External assessment 2025

Multiple choice question book

Specialist Mathematics

Paper 2 — Technology-active

General instruction

- Work in this book will not be marked.

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Section 1

Instruction

- Respond to these questions in the question and response book.

QUESTION 1

Rounded to the nearest degree, an angle equivalent to the arctangent of 2 is

(A) 1°

(B) 2°

(C) 63°

(D) 64°

QUESTION 2

Which unit vector product is correct?

(A) $\hat{i} \times \hat{i} = -1$

(B) $\hat{i} \times \hat{k} = 0$

(C) $\hat{j} \times \hat{i} = \hat{k}$

(D) $\hat{j} \times \hat{k} = \hat{i}$

QUESTION 3

If all roots of the equation $z^3 = 1$ are plotted on an Argand plane and then joined by straight lines, the shape formed is

(A) a right-angled triangle.

(B) an equilateral triangle.

(C) an isosceles triangle.

(D) a scalene triangle.

QUESTION 4

The expression $9 \times 2^{n+1} + 2^n$, where $n \in Z^+$ is divisible by

(A) 10

(B) 11

(C) 18

(D) 19

QUESTION 5

The height (cm) of people in a certain population is normally distributed with a standard deviation of 7.42 cm.

A researcher takes repeated random samples of 15 people and calculates the mean height for each sample.

The expected standard deviation (cm) of the distribution of these sample mean heights would be approximately

(A) 0.49

(B) 1.92

(C) 2.02

(D) 5.51

QUESTION 6

Determine the gradient of the tangent to $y^2 = 4x$ when $y = 1$.

(A) 4

(B) 2

(C) 0.5

(D) 0.25

QUESTION 7

Given the complex number $z = \text{cis}\left(-\frac{\pi}{2}\right)$, determine $\text{Arg}\left(z^6\right)$.

(A) π

(B) 0

(C) $-\pi$

(D) -3π

QUESTION 8

Consider the plane that contains both the x-axis and the y-axis. A sphere centred at (3, 4, 6) touches this plane.

The length of the radius of the sphere is

(A) 3 units.

(B) 4 units.

(C) 5 units.

(D) 6 units.

QUESTION 9

The masses (grams) of a random sample of 40 chocolate muffins produced by a local bakery are recorded.

Using the sample standard deviation of 0.845 grams, an approximate confidence interval for the population mean mass of chocolate muffins produced by this bakery is (149.68, 150.12) grams.

The z-value used in this calculation is

(A) 1.04

(B) 1.65

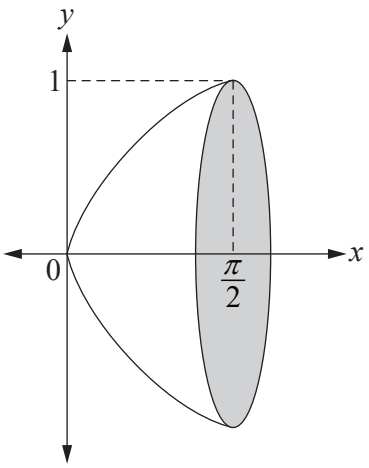
(C) 1.96

(D) 2.58

QUESTION 10

Consider the solid of revolution formed by rotating a section of the curve $y = \sin(x)$ around the x-axis.

Not to scale



Determine the volume of the solid of revolution.

(A) 0.79 units^3

(B) 0.86 units^3

(C) 2.47 units^3

(D) 2.60 units^3

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