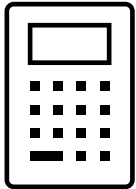


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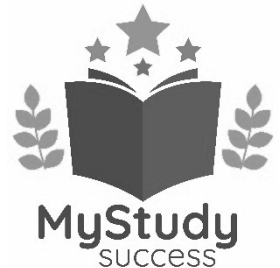
Forename(s):

GCSE Mathematics – Higher Tier

Paper 3 – Calculator



Practice Set C



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 = $2\pi r = \pi d$

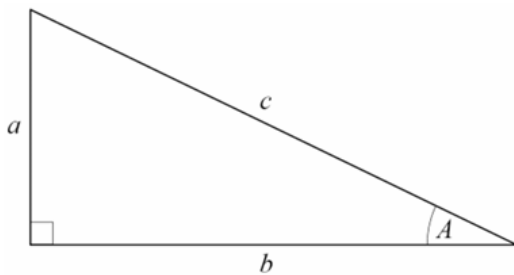
Area of a circle = πr^2

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

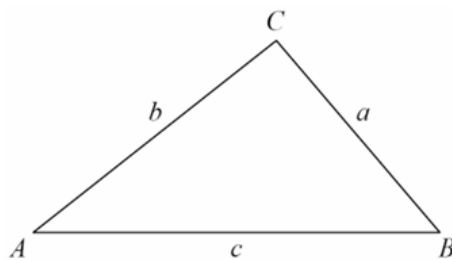


In any right-angled triangle where a , b and c are the length of the sides and c is the hypotenuse:

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

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 :

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

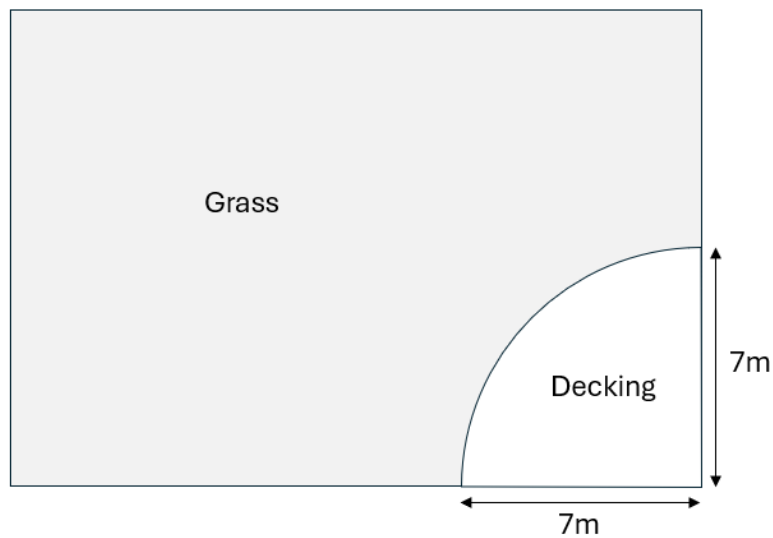
$$P(A \text{ and } B) = P(A \text{ given } B)P(B)$$

- 1 Bernie has a rectangular garden which has a width of 15m and a length of 27.5m. He builds a decking in the shape of a quarter circle with radius 7m.

The rest of the garden needs to be covered in grass seeds.

1 box of grass seed covers 60 square metres.

Work out how many boxes of grass seed Bernie will need to buy.



_____ boxes

(Total for question 1 is 4 marks)

- 2 Work out $\frac{8.82 \times 10^9}{3.6 \times 10^4}$
Give your answer in standard form.

(Total for question 2 is 2 marks)

- 3 In London, potatoes cost 49p per lb.
In Paris, potatoes cost €1.29 per kg.

$$£1 = €1.15$$

$$1\text{ kg} = 2.2\text{ lbs}$$

In which city are potatoes better value for money?
You must show your working.

(Total for question 3 is 3 marks)

4 (a) Simplify $(5 + ax)^0 + 5$

(2)

(b) Simplify $\frac{8x^2 - 8}{2x + 2}$

Give your answer in the form $ax + b$, where a and b are integers to be found.

(3)

(Total for question 4 is 5 marks)

- 5 Michael makes 80 litres of brown paint by mixing orange paint and blue paint in the ratio 5 : 3

One tin of orange paint costs £51.99 and contains 10 litres of paint.

One tin of blue paint costs £29.49 and contains 5 litres of paint.

Michael sells all of the brown paint that he makes.

He sells each tin of brown paint for £55.50 and each tin contains 8 litres of paint.

Work out Michael's percentage profit.

Give your answer to 1 decimal place.

_____ %

(Total for question 5 is 5 marks)

- 6 Simon wants to work out an estimate for the total number of fish in a large fishing lake.

One day, he catches 32 fish from the lake.

He puts a small tag on them all and releases them back into the lake.

The next week, he catches 90 fish from the lake.

3 out of the 90 fish are tagged.

Work out an estimate for the total number of fish in the fishing lake.

_____ fish

(Total for question 6 is 3 marks)

-
- 7 Find the equation of the line parallel to $3x + y - 4 = 0$ which passes through $(0, 5)$

(Total for question 7 is 2 marks)

- 8 The equation of a curve is $y = 4x^2 - 32x + 18$
Prove, by completing the square, that the turning point of the curve has coordinates
(4 , - 46)

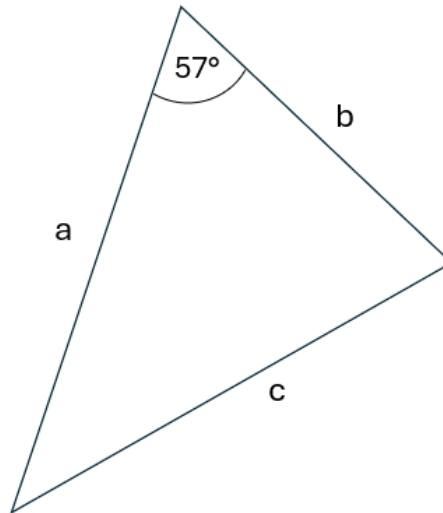
(Total for question 8 is 3 marks)

-
- 8 Convert 25 kilometres per hour into metres per second

_____ metres per second

(Total for question 9 is 3 marks)

10 Here is a diagram of a triangle.



All measurements are in centimetres.

$$a = 10 \text{ cm}$$

$$\frac{a}{b} = \frac{2}{5}$$

Work out the area of the triangle.

Give your answers correct to 3 significant figures.

_____ cm²

(Total for question 10 is 4 marks)

11 $f(x) = x^2 - 1$
 $g(x) = 2x + 1$

(a) Solve $fg(x) = 2f(x)$

$x =$ _____
(4)

Write down an expression for $f^{-1}(x)$

(2)

(Total for question 11 is 6 marks)

END OF TEST

TOTAL FOR THIS PAPER IS 40 MARKS