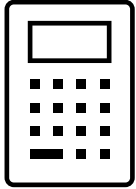


Surname:

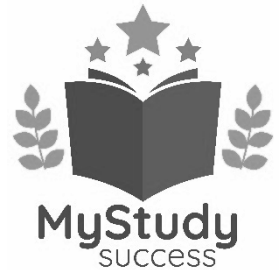
Forename(s):

GCSE Mathematics – Higher Tier

Paper 2 – Calculator



Practice Set D



Materials

- **Formulae Sheet** (on the next page)
- **Black** ink or ball-point pen
- Pencil
- Eraser
- Protractor
- Compass
- Tracing Paper
- **Calculator allowed**

/40

Instructions

- Time allowed: **45 minutes**.
- The total mark for this paper is **40**.
- Show **all** of your working.
- Draw diagrams in pencil.
- Plot graphs in pencil.
- Diagrams are **not** accurately drawn, unless otherwise indicated.
- Cross through any work you don't want to be marked

Higher Tier Formulae Sheet

Perimeter, Area and Volume

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

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

Volume of a prism = area of cross section $\times$ length

Where r is the radius and d is the diameter:

Circumference of a circle = $2\pi r = \pi d$

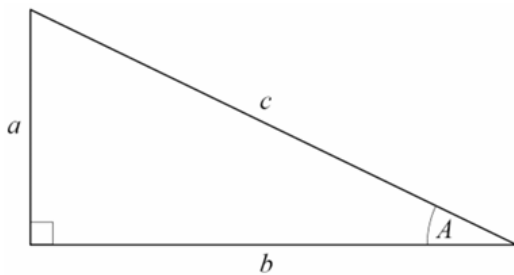
Area of a circle = πr^2

Quadratic Formula

The solution of $ax^2 + bx + c = 0$ where $a \neq 0$

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

Pythagoras' Theorem and Trigonometry

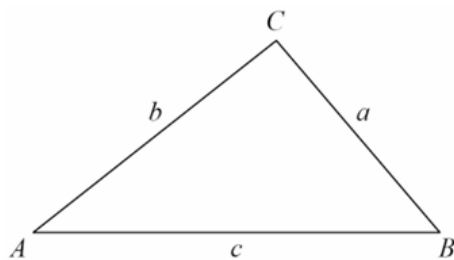


In any right-angled triangle where a , b and c are the length of the sides and c is the hypotenuse:

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

In any right-angled triangle ABC where a , b and c are the length of the sides and c is the hypotenuse:

$$\sin A = \frac{a}{c} \quad \cos A = \frac{b}{c} \quad \tan A = \frac{a}{b}$$



In any triangle ABC where a , b and c are the length of the sides:

$$\text{sine rule: } \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\text{cosine rule: } a^2 = b^2 + c^2 - 2bc \cos A$$

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

Compound Interest

Where P is the principal amount, r is the interest rate over a given period and n is number of times that the interest is compounded:

$$\text{Total accrued} = P \left(1 + \frac{r}{100} \right)^n$$

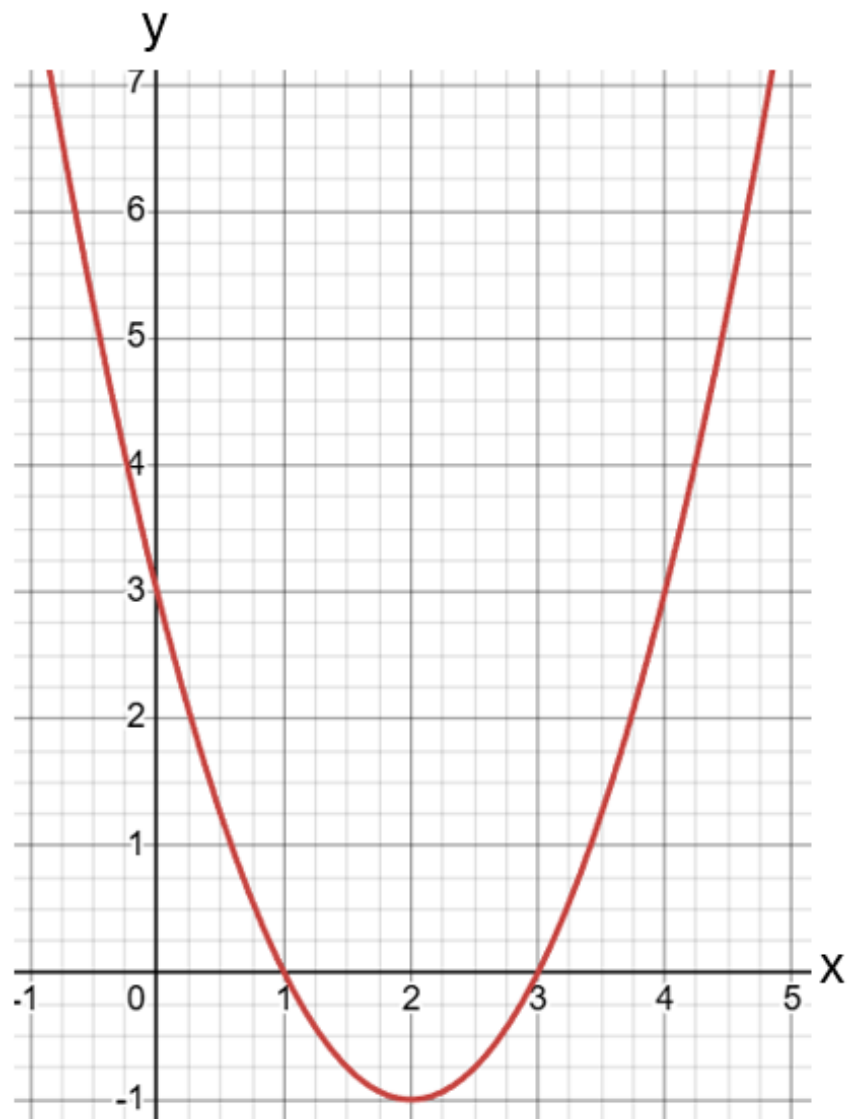
Probability

Where $P(A)$ is the probability of outcome A and $P(B)$ is the probability of outcome B :

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$P(A \text{ and } B) = P(A \text{ given } B)P(B)$$

1 Below is the graph of $y = x^2 - 4x + 3$



(a) Write down the turning point of the graph $y = x^2 - 4x + 3$

(_____ , _____)

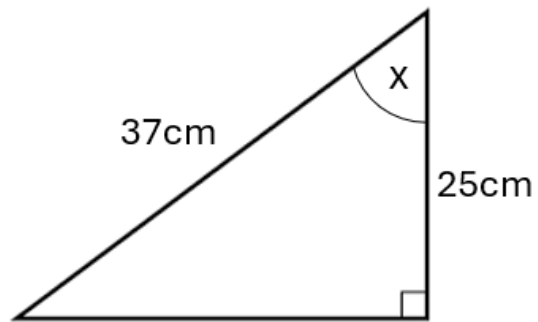
(1)

(b) Use your graph to find the roots of the equation $x^2 - 4x + 3 = 0$

(2)

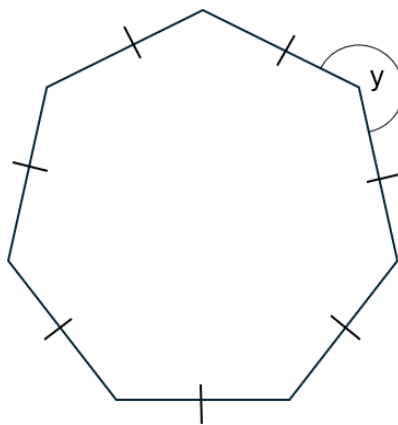
(Total for question 1 is 3 marks)

2 (a) Work out the size of angle x



_____°
(3)

(b) Work out the size of angle y.



_____°
(3)

(Total for question 2 is 6 marks)

- 3 The table below shows information about the weights of 110 lemons.

Weight (w grams)	Frequency
$50 < w \leq 100$	25
$100 < w \leq 150$	34
$150 < w \leq 200$	22
$200 < w \leq 250$	19
$250 < w \leq 300$	10

- (a) Write down the modal class interval.

(1)

- (b) Calculate an estimate for the mean weights of the 110 lemons.

Give your answer correct to 3 significant figures.

_____ grams

(3)

(Total for question 3 is 4 marks)

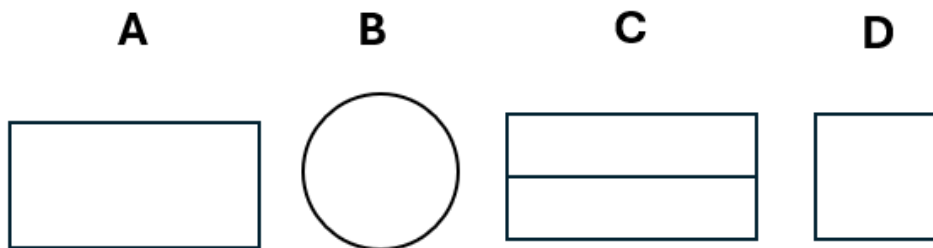
- 4 Jenson bought a new car.
After a year, the value of the car depreciated by 19%
After another year the value of the car depreciated by 14%
The value of the car is now £10797.30

What was the value of the car when Jenson bought it.

£ _____

(Total for question 4 is 3 marks)

- 5 The diagrams below show the plan view of shapes A, B, C and D.



Match each shape with the corresponding letter of each plan view.

Shape	Plan View
Cube	
Sphere	
Cylinder	
Triangular Prism	

(Total for question 5 is 2 marks)

- 6 n is the middle integer of three consecutive positive integers.
Prove that the product of these numbers, plus the middle integer results in a cube number.

(Total for question 6 is 4 marks)

-
- 7 The bearing of Town B from town A is 275°
Write down the bearing of town A from town B.

_____°
(Total for question 7 is 2 marks)

- 8 The number of ladybirds in a population at the start of year n is P_n
The number of ladybirds in the population at the start of year $(n+1)$ is P_{n+1} , where

$$P_{n+1} = kP_n$$

Given that k has a constant value of 1.33

- (a) Work out how many years it takes for the number of ladybirds in the population to triple.

You must show how you get your answer.

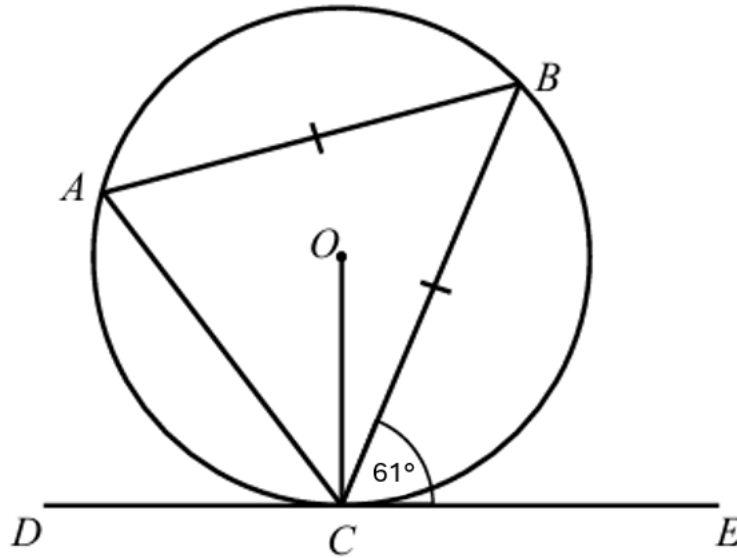
_____ years
(2)

- (b) After the first year, the value of k decreases from 1.33 to 1.21.
How does this affect your answer to part (a)?

(1)

Total for question 8 is 3 marks)

- 9 A, B and C are points on the circumference of a circle with centre O.
DE is a straight line which meets the circle at the circumference at point C.
 $AB = BC$
Angle $BCE = 61^\circ$

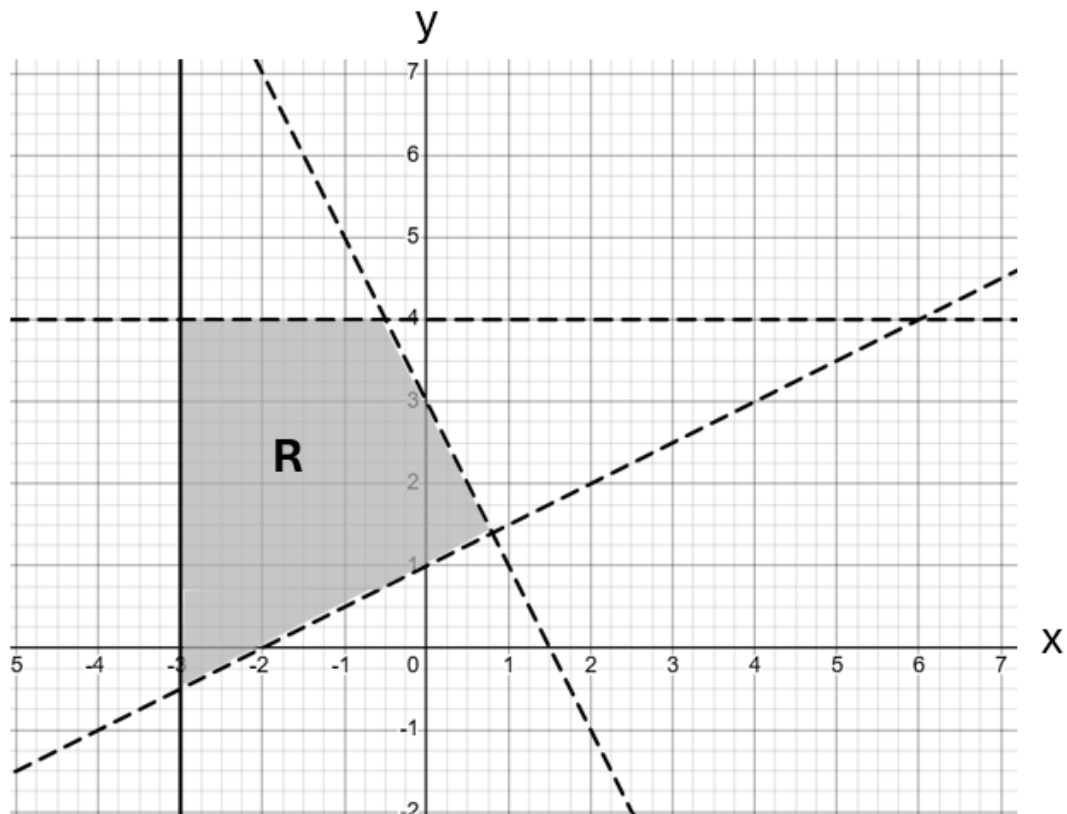


Calculate the size of angle AOC.

Write down any angle rules or circle theorems that you use in your working.

_____°
(Total for question 9 is 4 marks)

10 The shaded region R shown on the grid below is bounded by four straight lines.



Write down the four inequalities that define the shaded region R.

(Total for question 10 is 4 marks)

11 Solve the simultaneous equations.

Write down the coordinates of their points of intersection.

$$x^2 + y^2 = 20$$

$$y = 6 - 2x$$

(_____ , _____)

(_____ , _____)

(Total for question 11 is 5 marks)

END OF TEST

TOTAL FOR THIS PAPER IS 40 MARKS