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Sample assessment 2020

Multiple choice question book

Mathematical Methods

Paper 2 — Technology-active



Queensland
Government



Queensland Curriculum
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Section 1

Instructions

- Answer all questions in the question and response book.
 - This book will not be marked.
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QUESTION 1

Determine the asymptote of the graph of the function $f(x) = \log_3(x + 5)$

- (A) $x = -5$
- (B) $x = 5$
- (C) $y = -5$
- (D) $y = 5$

QUESTION 2

A population of bacteria after t hours is given by $P(t) = 5000e^{0.18t}$.

The rate of increase of the population (to the nearest unit) at 15 minutes is

- (A) 74 399 bacteria/hour.
- (B) 13 392 bacteria/hour.
- (C) 5230 bacteria/hour.
- (D) 941 bacteria/hour.

QUESTION 3

Using the trapezoidal rule with four sections, the approximate area under the curve $y = x^2 + 5$ between $x = 0$ and $x = 2$ is

- (A) 12.67 units²
- (B) 12.75 units²
- (C) 13.00 units²
- (D) 13.75 units²

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QUESTION 4

The area of the region enclosed by the graphs of $y = x\sqrt{x+1}$ and $y = 2x$ is

- (A) 1.267 units²
- (B) 0.467 units²
- (C) 0.200 units²
- (D) 0.029 units²

QUESTION 5

Two particles move along the x -axis. For $0 \leq t \leq 5$, their respective position functions are given by: $x_1 = \sin(2t)$ and $x_2 = e^{-2t}$

For how many values of t do the particles have the same position?

- (A) 4
- (B) 3
- (C) 1
- (D) 0

QUESTION 6

The side lengths of a triangle are in the ratio 2:3:4. The smallest angle in this triangle is

- (A) 0.51°
- (B) 0.81°
- (C) 28.96°
- (D) 46.57°

QUESTION 7

The graph of $y = x^3 - 6x^2$ is concave downwards when

- (A) $x < -2$
- (B) $x < 0$
- (C) $x < 2$
- (D) $x < 4$

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QUESTION 8

A particle travels along a straight line with a velocity of $v(t) = 3e^{\left(\frac{-t}{2}\right)} \times \sin(2t) \text{ m s}^{-1}$.

Determine the acceleration of the particle at $t = 2$ seconds.

- (A) -1.03 ms^{-2}
- (B) -0.01 ms^{-2}
- (C) 2.49 ms^{-2}
- (D) 3.51 ms^{-2}

QUESTION 9

The birth mass of babies is normally distributed with a mean 3500 grams and a standard deviation 500 grams.

The probability that the birth mass of a baby is less than 3200 grams is

- (A) 0.01
- (B) 0.06
- (C) 0.22
- (D) 0.27

QUESTION 10

A survey found that 142 out of 200 people aged 30 to 39 have some form of tertiary qualification.

The approximate 95% confidence interval for the proportion of people aged 30 to 39 who have some form of tertiary qualification for this survey is

- (A) (0.62, 0.80)
- (B) (0.63, 0.79)
- (C) (0.65, 0.77)
- (D) (0.66, 0.76)

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