

GCSE Mathematics — Higher Tier

Mixed practice paper · Calculator allowed

Name: _____

Date: _____

Total: **53 marks**

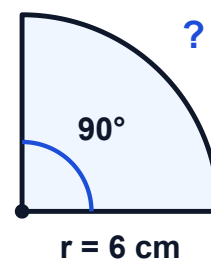
Instructions

- Answer all questions in the spaces provided.
- Show all working. Marks may be awarded for method.
- Diagrams are not drawn to scale.
- Calculators may be used unless a question says otherwise.

1 Arc length

2 marks

A sector of a circle has radius 6 cm and angle 90° . Work out the arc length. Give your answer in terms of π .



2 Venn diagrams

3 marks

In a class of 40 students, 14 study French, 18 study Spanish and 6 study both. Work out the number of students who study neither.

3 Solving linear equations

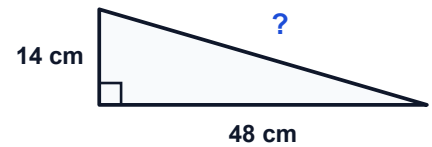
3 marks

Solve the equation $(2x + 2)/2 = (2x + 8)/4$.

4 Pythagoras

2 marks

A right-angled triangle has shorter sides of length 14 cm and 48 cm. Work out the length of the hypotenuse.



5 Expanding triple brackets

3 marks

Expand and simplify $(x - 2)(x - 2)(x - 4)$.

6 Simultaneous equations

4 marks

Solve the simultaneous equations

$$4x + 5y = 18$$

$$x + 5y = 12$$

7 Bounds

2 marks

A number x is rounded to 1 decimal place to give 5.2. Write down the lower and upper bounds of x .

8 Completing the square

3 marks

Write $x^2 + 10x + 19$ in the form $(x + p)^2 + q$.

9 Ratio sharing

3 marks

Ali, Ben and Cara share £108 in the ratio 4 : 5 : 3. Work out how much Ben receives.

10 Sequences (nth term)

2 marks

Here are the first five terms of a sequence:

11, 6, 1, -4, -9

(a) Find an expression for the n th term.

(b) Hence find the 50th term.

11 Standard form

2 marks

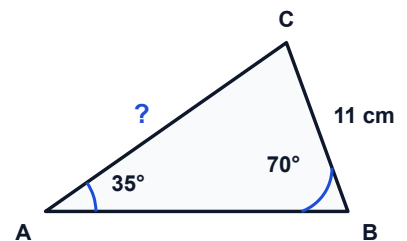
Work out $(7.4 \times 10^{-1}) \times (9.3 \times 10^1)$. Give your answer in standard form.

12 Sine rule

3 marks

In triangle ABC, angle A = 35° , angle B = 70° and side a = 11 cm.

Work out the length of side b. Give your answer to 3 significant figures.



13 Compound measures

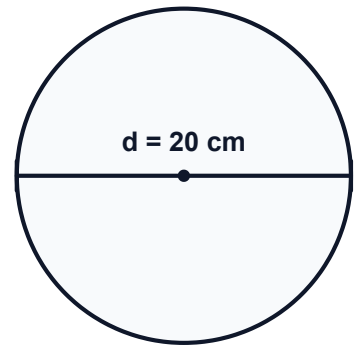
2 marks

A car travels at 60 mph for 3 hours. Work out the distance travelled.

14 Area of a circle

2 marks

A circle has diameter 20 cm. Work out its area in terms of π .



15 Rearranging formulae

3 marks

Make x the subject of $y = (3x + 1)/4$.

16 Geometric sequences

2 marks

The first three terms of a geometric sequence are 3, 9, 27. Work out the 7th term.

17 Percentages (reverse)

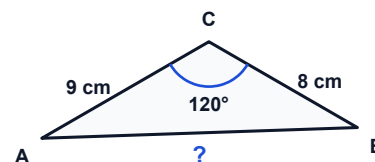
2 marks

In a sale, all prices are reduced by 30%. A coat now costs £50.40. Work out the original price.

18 Cosine rule

3 marks

In triangle ABC, side $a = 8$ cm, side $b = 9$ cm and angle $C = 120^\circ$. Work out the length of side c . Give your answer to 3 significant figures.

**19** Functions

4 marks

$f(x) = 5x - 1$ and $g(x) = x^2 + 1$.

(a) Work out $fg(2)$.

(b) Find $f^{-1}(x)$.

20 Quadratic formula

3 marks

Solve $x^2 + 3x - 5 = 0$. Give your answers to 3 significant figures.