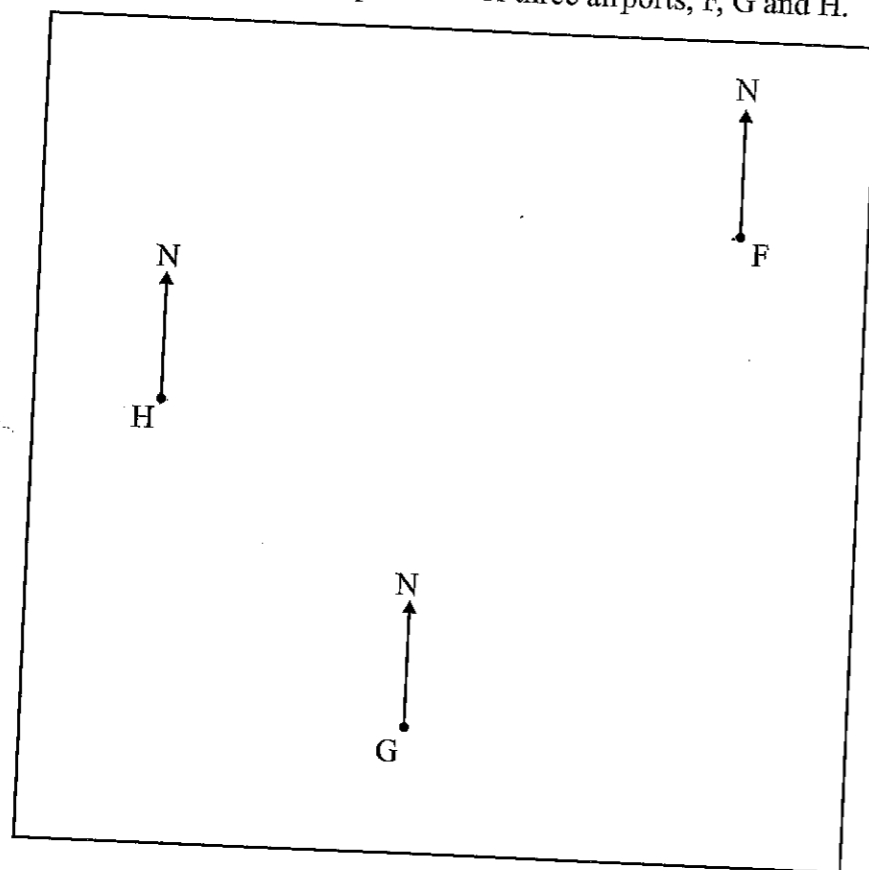
gradient is steepest during the train section
[1]

(d) Calculate the average speed, in km/h, of Mike's complete journey to work.

$\dfrac{72 km}{1·5 hrs}$ ①

.....4 8..... km/h
[2]

[Total 5 marks]

13 The map below accurately shows the positions of three airports, F, G and H.

(a) Measure the bearing of F from H.
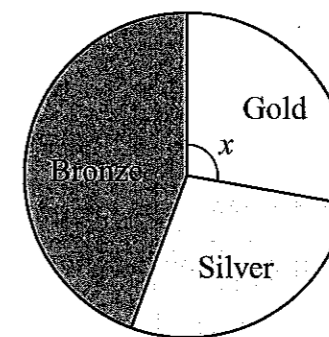
.........072......... °

[1]

(b) Measure the bearing of H from G.

$360° - 39°$

.........321......... °

[2]

[Total 3 marks]

14 In the London 2012 Summer Olympics, the Netherlands won 6 gold medals, 6 silver medals and 8 bronze medals. This information is shown approximately on the pie chart below.

(a) If the pie chart was drawn accurately, what would be the size of angle x?

$6 + 6 + 8 = 20$

$\frac{6}{20} \times 360 = 108°$

$x =$ ....108......... °

[2]

The number of medals won by the Netherlands in the Sochi 2014 Winter Olympics are shown on the bar chart below.
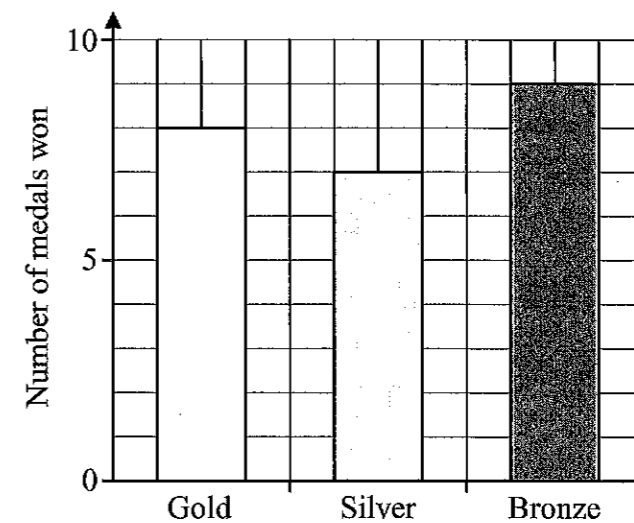
(b) At which Olympics did bronze medals make up a greater percentage of the Netherlands' total number of medals? You must show your working.

$2012 \Rightarrow \frac{8}{20} \times 100 = 40\%$

$2014 \Rightarrow \frac{9}{24} \times 100 = 37.5\%$

.........2012.........

[3]

[Total 5 marks]

15 An acre is a unit of area.

Niall is a retired farmer who wants to offload $12\frac{1}{4}$ acres of his land.
He sells some to two other farming companies.
He donates the rest to a nature conservation charity.

Fibley Farms buys $6\frac{1}{8}$ acres at £8000 per acre.

Caraway Crops buys $4\frac{3}{4}$ acres at £8500 per acre.

It costs Niall £1750 in total to organise the sales and donation.

(a) Calculate the area of land that Niall donates to the charity.
Give your answer as a mixed number.

$$12\frac{1}{4} - 6\frac{1}{8} - 4\frac{3}{4} =$$

(on your calculator)

..........$1\frac{3}{8}$.......... acres
[2]

(b) Calculate the profit that Niall makes from selling his land.

$6\frac{1}{8} \times 8000 = 49,000$

$4\frac{3}{4} \times 8500 = 40,375 +$

$\overline{89\ 375}$ ①

$1\ 750^{-}$ £...87,625...
[2]

[Total 4 marks]

---

16 45% of the pupils at a school are boys.
20% of boys at the school have blond hair.

What percentage of pupils are boys with blond hair?

20% of 45% ①

0.2×0.45

$= 0.09$

$100^{\times}$

.........9......... %
[Total 2 marks]

---

17 A teacher receives seven essays from her students.
The number of words in an essay is called the word count.
The word counts for the 7 essays are:

510   379   418   754   530   369   652

(a) Calculate the mean word count of the seven essays.

$510 + 379 + 418 + 754 + 530$
$+ 369 + 652$ ①

$= 3612 \div 7$

..........516.......... words
[2]

(b) Work out the median word count of the seven essays.

369, ~~379~~, ~~418~~, 510, ~~530~~, ~~652~~, ~~754~~ ①

..........510.......... words
. [2]

The teacher receives an essay late. When included with the other essays, the range
in word counts is now more than double the range in word counts of the original seven.

(c) Explain clearly why the late essay must have the highest word count of all the essays.

Old range $\Rightarrow$ $754 - 369 = 385$ ①
new range $\Rightarrow$ $> 385 \times 2 = 770$
has to be highest
as $754 - 770 = -16$ can't happen
[2]

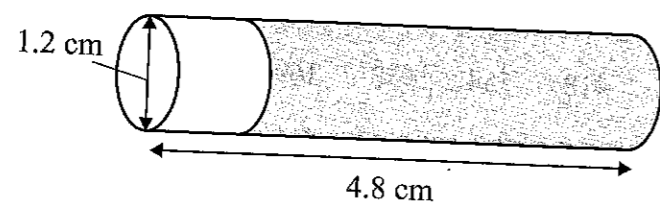(d) Work out the median word count of the eight essays.

halfway between
510 & 530

..........520.......... words
. [1]

[Total 7 marks]

18 The diagram below shows a lithium battery in the shape of a solid cylinder with diameter 1.2 cm and length 4.8 cm.

1.2 cm

4.8 cm

$r = 1.2 \div 2$
$= 0.6$ ①

(a) Calculate the volume of the battery. Give your answer to three significant figures.

Area of cross section $= \pi r^2 = \pi \, 0.6^2$

Volume $= \pi \times 0.6^2 \times 4.8$ ①

$= 5.4286...$

$= 5.43 \, cm^3$ ①

.... cm³
[3]

The mass of the battery is 29.1 g.

(b) Calculate the density of the battery. Give your answer to three significant figures.

$D = \dfrac{m}{V} = \dfrac{29.1g}{5.43cm^3}$ ①

$= 5.3604...$

5.36 ① .... g/cm³
[2]

[Total 5 marks]

19 Shapes A and B are drawn on the grid below.
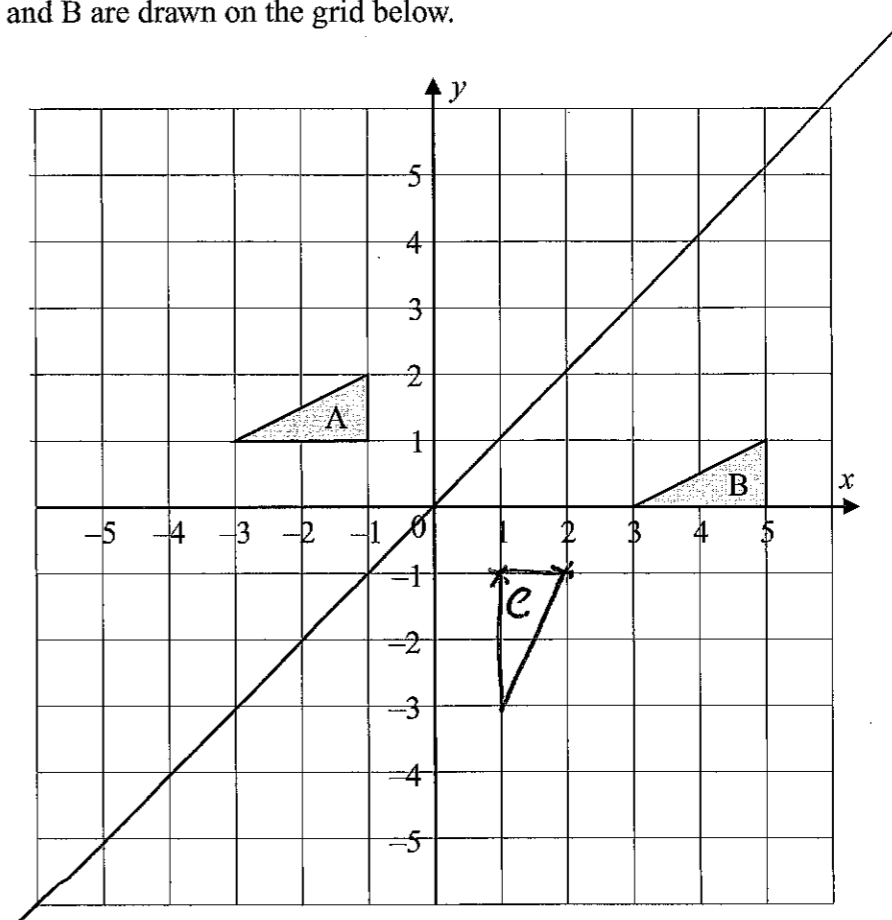
(a) Describe the single transformation that maps shape A to shape B.

Translation ① $\Rightarrow \begin{pmatrix} 6 \\ -1 \end{pmatrix}$ ①

....

....
[2]

(b) On the grid above, reflect shape A in the line $y = x$.
Label your image C.

[2]

[Total 4 marks]

20 Make s the subject of the formula $v^2 = u^2 + 2as$

$$-u^2 \quad -u^2$$

$$v^2 - u^2 = 2as \;①$$

$$\div 2a \qquad \div 2a$$

$$s = \frac{v^2 - u^2}{2a} \;①$$

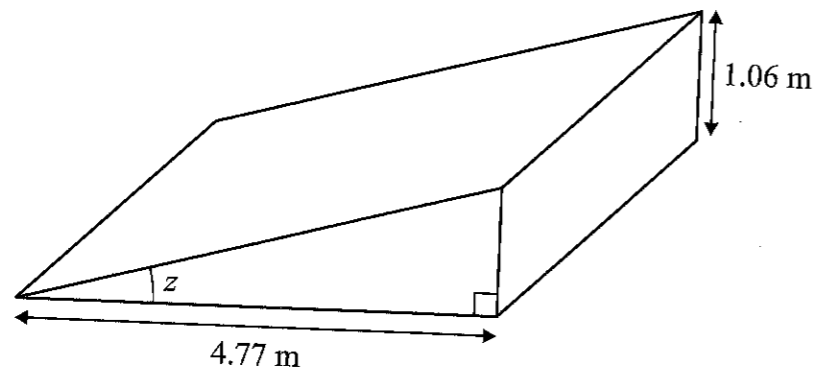*[Total 2 marks]*

21 A skate park ramp is in the shape of a triangular prism. The cross-section of the prism is a right-angled triangle with a 4.77 m base and 1.06 m perpendicular height.

1.06 m

z

4.77 m

Calculate z, the angle of the ramp. Give your answer to a suitable degree of accuracy.

1.06
OPP

4.77
adj

SOH   CAH   TOA

$$\text{Tan } x = \frac{1.06}{4.77} \;①$$

$$x = \tan^{-1}\left(\frac{1.06}{4.77}\right) \;①$$

$$12.5288..$$

(3 s.f.)

$$z = \underline{12.5^\circ} \quad ^\circ$$

①

[Total 3 marks]

---

22 Olivia asks the 16 members of the Year 11 girls school football squad which football team they support. 12 of the squad said they supported a team in Lancashire.

Olivia says, "75% of girls at our school support a football team in Lancashire."

Give two reasons why her conclusion is likely to be incorrect.

1) ...Sample size is too small to apply to whole school...

2) ...Only asked Year 11 girls so bias...

Only asked football players so bias

[Total 2 marks]

23 In January 2016, the hedgehog population in Wales was estimated to be 96 400. This is 4% less than the estimate for January 2015. This formula is used to predict the size of the hedgehog population in the future:

$$n = 96\,400 \times 0.96^t$$

where n is the number of hedgehogs and t is the number of years after January 2016.

(a) What assumption has been made by choosing to use this formula?

...Same reduction in population each year of 4%...

[1]

(b) How many full years will it be before the hedgehog population is less than $\frac{3}{4}$ of the total in January 2016?

$$\frac{3}{4} \text{ of } 96,400 \text{ is } 72,300 \;①$$

$$96400 \times 0.96$$

y1	y2	y3	y4	y5
92544	88842	85289	81877 ①	78602

y6	y7	y8	
75458	72440	69542	after 8 yrs ①

[3]

[Total 4 marks]

Leave blank

24 A bus company's fleet of double-deckers, single-deckers and minibuses was in the ratio $8:3:2$. After selling some of the double-deckers and single-deckers the ratio is $12:5:4$.

The bus company has 20 minibuses.
How many buses did the company sell in total?

$8 : 3 : \boxed{2} = 20 \ /part$ $20 \div 2 = 10$

$12 : 5 : \boxed{4} = 20$ $8+3+2 = 13$

$13 \times 10 = 130$ ①

$20 \div 4 = 5$

$12+5+4 = 21$

$21 \times 5 = 105$ ①

$130 - 105 = $ .... 25 ①

[Total 3 marks]

25 The diagram shows an equilateral triangle *AED* which shares the side *AD* with the square *ABCD*.

Work out the size of angle *y*.

$180 - 30° = 150°$

$150 \div 2 = 75$ ①

$ECD \Rightarrow$ isosceles ①

$y = $ .... $75°$ .... °

[Total 4 marks]

[TOTAL FOR PAPER = 80 MARKS]

General Certificate of Secondary Education

GCSE
Mathematics (Grade 9-1)
Foundation Tier

Centre name	
Centre number	
Candidate number	

Practice Set 1
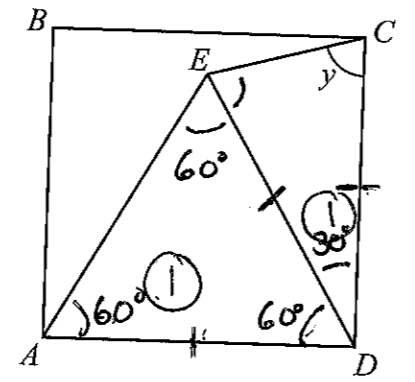## Paper 2: Calculator

Surname	
Other names	
Candidate signature	

Time allowed: 1 hour 30 minutes

In addition to this paper you should have:
• A pen, pencil and eraser.
• A ruler.
• A protractor.
• A pair of compasses.
• A calculator.

Instructions to candidates
• Write your name and other details in the spaces provided above.
• Answer all questions in the spaces provided.
• In calculations show clearly how you worked out your answers.
• Diagrams are **not** drawn accurately unless otherwise indicated.
• Calculators may be used — if your calculator doesn't have a π button, take the value of π to be 3.142

Information for candidates
• There are 80 marks available for this paper.
• The marks available are given in brackets at the end of each question.
• You may get marks for method, even if your answer is incorrect.

Advice to candidates
• Work steadily through the paper.
• Don't spend too long on one question.
• If you have time at the end, go back and check your answers.

For examiner's use			
Q	Mark	Q	Mark
1		14	
2		15	
3		16	
4		17	
5		18	
6		19	
7		20	
8		21	
9		22	
10		23	
11		24	
12		25	
13			
Total			