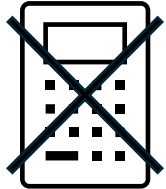


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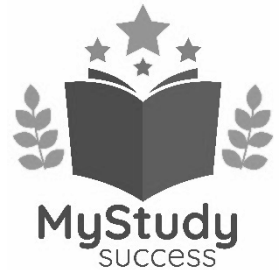
Forename(s):

GCSE Mathematics – Higher Tier

Paper 1 – Non Calculator



Practice Set D



Materials

- **Formulae Sheet** (on the next page)
- **Black** ink or ball-point pen
- Pencil
- Eraser
- Protractor
- Compass
- Tracing Paper
- **No 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 = $2\pi r = \pi d$

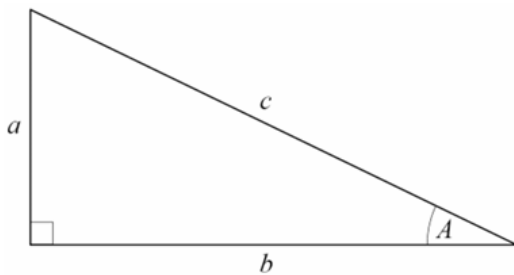
Area of a circle = πr^2

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

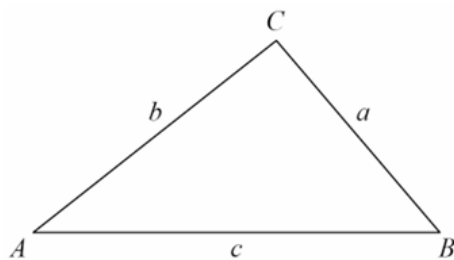


In any right-angled triangle where a , b and c are the length of the sides and c is the hypotenuse:

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

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 (a) Work out the value of $\frac{3^{12} \times 3^3}{3^{11}}$

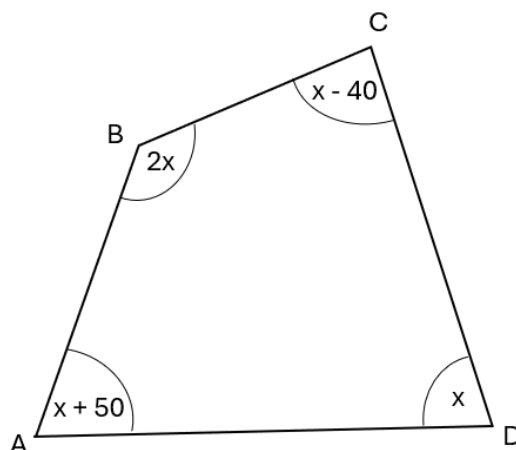
_____ (2)

- (b) Write down the value of 2^{-3}

_____ (1)

(Total for question 1 is 3 marks)

- 2 Here is a diagram of quadrilateral ABCD
All angles are in degrees

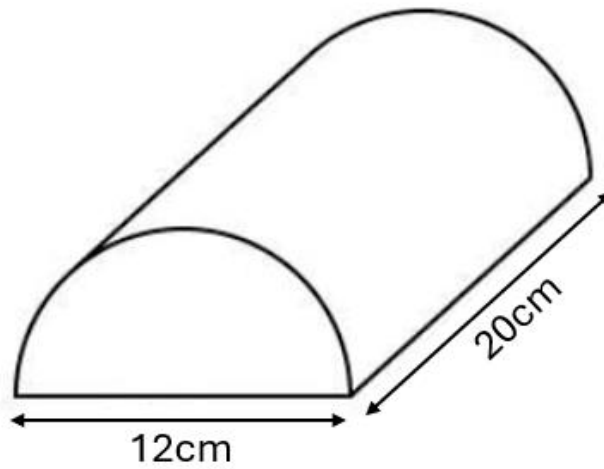


Work out the size of the largest angle in this quadrilateral.

_____ °

(Total for question 2 is 3 marks)

- 3 The diagram shows a half cylinder with diameter 12cm and length 20cm.



This object has a density of 0.3 grams per cm^3 .

Work out the mass of this object.

Give your answer in terms of π in its simplest form.

_____ grams

(Total for question 3 is 5 marks)

4 $e = \sqrt{\frac{f^3 + 3}{2}}$

Make f the subject of the formula.

(Total for question 4 is 3 marks)

5 Solve $\frac{x+5}{3x} + \frac{x-3}{5x} = 2$

Give your answer as a fraction in its simplest form.

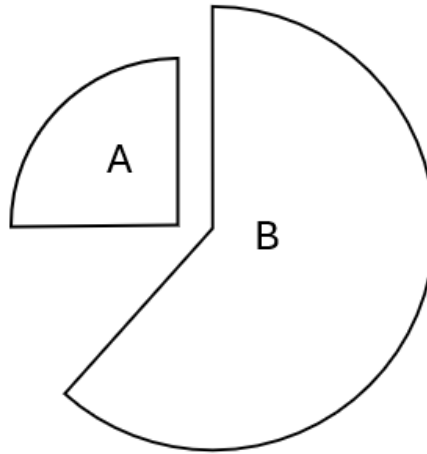
$x =$ _____

(Total for question 5 is 4 marks)

6 The diagram shows shape P and shape Q.

Shape A is $\frac{1}{4}$ of a circle with radius 10cm.

Shape B is $\frac{2}{3}$ of a circle with radius 15cm.



How many times bigger is shape B than shape A.

You must show your working.

(Total for question 6 is 4 marks)

- 7 (a) Rationalise the denominator $\frac{12}{\sqrt{6}}$
Give your answer in its simplest form.

- (b) Show that $\frac{\sqrt{5}}{2\sqrt{5}-2}$ can be written in the form $\frac{a+\sqrt{5}}{b}$ where a and b are integers.

_____ (2)

_____ (3)

(Total for question 7 is 5 marks)

- 8 There are 12 counters in a bag
The counters are either red or white.
 $\frac{1}{6}$ of the counters are white.

Theo takes two counters from the bag at random.

Work out the probability that Theo's counters are different colours.

You must show your working.

(Total for question 8 is 4 marks)

8 Given that $y < 180^\circ$

Solve $\cos y = \tan 30^\circ \times \sin 60^\circ$

$y = \underline{\hspace{2cm}}^\circ$

(Total for question 9 is 3 marks)

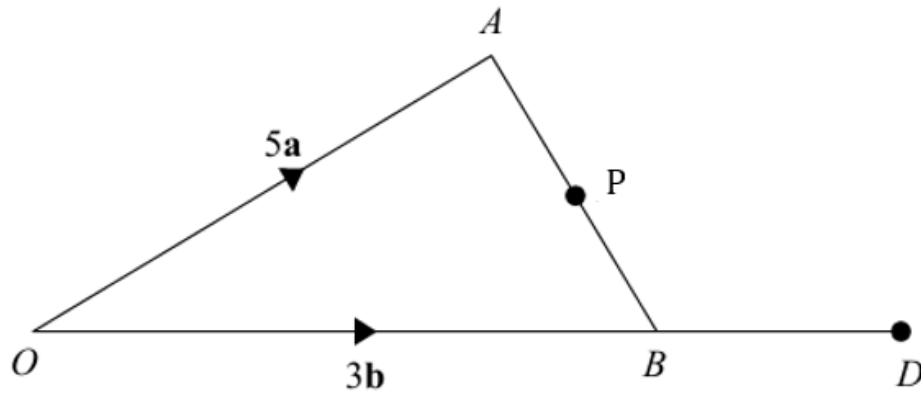
9 The table gives information about the test scores of students in Set 1 and Set 2.
All students sat the same test paper.

	Median Score	Interquartile Range of Scores
Set 1	71	42
Set 2	62	35

Make **one** comparison of the distribution of scores in Set 1 and Set 2.

(Total for question 10 is 1 marks)

11



$$\overrightarrow{OA} = 5\mathbf{a}$$

$$\overrightarrow{OB} = 3\mathbf{b}$$

P is the midpoint of AB

Q is the point on OA such that $OQ : QA = 4 : 1$

D is the point such that $OB : BD = 3 : 1$

Prove that QPD is a straight line.

(Total for question 11 is 5 marks)

END OF TEST

TOTAL FOR THIS PAPER IS 40 MARKS