OCR
RECOGNISING ACHIEVEMENT

GENERAL CERTIFICATE OF SECONDARY EDUCATION **1962/4**

MATHEMATICS SYLLABUS A

PAPER 4 (Intermediate Tier)

MONDAY 15 JANUARY 2007 Morning

Time: 2 hours

Additional materials: Electronic Calculator
Geometrical instruments
Tracing paper (optional)

Candidate Name

Centre Number

Candidate Number

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Show your working. Marks may be given for working that shows that you know how to solve the problem even if you get the answer wrong.
- You are expected to use an electronic calculator for this paper.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- Unless otherwise instructed in the question, take π to be 3.142 or use the π button on your calculator.

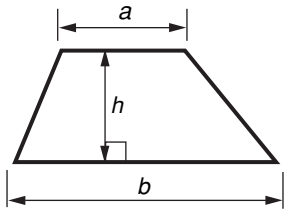
For Examiner's Use

This document consists of **19** printed pages and **1** blank page.

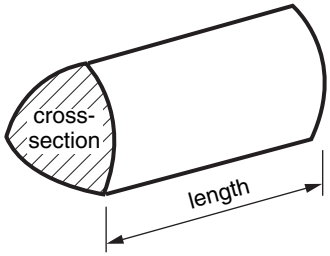
[Turn over

Formulae Sheet: Intermediate Tier

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



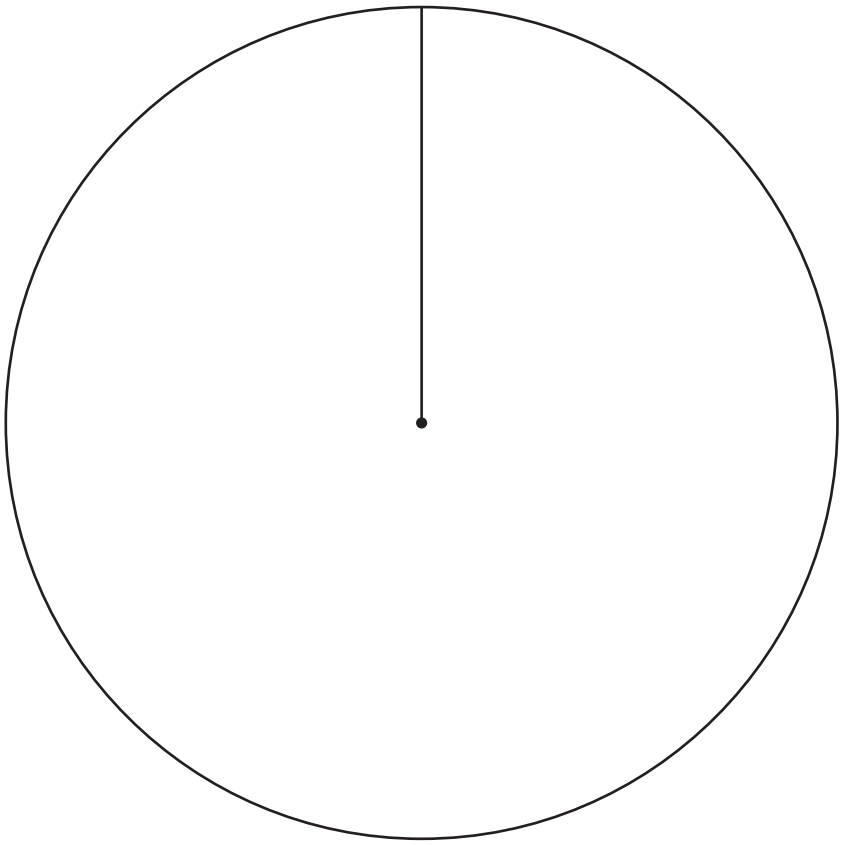
Volume of prism = (area of cross-section) $\times$ length



1 John asked 90 students, 'How many programmes did you watch on TV yesterday?' The results are shown in the table.

Number of programmes	Number of students
0	5
1 or 2	30
3 or 4	45
More than 4	10

(a) Using the circle below, draw and label a pie chart to show this information.



[4]

(b) John wanted to find out how many hours the students had spent watching TV.

Explain why his question was not suitable.

_____

_____

_____ [1]

2 When Jane visited Australia the exchange rate was

£1 = $ 2.46.

(a) She changed £350 into Australian dollars ($).

How many dollars did Jane receive?

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.....

(a) $ _____[2]

(b) Jane made a phone call which cost $5.

Calculate the cost of the phone call in British money.
Give your answer correct to the nearest penny.

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(b) £ _____[2]

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3 **(a)** Solve.

$5x - 7 = 38$

.....

.....

(a) _____[2]

(b) A washing machine repairer charges a total of £T for a repair which takes H hours.
The formula connecting T and H is

$T = 35 + 20H$.

Find H when T is 85.

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(b) _____[3]

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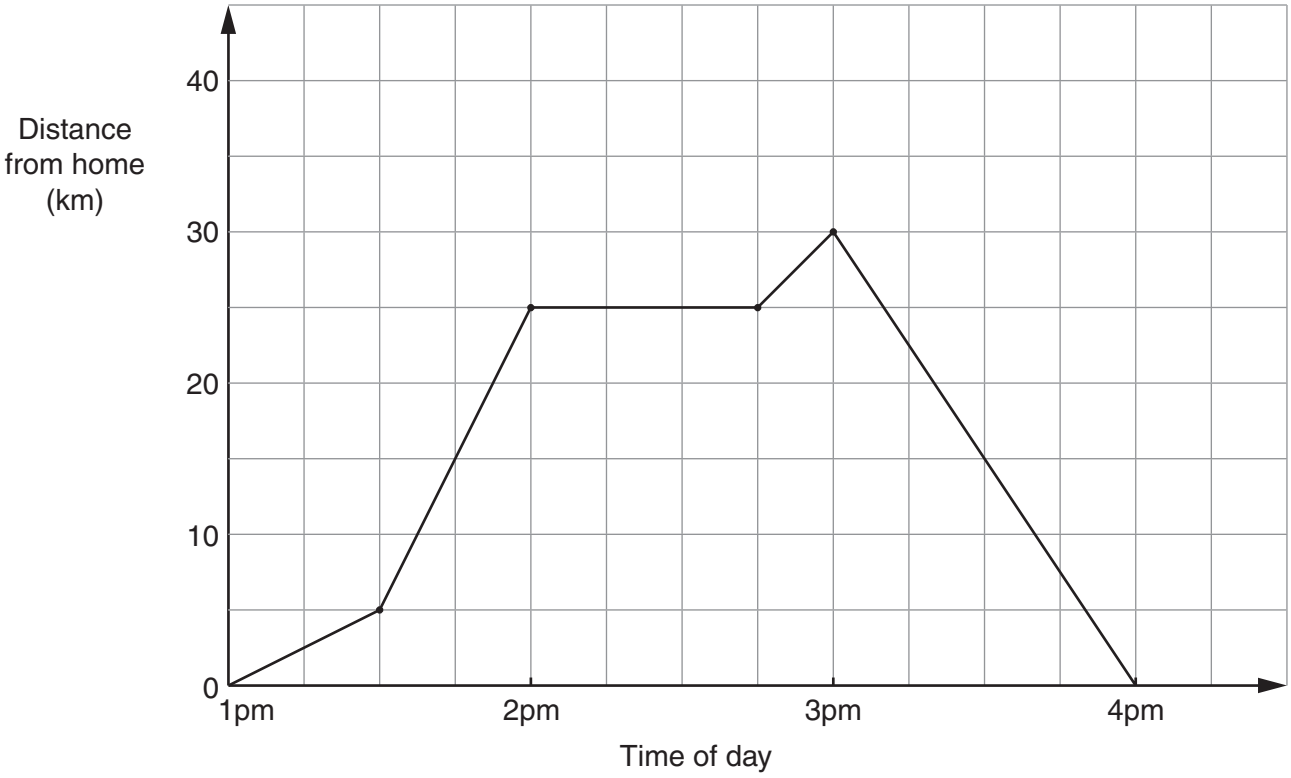
4 The distance-time graph below shows Khalid's bicycle trip.



Khalid left home at 1 pm.

(a) How far was he away from home at 1 45 pm?

(a) _____km [1]

(b) What happened between 2 pm and 2 45 pm?

_____

_____ [1]

(c) Between which times was Khalid cycling fastest?

(c) Between _____ and _____[1]

(d) By the time he returned home Khalid had cycled 60 km in total.

Calculate the average speed for Khalid's trip.

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.....

(d) _____ km/h [2]

5 **(a)** Hannah had her photograph taken at nursery school.
The photographer sells different packs of photographs.

One large photograph and four small photographs cost £17.
One large photograph and three small photographs cost £14.

Work out the cost of one **large** photograph.

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(a) £ _____[3]

(b) A small photograph is a rectangle measuring 10.2 cm by 13.5 cm.

(i) Work out the area of a small photograph.

.....

.....

(b)(i) _____ cm^2 [2]

A large photograph is an enlargement of a small photograph with scale factor 3.

(ii) Work out the length and width of a large photograph.

.....

.....

(ii) _____cm by _____cm [2]

(iii) How many times bigger is the area of the large photograph than the area of the small photograph?

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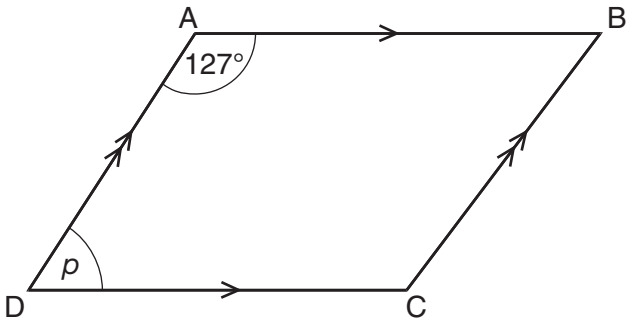
(iii) _____ [2]

6 **(a)**



NOT TO SCALE

In the diagram AB is parallel to DC and AD is parallel to BC.

(i) Work out angle *p*. Give a reason for your answer.

p = _____° because _____

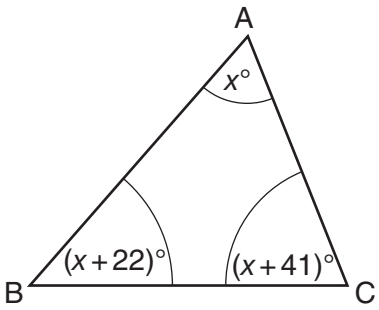
_____ [2]

(ii) All the sides of ABCD are equal.

What is the special name of this shape?

(ii) _____[1]

(b)



NOT TO SCALE

The angles of triangle ABC are $x°$, $(x + 22)°$ and $(x + 41)°$.

Form an equation in terms of x and solve it to find the value of x.

_____

_____

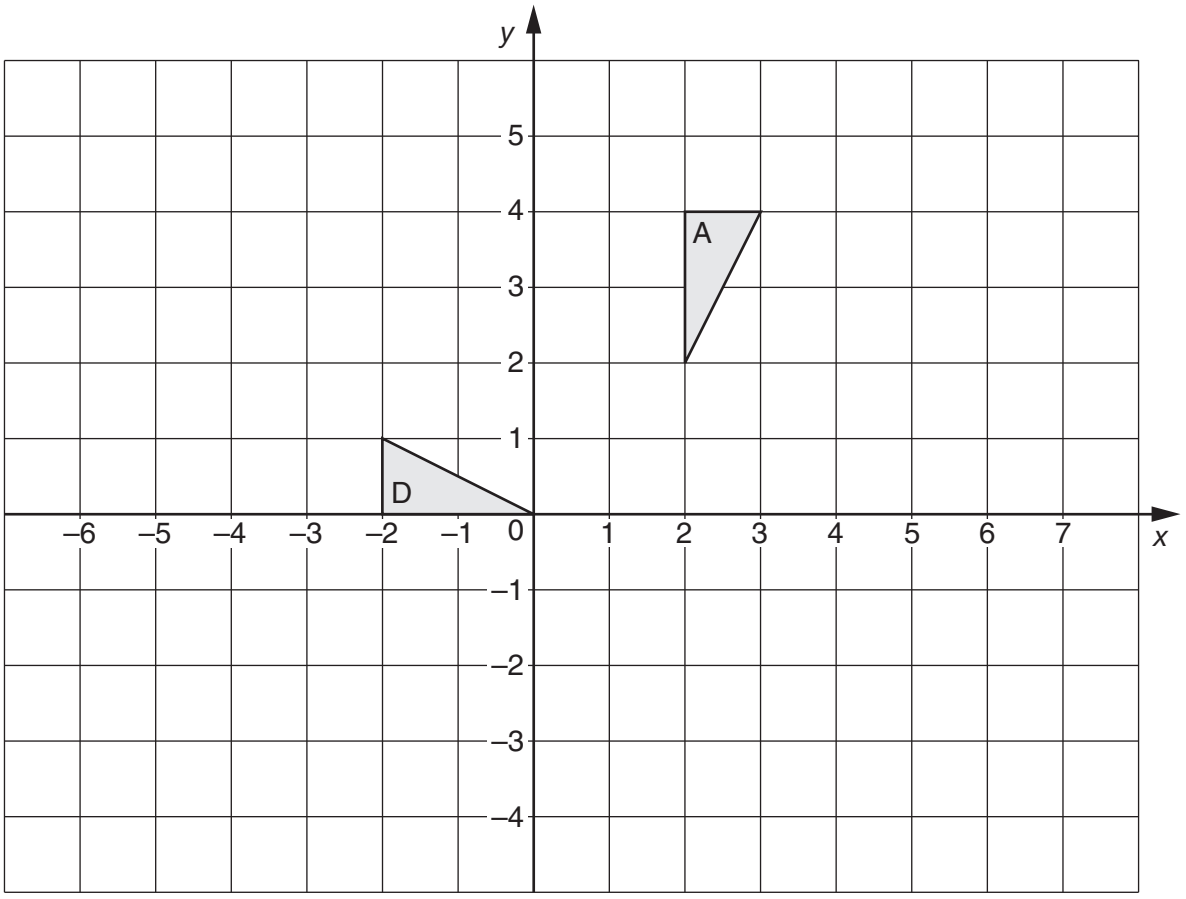
_____

_____

_____

(b) x = _____[4]

7



(a) Reflect triangle **A** in the y axis.
Label the image **B**. [1]

(b) Translate triangle **A** by 2 units to the right and 4 units down.
Label the image **C**. [1]

(c) Describe fully the **single** transformation that maps triangle **A** onto triangle **D**.

_____

_____

_____ [3]

8 (a)

Tom is buying a new car. He can pay in one of two ways.

- £9640 in cash.
- A deposit of **one quarter** of the cash price plus 18 payments each of £510.

How much cheaper is it to pay in cash?

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(a) £ _____[5]

(b) A car headlight is a circle of radius 8.7 cm.

Calculate the area of the circle.
Give the units of your answer.

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.....

(b) _____[3]

9 Use your calculator to work these out.

(a) $\dfrac{13.72}{17.55 - 15.87}$

Give your answer correct to one decimal place.

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(a) _____[2]

(b) $\sqrt{0.42 \times 12.7 + 4.8^2}$

Give your answer correct to three significant figures.

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(b) _____[2]

(c) The reciprocal of 1.25

.....

(c) _____[1]

(d) $(1.5 \times 10^3)^2$

Give your answer in standard form.

.....

(d) _____[2]

(e) $5\cos 60° + 8\sin 30°$

.....

(e) _____[1]

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10 Here is a number pattern.

1st Term	2nd Term	3rd Term	4th Term
1×4	2×5	3×6	4×7

Write down an expression, in terms of n, for the nth term of the number pattern.

.....

.....

_____[2]

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11 **(a)** Factorise.

$12y + 9$

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(a) _____[1]

(b) Solve this inequality.

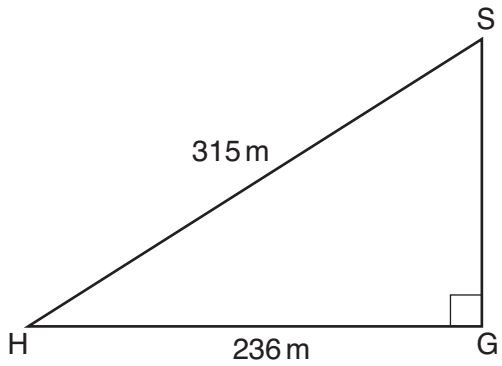
$3x + 1 > 13$

.....

.....

(b) _____[2]

12



NOT TO SCALE

Razia's home (H) is next to her school playing field.
She can walk 315 m across the playing field to school (S), or she can walk 236 m along the road to the school gate (G) then up the drive (GS). The angle at G is 90°.

Work out the distance GS.

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.....

.....

_____ m [3]

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13 **(a)** Simplify.

(i) $2p \times 3p$

(a)(i) _____[1]

(ii) $m^2 \times m^7$

(ii) _____[1]

(iii) $\frac{t^3}{t}$

.....

(iii) _____[1]

(b) 36 can be written as the product of prime factors.

$$36 = 2 \times 2 \times 3 \times 3$$

(i) Write 30 as the product of prime factors.

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(b)(i) _____ [2]

(ii) Work out the highest common factor (HCF) of 30 and 36.

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(ii) _____ [1]

(iii) Richard and John are cyclists. Richard completes each lap of a track in 30 seconds.
John completes each lap of the same track in 36 seconds.
They start a race together from the start line.

How long will it be before they next cross the start line together?

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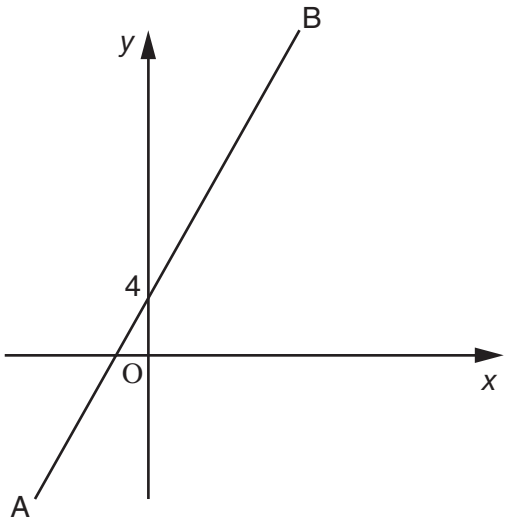
(iii) _____seconds [2]

14 The straight line AB has gradient 3 and passes through the point (0, 4).

NOT TO SCALE



(a) Write down the equation of the line AB.

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(a) _____[2]

(b) Work out the equation of the straight line which passes through the point (6, 0) and is parallel to the line AB.

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.....

(b) _____[2]

15 (a) When Springton Rovers play a home match, the probability that they will win is 0.45. The probability that they will draw is 0.25.

Work out the probability that Springton Rovers will lose a home match.

.....

.....

(a) _____[2]

(b) The grouped frequency table below summarises the attendance figures for the last 25 home matches played by Springton Rovers.

Attendance (x)	Frequency
$0 \leqslant x < 1000$	2
$1000 \leqslant x < 2000$	12
$2000 \leqslant x < 3000$	7
$3000 \leqslant x < 4000$	3
$4000 \leqslant x < 5000$	1

Calculate an estimate of the mean attendance.

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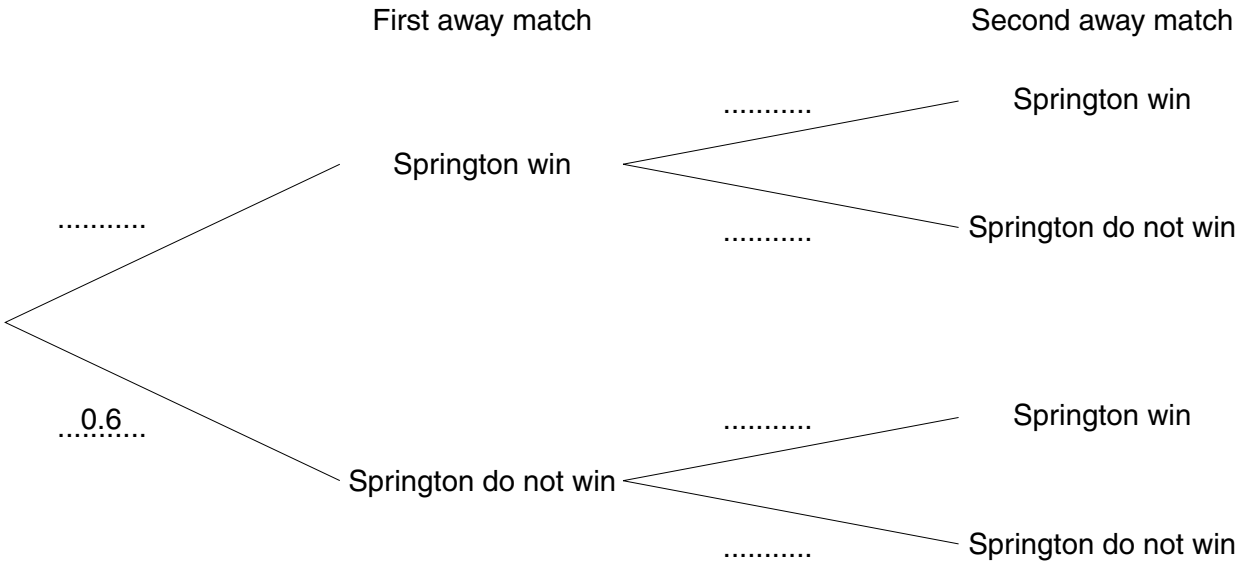
(b) _____[4]

(c) When Springton Rovers play an away match, the probability they will **not** win is 0.6.

(i) Complete the tree diagram below for the next two away matches.
The results are independent.



[2]

(ii) Calculate the probability that Springton Rovers **will win** both of these away matches.

.....

.....

(ii) _____[2]

16 In a sale, the price of a new kitchen is reduced by 25%.

The price in the sale is £7245.

Calculate the price of the kitchen before the sale.

.....

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.....

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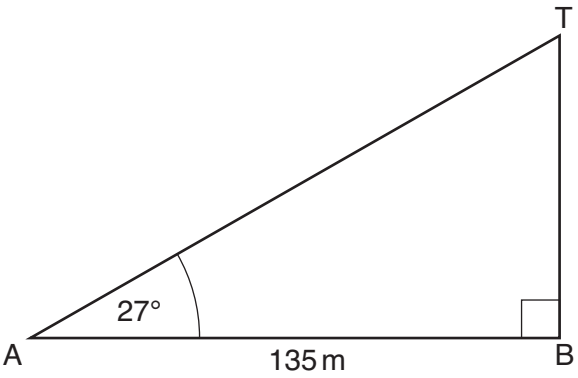
£ _____[3]

17



NOT TO SCALE

Point A is 135 metres from the base, B, of a tower.
The angle of elevation of the top, T, of the tower from A is 27°. Angle ABT is 90°.

Calculate BT, the height of the tower.
Give your answer to an appropriate degree of accuracy.

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_____m [4]

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18 In these expressions a, b and c represent lengths.

$2a + 2b + 2c$	$\pi\sqrt{ab}$	$a(b + c)$	$\frac{ab}{c}$

Which one of these expressions could represent an area?
Show how you decide.

_____ because _____

_____

_____ [2]

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19 **(a)** Multiply out the brackets and simplify.

$$(x + 7)(x - 3)$$

.....

.....

(a) _____[2]

(b) Simplify.

$$\frac{x(x + 5)}{(x + 5)}$$

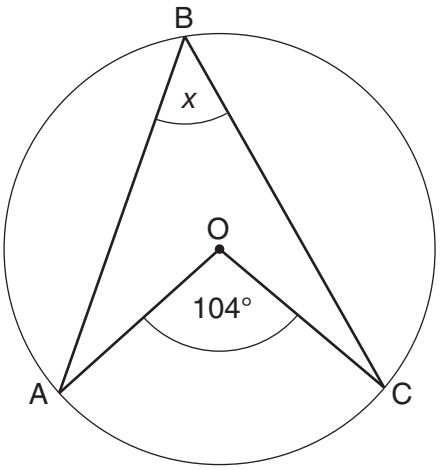
.....

.....

(b) _____[1]

Turn over for question 20

20



NOT TO SCALE

In the diagram A, B and C are points on the circumference of the circle, centre O.

Work out angle *x*. Give a reason for your answer.

x = _____° because _____

_____

_____ [2]

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