N5

CJ Maths

Practice Paper C

Paper 2 – Calculator

Total Marks – 60

Attempt ALL questions.

You may use a calculator.

Full credit will only be given to solutions which contain appropriate working.

State the units for your answers where appropriate

Write your answers clearly in the space provided in this booklet.

FORMULAE LIST

The roots of $ax^2 + bx + c = 0$ are $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Sine Rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule: $a^2 = b^2 + c^2 - 2bc \cos A$ or $\cos A = \frac{(b^2 + c^2 - a^2)}{2bc}$

Area of a triangle: $A = \frac{1}{2}ab \sin C$

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

Volume of a cone: $V = \frac{1}{3}\pi r^2 H$

Volume of a pyramid: $V = \frac{1}{3}Ah$

Standard Deviation $s = \sqrt{\frac{\sum(x - \bar{x})^2}{n-1}}$

or $s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}}$, where n is the sample size.

1. The value of a watch decreases by 4% per annum. Calculate the value of a watch after 5 years if the original value was £495. 3

2. Solve 3

$$\frac{3}{4}(2x+1)=5$$

3

3. The vector b has components $\begin{pmatrix} 2 \\ 3 \\ -5 \end{pmatrix}$. Find $|3b|$

4. Expand 2

$$(2x + 1)(2x - 1)^2$$

5. Fully factorise 2

$$2x^2 - 5x - 12$$

6. Solve for x 3

$$3(x + 5) \leq 2(2x - 5)$$

7. A sample of test results from class 3.1 are shown below.

$$39, 51, 71, 83, 61$$

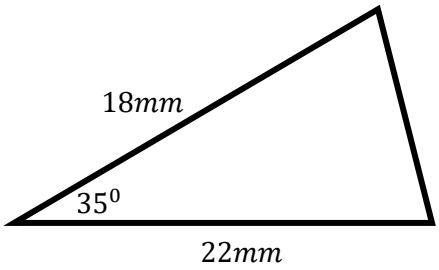
(a) Calculate the mean score for class 3.1 1

(b) Calculate the standard deviation 3

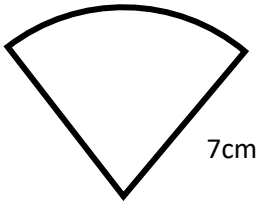
A second sample of test results has a mean score of 67% and a standard deviation of 15.

(c) Write two statements comparing the two samples of results. 2

8. Find the area of 2



9. The perimeter of the sector below is $24cm$



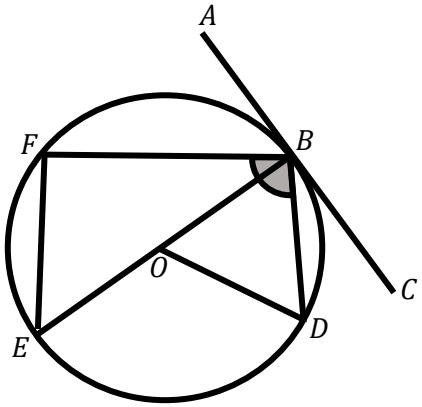
(a) State the length of the arc AB 1

(b) Prove that the size of the angle is 81.9^0 3

(c) Hence, or otherwise, find the area of the sector 3

10. Find the roots of $y = 3\sin x + 1$, where $0 \leq x \leq 360^0$ 3

11. 3



- $\angle CBD = 30^0$
- $\angle FEB = 40^0$
- AC is a tangent to the circle.

Find the size of the shaded angle $\angle FBD$.

13. Solve for x 3

$$2x^2 - 8x + 3 = 0$$

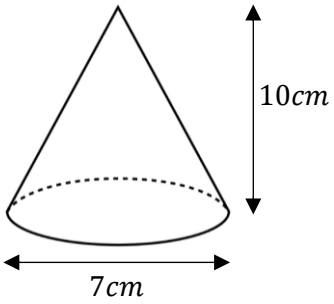
Give your answer to 2 decimal places.

14. Write the following as a single fraction in its simplest from 3

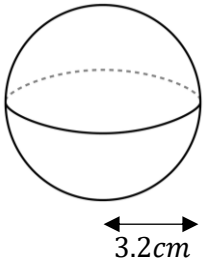
$$\frac{2}{x-5} - \frac{4}{x}, x \neq 5 \; or \; x \neq 0$$

14. Which of the following has the greatest volume? Justify your answer. 4

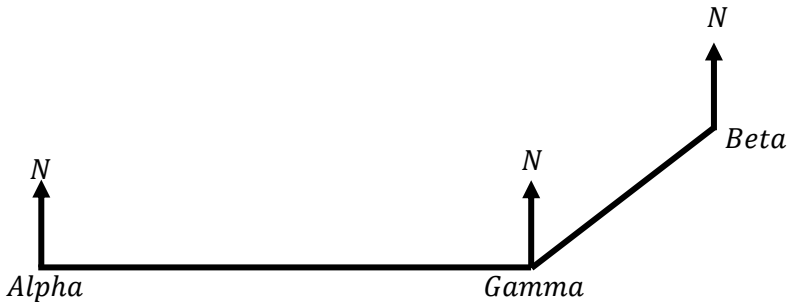
Cone



Sphere



16. The diagram shows three ports. 3



- Gamma is $300km$ due East of Alpha
- Beta is $120km$ on a bearing of 40^0 from Gamma

Calculate the distance between Alpha and Beta.

16. Change the subject of the formula to x 3

$$y = 3x^3 - 5$$

17. Find the possible value(s) of p such that 5

$$3x^2 - px + (p - 3)$$

has equal roots.

END OF PAPER