N5

Mathematics

National 5 Practice Paper C

Paper 2

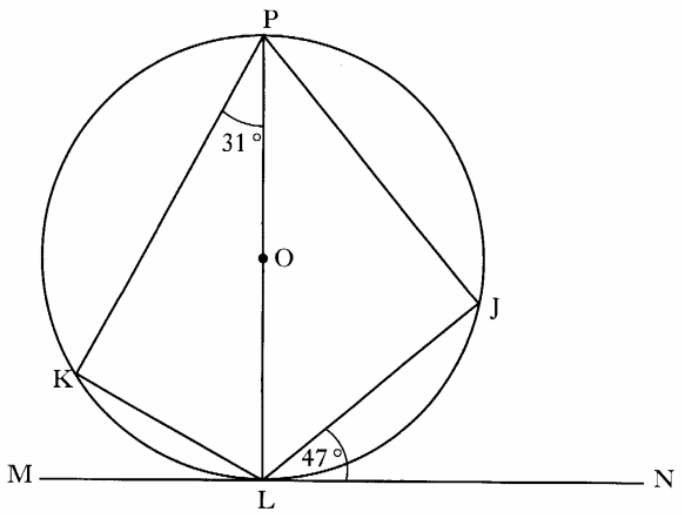
Duration – 1 hour and 30 minutes

Total marks – 50

- You may use a calculator
- Attempt all the questions.
- Use **blue** or **black** ink.
- Full credit will only be given to solutions which contain appropriate working.
- State the units for your answer where appropriate.

1. Bacteria in a test-tube increase at the rate of 4.6% per hour.
At 12 noon, there are 50 000 bacteria.
At 5 pm, how many bacteria will be present?
Give your answer correct to 3 significant figures. 4

2.



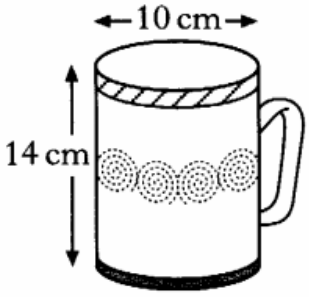
The tangent, MN, touches the circle, centre O, at L.
Angle JLN = 47°
Angle KPL = 31°

Find the size of angle JLK. 3

3. Change the subject of the formula

$y = ax^3 + c$ to x. 3

4. A mug is in the shape of a cylinder with diameter 10 centimetres and height 14 centimetres.

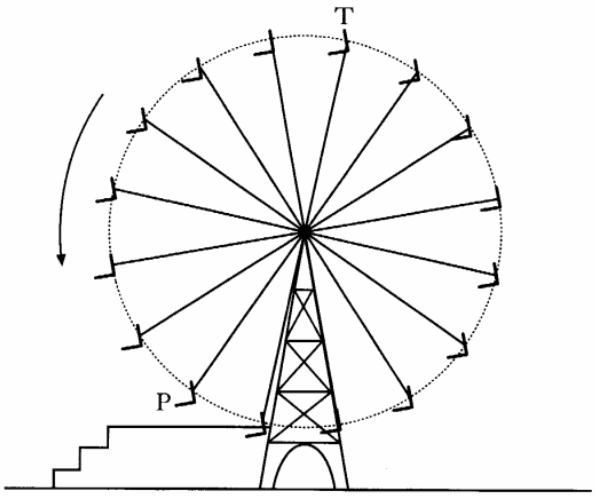


(a) Calculate the capacity of the mug. 2

(b) 600 millilitres of coffee are poured in.

Calculate the depth of the coffee in the mug. 3

5. The diagram below shows a big wheel at the fairground.



The wheel has 16 chairs equally spaced on its circumference.
The radius of the wheel is 9 metres.

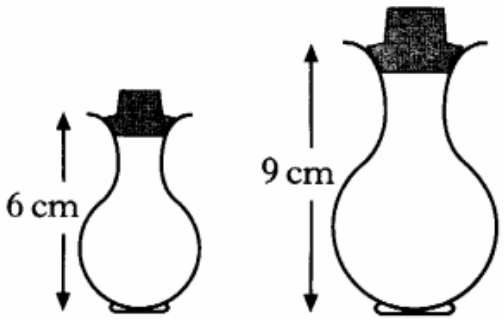
As the wheel rotates in an anticlockwise direction, find the distance a chair travels in moving from position T to position P in the diagram. 4

6. Find the roots of the equation

$$2x^2 + 4x - 9 = 0.$$

Give your answers correct to one decimal place. 4

7. Two perfume bottles are mathematically similar in shape.



The smaller one is 6 centimetres high and holds 30 millilitres of perfume.
The larger one is 9 centimetres high.

What volume of perfume will the larger one hold? 3

8. Determine the nature of the roots of the equation

$$(x - 2)^2 - 5x = 0.$$ 4

9. A pony shelter is part of a cylinder as shown in figure 1.

It is 6 metres wide and 2 metres high.

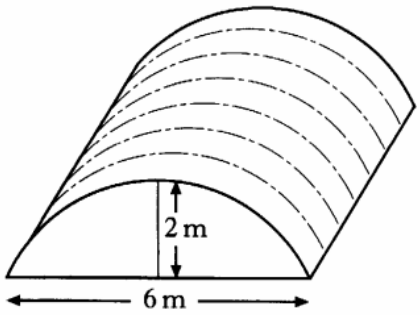


Figure 1

The cross-section of the shelter is a segment of a circle with centre O, as shown in figure 2.

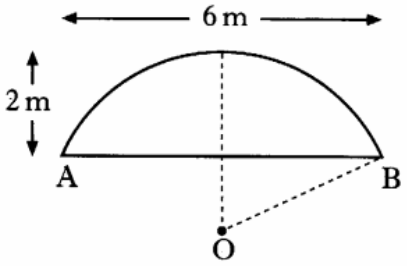
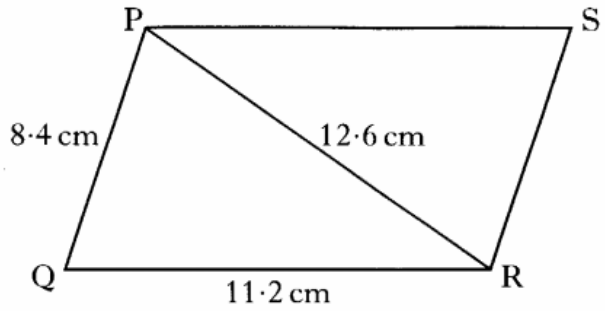


Figure 2

OB is the radius of the circle.

Calculate the length of OB. 4

10. The diagram shows a parallelogram, PQRS.



(a) Calculate the size of angle PQR. Do not use a scale drawing. 3

(b) Calculate the area of the parallelogram. 3

11. (a) Solve the equation

$$2\tan x° + 7 = 0, \qquad 0 \leq x \leq 360.$$ 3

(b) Prove that

$$\sin^3 x + \sin x \cos^2 x = \sin x.$$ 2

12. (a) A driver travels from A to B, a distance of x kilometres, at a constant speed of 75 kilometres per hour.

Find the time taken for this journey in terms of x. 1

(b) The time taken for the journey from B to A is $\frac{x}{50}$ hours.

Calculate the average speed for the whole journey. 4

[End of question paper]