Paper Reference

| **5** | **5** | **4** | **4** | **/** | **1** | **5** |

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

Formulae sheet.

Instructions to Candidates

In the boxes above, write your Centre Number and Candidate Number, your surname, initial(s) and signature.

Check that you have the correct question paper.

Answer **ALL** the questions in the spaces provided in this question paper.

Supplementary answer sheets may be used.

Information for Candidates

The total mark for this paper is 60.

The marks for the various parts of questions are shown in round brackets, e.g.: (**2**).

This paper has 19 questions.

Calculators may be used.

Advice to Candidates

Work steadily through the paper.

Do not spend too long on one question.

Show all stages in any calculations.

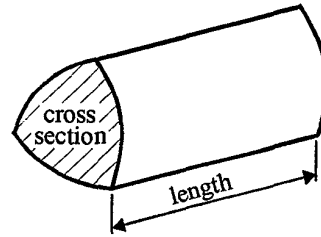If you cannot answer a question, leave it and attempt the next one.

Return at the end to those questions you have left out.

Formulae – Higher Tier
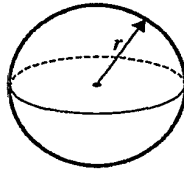**You must not write on this formula page.**
Anything you write on this formulae page will gain NO credit.

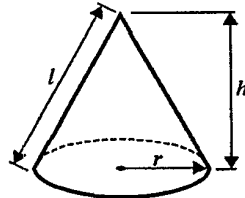**Volume of prism = area of cross-section $\times$ length**

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

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

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

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

In any triangle *ABC*
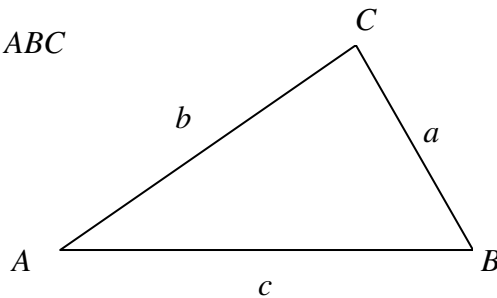
Sine Rule: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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

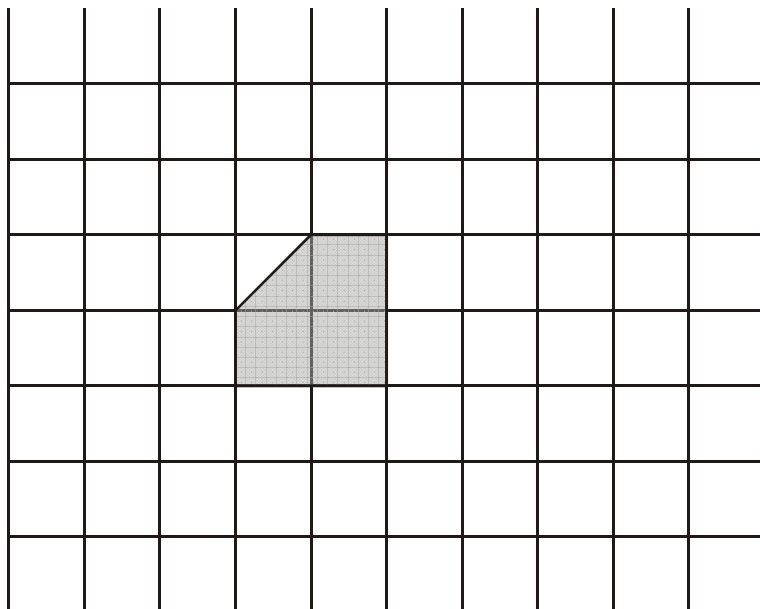**Area of a triangle** $= \dfrac{1}{2} ab \sin C$

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by $x = \dfrac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

Answer ALL NINETEEN questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1.

(a) Translate the shaded shape 3 squares to the right and 2 squares up.

(1)

Diagram **NOT** accurately drawn

2 cm — C — 3 cm

D — 8 cm — 12 cm
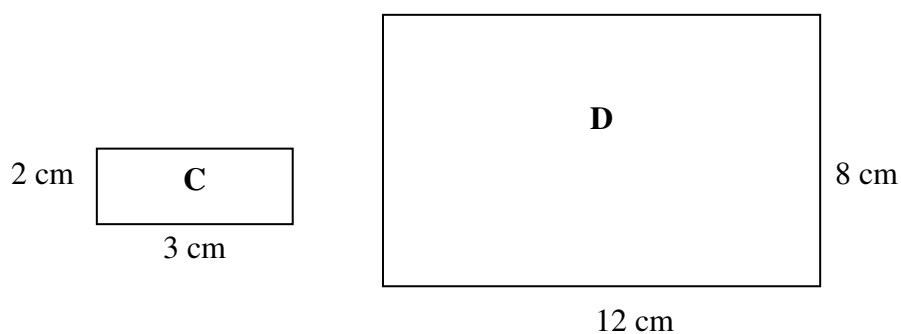
Rectangle **D** is an enlargement of rectangle **C**.

(b) Find the scale factor of the enlargement.

....

(1)
(Total 2 marks)

2. Change 7 m^2 to cm^2.

………………….cm^2
(Total 2 marks)

3. The size of each exterior angle of an regular polygon is 24°.

Work out the number of sides the polygon has.

....
(Total 2 marks)

4. A man left home at 12 noon to go for a cycle ride.
The travel graph represents part of the man's journey.

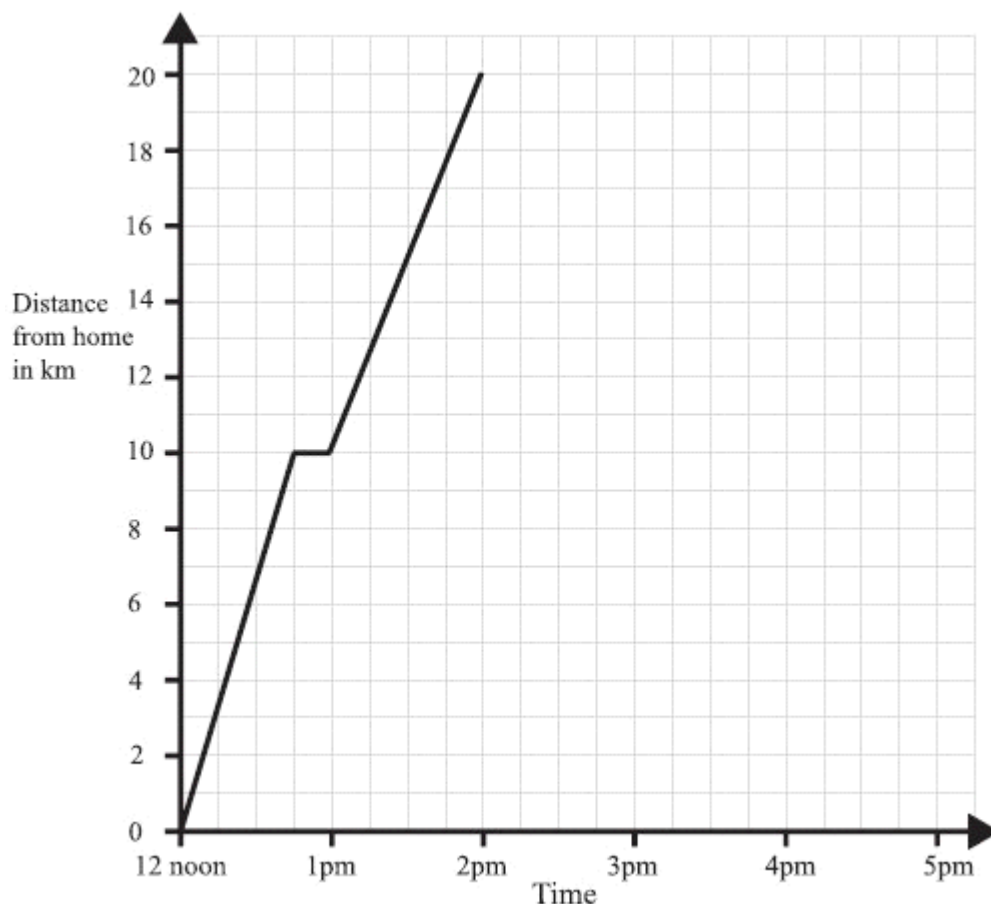At 12.45 pm the man stopped for a rest.

(a) For how many minutes did he rest?

.............minutes

(1)

(b) Find his distance from home at 1.30 pm.

...................km

(1)

The man stopped for another rest at 2 pm.

He rested for one hour.

Then he cycled home at a steady speed. It took him 2 hours.

(c) Complete the travel graph.

(2)

(Total 4 marks)

5. Here are five graphs labelled **A**, **B**, **C**, **D** and **E**.

A

B

C

D

E
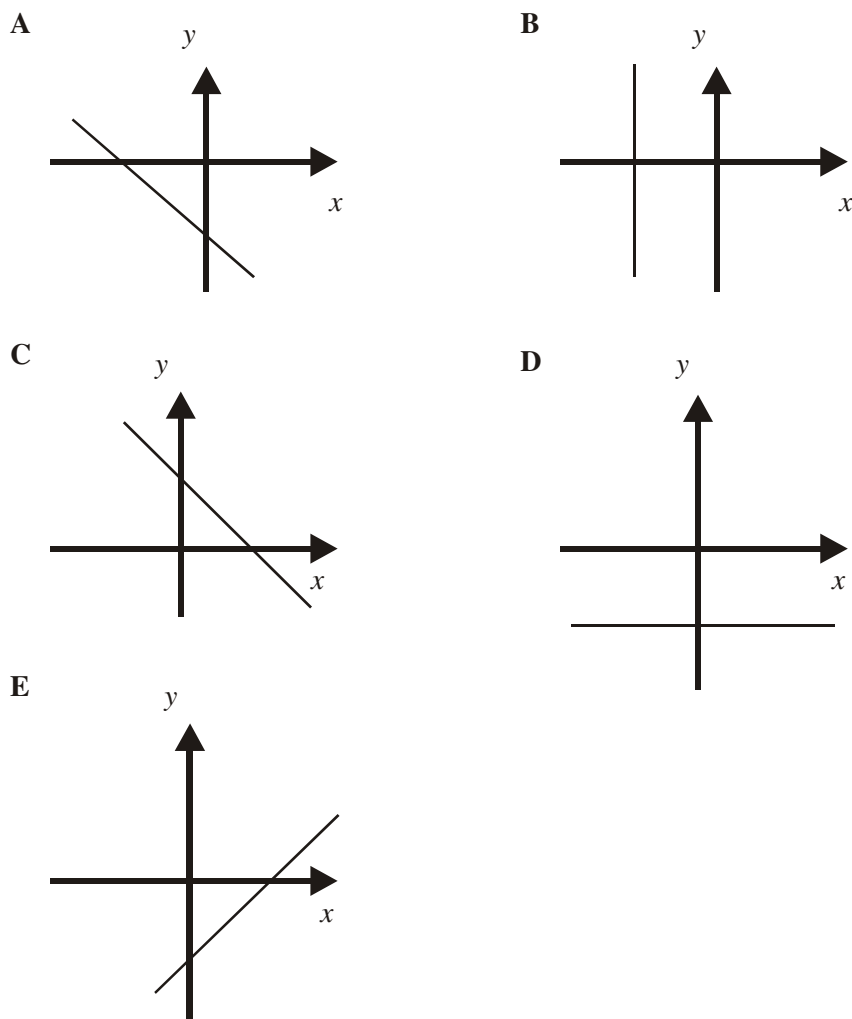
Each of the equations in the table represents one of the graphs **A** to **E**.

Write the letter of each graph in the correct place in the table.

Equation	Graph
$x + y = 5$	
$y = x - 5$	
$y = -5 - x$	
$y = -5$	
$x = -5$	

(Total 3 marks)

6.

9.7 cm

Diagram **NOT**

accurately drawn

The radius of the circle is 9.7 cm.

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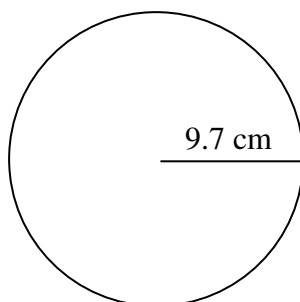Give your answer to 3 significant figures.

Write down the units in your answer.

……………………………
(Total 3 marks)

7. William bought an engagement ring for Tricia.
The total cost of the ring was £422 **plus** VAT at $17\frac{1}{2}$ %.

Work out the cost of the ring.

£ …………………………
(Total 2 marks)

8.

A

8 cm
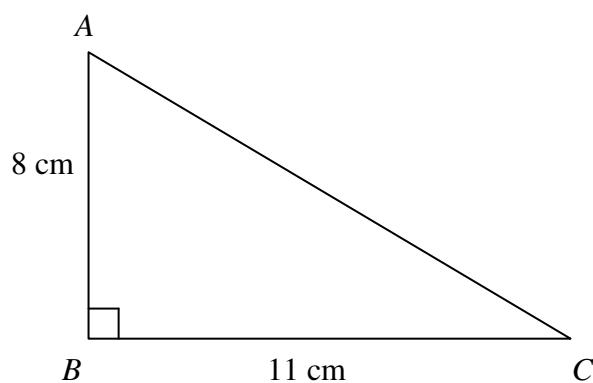
Diagram **NOT**

accurately drawn

B   11 cm   C

ABC is a right-angled triangle.

AB = 8 cm,
BC = 11 cm.

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

…………………………… cm

(Total 3 marks)

9. (a) Solve the equation $7x + 2 = 3x - 2$

$x =$ ………….
(3)

(b) Solve $2x + 1 = \dfrac{5x}{3}$

$x =$ …………………..
(2)

(Total 5 marks)

10. Use your calculator to work out the value of

$$\frac{(7.9 + \sqrt[3]{85}) \times 4.32}{6.23 + 1.491}$$

Give your answer correct to 3 significant figures.

………………………

(Total 3 marks)

11. (a) Complete the table of values for $y = x^2 - 6x + 10$

x	0	1	2	3	4	5	6
y	10						10

(2)

(b) On the grid draw the graph of $y = x^2 - 6x + 10$
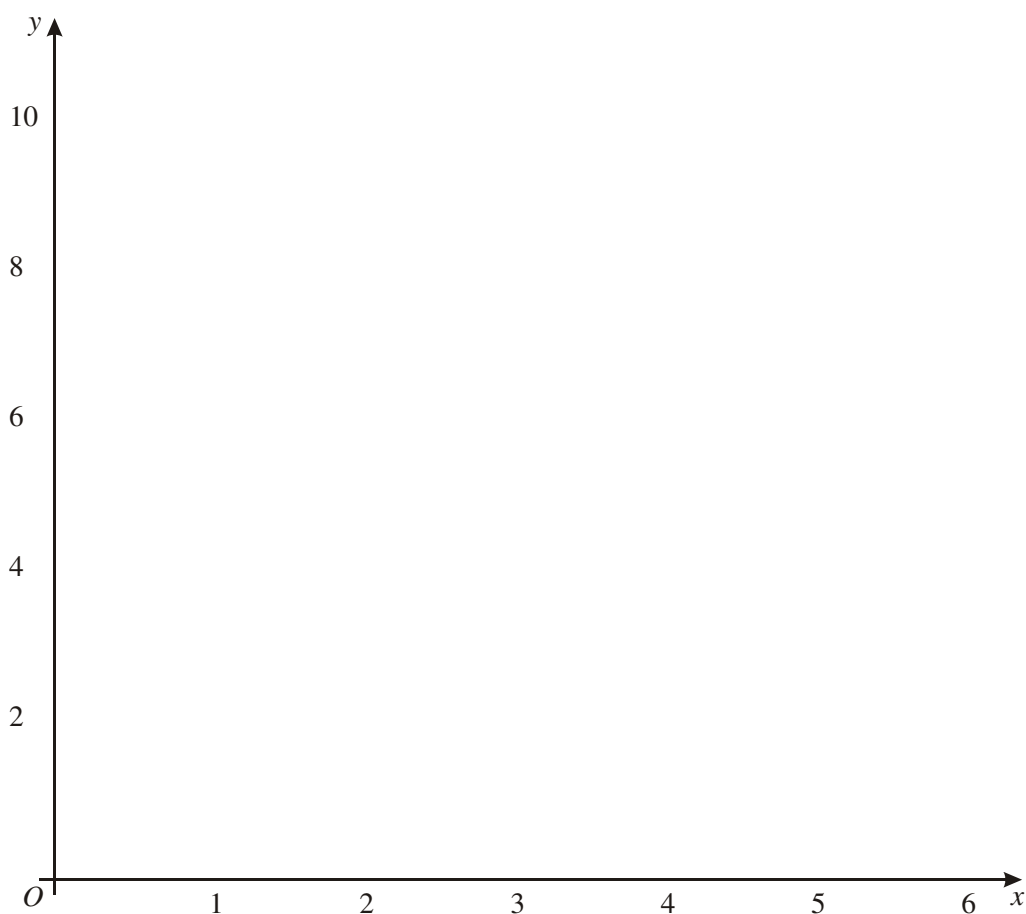
(2)
(Total 4 marks)

12. The diagram shows the position of Colwyn Bay and the position of Blackpool.

N

✕ Blackpool

N
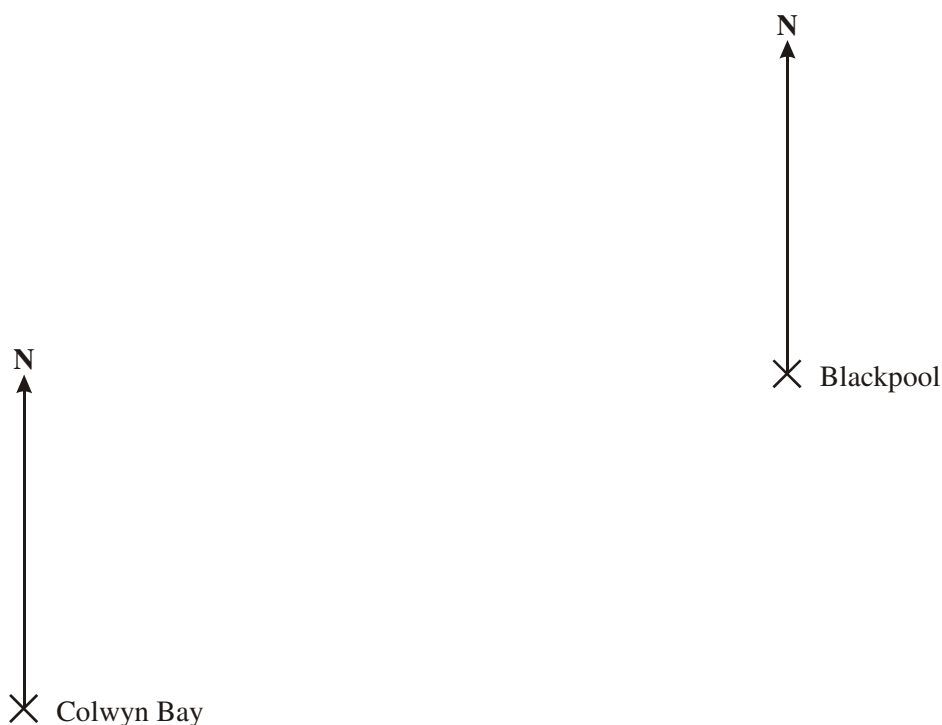
✕ Colwyn Bay

The bearing of a ship from Colwyn Bay is 032°.
The bearing of the ship from Blackpool is 290°.

In the space above, draw an accurate diagram to show the position of the ship.

Mark this position with a cross ✕. Label it **S**.

(Total 3 marks)

13. In a sale, normal prices are reduced by 12%.
The sale price of a DVD player is £242.

Work out the normal price of the DVD player.

£ ………………………
(Total 3 marks)

14.
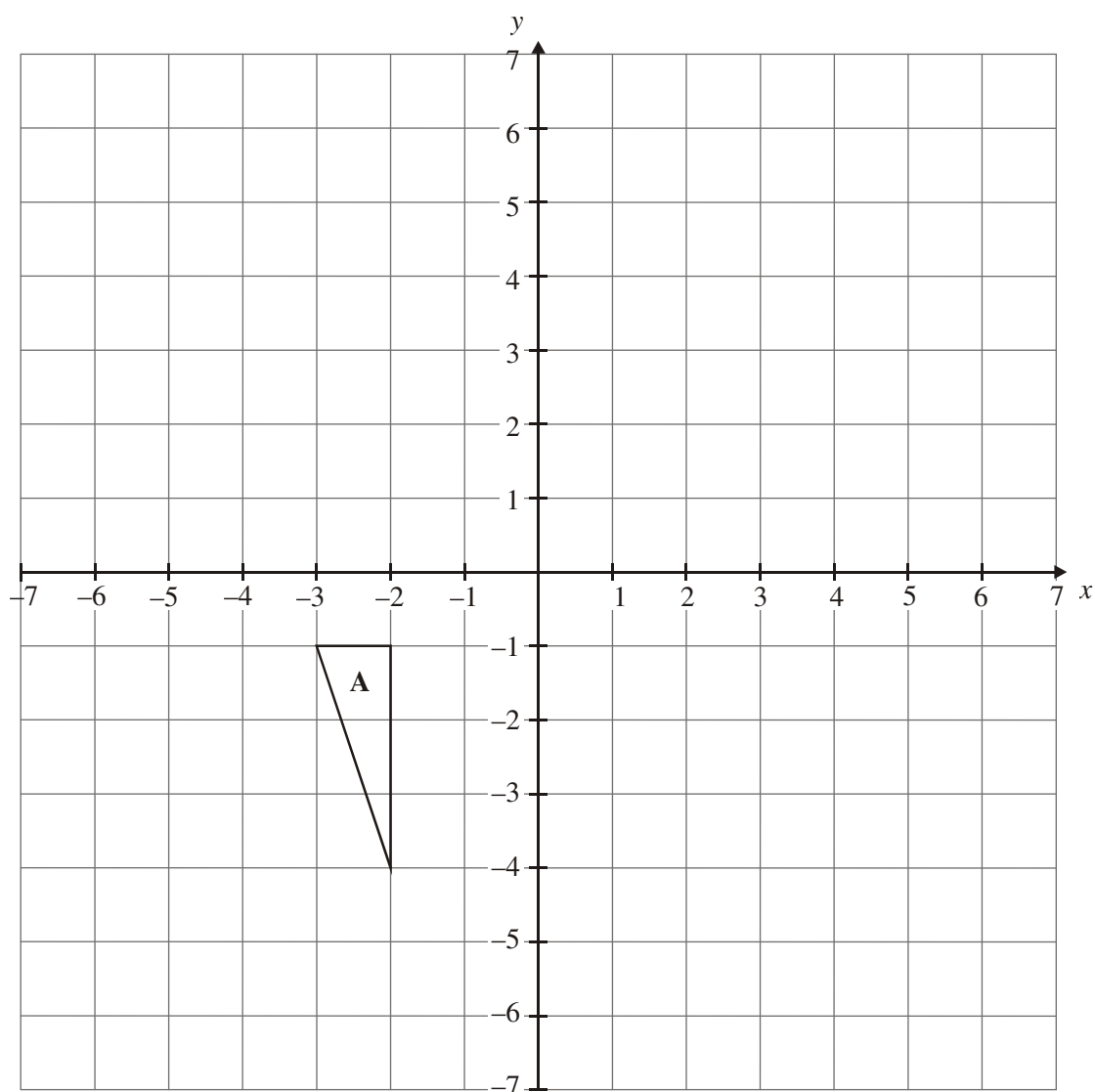
Enlarge triangle **A** by scale factor –2, centre (0, –1)

(Total 3 marks)

15. Ben bought a car for £12 000.
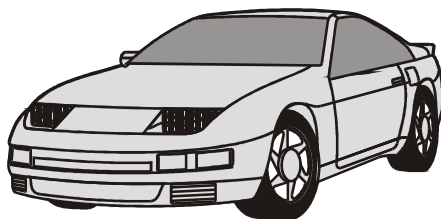
Each year the value of the car depreciated by 10%.

Work out the value of the car two years after he bought it.

£ ....

(Total 3 marks)

16. A straight line has equation $\qquad y = \frac{1}{2}x + 1$

The point *P* lies on the straight line.
P has a *y*-coordinate of 5.

(a) Find the *x*-coordinate of *P*.

....
(2)

(b) Rearrange $y = \frac{1}{2}x + 1$ to make *x* the subject.

....
(2)
(Total 4 marks)

17.
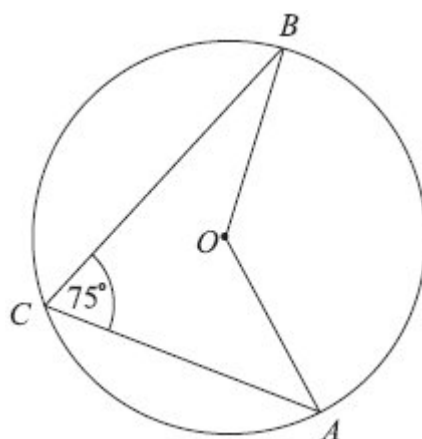
Diagram **NOT** accurately drawn

In the diagram, *A*, *B* and *C* are points on the circumference of a circle, centre *O*.
Angle *ACB* = 75°.

(i)   Work out the size of angle *AOB*.

…………°

(ii) Give a reason for your answer.

....

....

(Total 2 marks)

18.

Diagram **NOT**
accurately drawn

In triangle *ABC*,
AB = 8.1 cm,
AC = 7.5 cm,
angle *ACB* = 30°.

(a) Calculate the size of angle *ABC*.

Give your answer correct to 3 significant figures.

……………………°

(3)

(b) Calculate the area of triangle *ABC*.

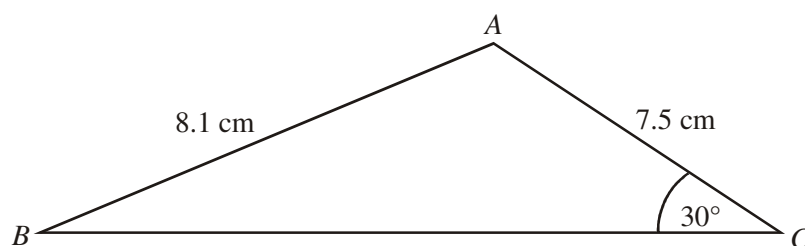Give your answer correct to 3 significant figures.

…………………..cm^2

(3)
(Total 6 marks)

19. Correct to 2 significant figures, the area of a rectangle is 470 cm^2.
Correct to 2 significant figures, the length of the rectangle is 23 cm.

Calculate the upper bound for the width of the rectangle.

Write down all the numbers on your calculator display.

………………………. cm
(Total 3 marks)

TOTAL FOR PAPER: 60 MARKS

END

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2544 Unit 4 Higher tier Practice Paper D (Section B – Calculator) Mark Scheme

Qu	Working	Answer	Mark	Notes
1a		Translation	1	B1 for translation 3 to the right and 2 up
b		4	1	B1 cao
2	7×100^2	70 000	2	M1 for 7×100^2 A1 cao
3	$360 \div 24$	15	2	M1 for $360 \div 24$ A1 cao
4a		15	1	B1
b		15	1	B1
c			2	B1 for straight line across 4 blocks B1 (indep) for a line from a distance of 20 km to 0 km across 8 blocks
5		C E A B D	3	B3 (B2 for 3 or 4 correct) (B1 for 1 or 2 correct)
6	$\pi (9.7)^2 = \pi\, 94.09$ $= 295.5924\ldots$	295 – 296 cm^2	3	M1 for $\pi (9.7)^2$ A1 for answer of 295 to 296 inclusive B1 (indep) for cm^2
7	$17.5 \div 100 \times 422 = 73.85$ $422 + 73.85$	495.85	2	M1 for $17.5 \div 100 \times 422$ oe or 73.85 seen A1 cao
8	$8^2 + 11^2 = 64 + 121 = 185$ $\sqrt{185}$	13.6 …	3	M1 for $8^2 + 11^2$ oe or 185 seen M1 (dep) for $\sqrt{"185"}$ A1 for 13.6(0137051)
9a	$7x - 3x = -2 - 2$ $4x = -4$ $x = -4 \div 4$	−1	3	M1 for $7x - 3x = -2 - 2$ or $2 + 2 = -3x + 7x$ M1 for $x = -4 \div 4$ or $4 \div -4$ A1 cao

b	$3(2x + 1) = 5x$ $6x - 5x = -3$	-3	2	M1 for $3(2x + 1) = 5x$ or $6x + 3 = 5x$ A1 cao
10	$\dfrac{(7.9 + 4.39682...) \times 4.32}{7.721}$	6.88	3	B3 for 6.88 or better (6.880236263) (B2 for 53.122 … seen or 6.9 seen) (B1 for 4.3968… or 12.2968… or 7.721 seen)
11a		(10),5,2,1,2,5,(10)	2	B2 for all correct (B1 for 3, 3 or 4 correct)
b		correct graph	2	B2 for correct curve (with a curve at the minimum point) (B1 for 5 correct points plotted f.t. dep on B1 scored in part a)
12			3	B1 for bearing of 30° ± 2° from C B1 for bearing of 290° ± 2° from B B1 for correct position of $\times$ (need not be labelled)
13	$100 \div 88 \times 242$	275	3	B1 for 88 or 0.88 seen M1 for $100 \div$ "88" $\times 242$ oe A1 cao
14		Triangle with coordinates $(4, -1), (4, 5), (6, -1)$	3	B3 for correct triangle (B2 for triangle in correct orientation, correct size or correct triangle, incorrect scale factor) (B1 for 1 line in correct position or any triangle, s.f. = 2)
15	$10 \div 100 \times 1200 = 120$ $1200 - 120 = 1080$ $10 \div 100 \times 1080 = 108$ $1080 - 108 =$	972	3	M1 for $10 \div 100 \times 1200$ or 120 seen or 1080 seen M1 (dep) for $10 \div 100 \times$ "1080" or 108 seen A1 cao
16a	$5 = \frac{1}{2}x + 1$ $5 - 1 = \frac{1}{2}x$ $x = (5 - 1) \times 2$	8	2	M1 for $5 = \frac{1}{2}x + 1$ oe A1 cao
b	$y - 1 = \frac{1}{2}x$	$2(y - 1)$ or $2y - 2$	2	M1 for $y - 1 = \frac{1}{2}x$ or $2y = x + 2$ A1 for $2(y - 1)$ or $2y - 2$

17		150	2	B1 for 150 B1 for angle at the centre = twice the angle at the circumference
18a	$\dfrac{\sin ABC}{7.5} = \dfrac{\sin 30}{8.1}$ $\sin ABC = \dfrac{7.5 \sin 30}{8.1} =$ $ABC = \sin^{-1} 0.4629$	27.6	3	M1 for $\dfrac{\sin ABC}{7.5} = \dfrac{\sin 30}{8.1}$ or 0.4629 seen M1 for $\sin^{-1} 0.4629$ A1 for 27.6 or better (27.57846…)
b	$180 - 30 - \text{"27.6"} = 122.4$ A = ½ ×8.1×7.5sin "122.4"	25.3	3	B1 for $180 - 30 - \text{"27.6"}$ or 122.4 seen M1 for A = ½ $\times$ 8.1 $\times$ 7.5 $\times$ sin "122.4" A1 for 25.3(2983…)
19	W = Big 470 ÷ small 22.5 = 475 ÷ 22.5	21.1111(1111)	3	B1 for 475 or 22.5 seen M1 for 475 ÷ 22.5 A1 for 21.111 or better