



GCSE MATHEMATICS

S21-C300

Non-Calculator Assessment Resource P

Higher Tier

Formula list

Area and volume formulae

Where r is the radius of the sphere or cone, l is the slant height of a cone and h is the perpendicular height of a cone:

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

$$\text{Volume of a sphere} = \frac{4}{3}\pi r^3$$

$$\text{Volume of a cone} = \frac{1}{3}\pi r^2 h$$

Kinematics formulae

Where a is constant acceleration, u is initial velocity, v is final velocity, s is displacement from the position when $t = 0$ and t is time taken:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

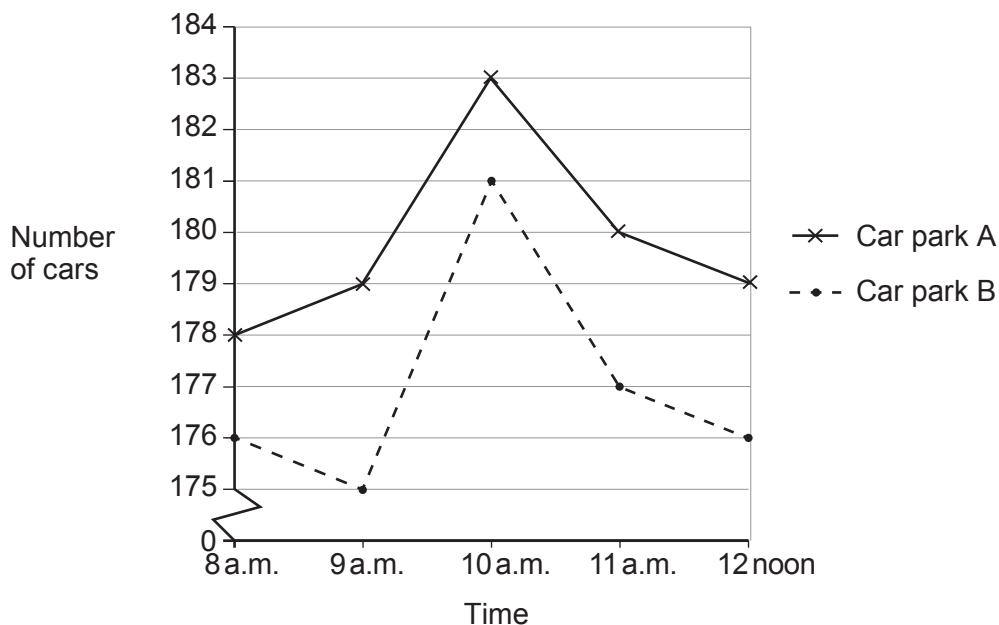
$$v^2 = u^2 + 2as$$

1. Peter and Paula record the number of cars in each of two airport car parks, A and B, between 8 a.m. and 12 noon one Saturday morning. This was done to find out if there was a peak time for parking during that period.

The table shows the data they collected.

Time	8 a.m.	9 a.m.	10 a.m.	11 a.m.	12 noon
Number of cars in car park A	178	179	183	180	179
Number of cars in car park B	176	175	181	177	176

Paula draws this graph to represent the data.



Peter says,

"This graph is not sensible as it does not show the data fairly."

- (a) What has been done in the drawing of the graph that has made Peter think this? [1]

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- (b) What error might this lead to, for people who do not look carefully at the graph? [1]

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3. (a) Simplify $\frac{x^2 \times x^7}{x^3}$. [2]

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(b) (i) Find the positive value of $16^{\frac{1}{4}}$. [1]

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(ii) Find the value of $27^{\frac{4}{3}}$. [2]

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- (c) **Estimate** the value of $(3.9 \times 10^6)^3$.
Give your answer in standard form.

[3]

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Estimate

- (d) Write $\frac{42}{\sqrt{6}}$ in the form $a\sqrt{6}$ where a is an integer.

[2]

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5. Write $7.\overline{341}$ as a fraction.

[2]

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6. Alys has 10 different-coloured tokens.
Each day, she chooses 3 of her tokens at random and places them in a row on her desk.

(a) Find the number of different ways in which this can be done. [2]

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(b) One of her tokens is pink and another is green.

Find the number of arrangements where the middle token is pink or green. [2]

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8. In this question, all lengths are in centimetres.

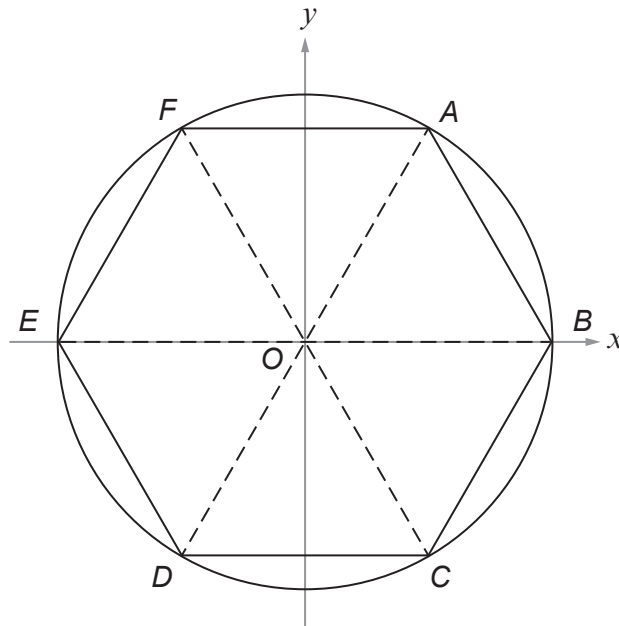


Diagram not drawn to scale

The diagram shows a sketch of a circle, centre O .
 Points A, B, C, D, E and F lie on the circumference of the circle.
 Triangles AOB, BOC, COD, DOE, EOF and FOA are congruent.

The circle has equation $x^2 + y^2 = \frac{25}{4}$.

Calculate the perimeter of the hexagon $ABCDEF$.
 You must justify any decisions that you make.

[4]

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