

External assessment 2022

Multiple choice question book

Mathematical Methods

Paper 2 — Technology-active

General instruction

- Work in this book will not be marked.

Section 1

Question 1

The position (in cm) of a particle is given by $x = \cos(4t)$, where t is time (in seconds).

The velocity of the particle when $t = 5$ is

- (A) 1.6323 cm s^{-1}
- (B) 0.4081 cm s^{-1}
- (C) $-0.9129 \text{ cm s}^{-1}$
- (D) $-3.6518 \text{ cm s}^{-1}$

Question 2

Identify the correct features of the function $f(x) = xe^x$

- (A) $f'(-1) = 0, f''(-1) < 0$
- (B) $f'(-1) = 0, f''(-1) > 0$
- (C) $f'(-1) < 0, f''(-1) < 0$
- (D) $f'(-1) < 0, f''(-1) > 0$

Question 3

The derivative of the function $f(x)$ is given by $f'(x) = \sin(x^3)$ for the domain $-1.8 < x < 1.8$.

The number of points of inflection that the graph of $f(x)$ has on this interval is

- (A) 1
- (B) 3
- (C) 4
- (D) 5

Question 4

The distribution for a sample proportion \hat{p} has a mean of 0.15 and a standard deviation of 0.0345.

The sample size is

- (A) 10
- (B) 14
- (C) 107
- (D) 116

Question 5

The continuous random variable X has the probability density function

$$f(x) = \begin{cases} \frac{\cos(x)}{2}, & -\frac{\pi}{2} \leq x \leq \frac{\pi}{2} \\ 0, & \text{otherwise} \end{cases}$$

The standard deviation of X is

- (A) 0.467
- (B) 0.684
- (C) 1.211
- (D) 1.467

Question 6

A stall at the school fete sells cups of lemonade. Assuming the amount of lemonade in a cup is normally distributed with a mean of 60 mL and a standard deviation of 3 mL, 80% of the cups contain more than

- (A) 52.4 mL
- (B) 57.5 mL
- (C) 61.6 mL
- (D) 62.5 mL

Question 7

A marble moves in one direction in a straight line with velocity $v = 2\ln(t + 1)$ (in metres per second) where t is time (in seconds) since the marble passed through the origin.

Determine the distance from the origin the marble has rolled after 4 seconds.

- (A) 0.40 m
- (B) 1.60 m
- (C) 3.22 m
- (D) 8.09 m

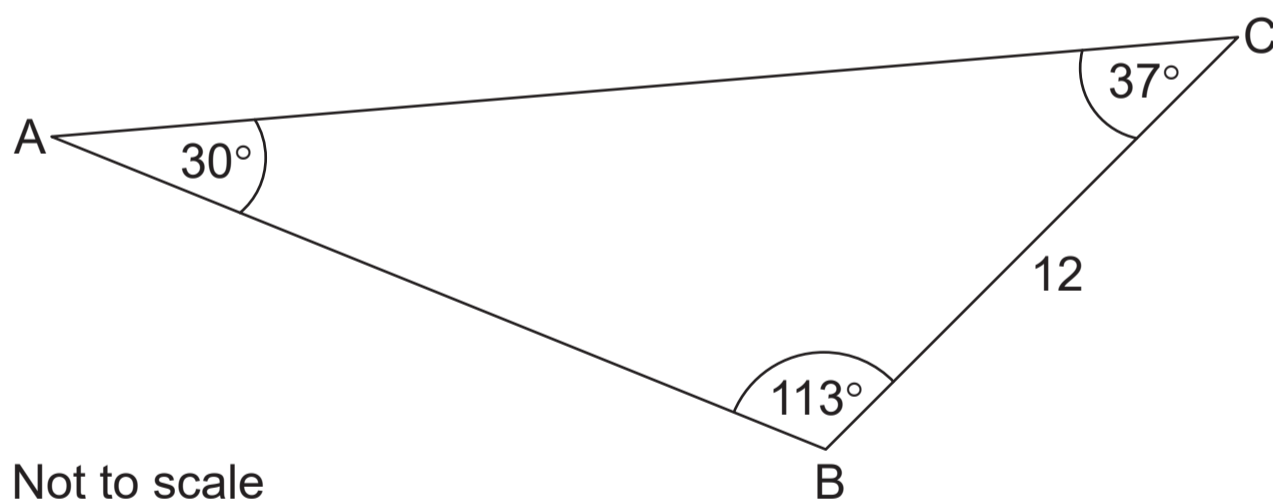
Question 8

Determine the equation of the asymptote of the function $f(x) = \log_9(x - 3) - 4$.

- (A) $x = -4$
- (B) $x = -3$
- (C) $x = 3$
- (D) $x = 4$

Question 9

Determine the length of side AB in triangle ABC.



Not to scale

- (A) 22.13
- (B) 14.44
- (C) 9.97
- (D) 7.82

Question 10

The solution of $e^{2x - 3} = 42$ is

- (A) 1.48
- (B) 2.31
- (C) 3.37
- (D) 4.54



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