External assessment 2025

Multiple choice question book

Mathematical Methods

Paper 2 — Technology-active

General instruction

- Work in this book will not be marked.

Queensland Government | QCAA Queensland Curriculum & Assessment Authority

Section 1

Instruction

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

QUESTION 1

Determine $\int 10.4x^3\,dx$

(A) $2.6x^4 + c$

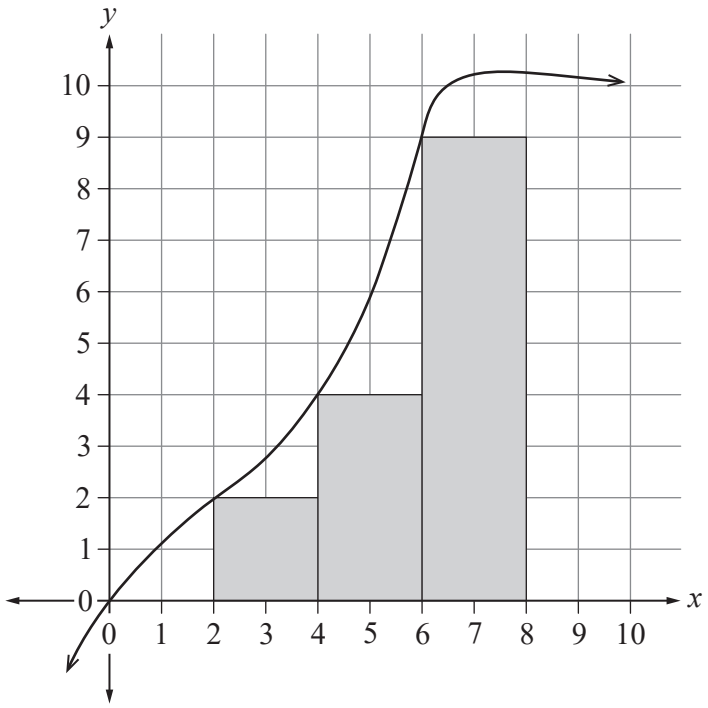
(B) $6.4x^4 + c$

(C) $14.4x^4 + c$

(D) $41.6x^4 + c$

QUESTION 2

Determine the approximate area (units^2) between the curve and the x-axis for $0 \leq x \leq 8$ by calculating the area of the shaded rectangles.



(A) 15

(B) 28

(C) 30

(D) 31

QUESTION 3

A streaming service surveyed a random sample of 100 customers, and 60 customers said that they prefer to watch movies rather than miniseries.

Based on these results, the 95% confidence interval for the proportion of customers who prefer to watch movies was (0.5, 0.7).

Which statement shows the correct interpretation of this outcome?

(A) The streaming service can be 95% confident that the proportion of customers who prefer to watch movies is between 50% and 70%.

(B) There is a probability between 50% and 70% that most customers prefer to watch movies 95% of the time.

(C) 60% of the sampled customers prefer to watch movies between 50% and 70% of the time.

(D) 60 customers in the random sample prefer to watch movies 95% of the time.

QUESTION 4

An object moves in a straight line such that its velocity (m s^{-1}) is given by $v(t) = t^2 - e^{-t}$ for $0 \le t \le 5$, where t represents time (s).

Determine the time, t, when the acceleration of the object is 2 m s^{-2}.

(A) 0.768

(B) 1.157

(C) 3.865

(D) 4.135

QUESTION 5

Which statement best describes a feature of the graph of the exponential function $y = e^x$, $x \in R$?

(A) $\lim_{x \to \infty} \left(e^x\right) = e$

(B) When $x = 0$, $y = e$

(C) The graph has an asymptote with the equation $x = 0$

(D) The gradient of the graph has the same value as the function at all points on the graph.

QUESTION 6

Solve the equation $\cos(\theta) = -0.6$ for $0° \le \theta \le 360°$

(A) 53.13° and 126.87°

(B) 53.13° and 233.13°

(C) 126.87° and 306.87°

(D) 126.87° and 233.13°

QUESTION 7

An object starts from rest at the origin with acceleration (m s^{-2}) given by $a(t) = 16 - t^2 + t^3$ for $t \ge 0$, where t represents time (s).

Determine the displacement from the origin of the object 1.5 seconds after it starts moving.

(A) 7.0

(B) 17.125

(C) 17.958

(D) 24.141

QUESTION 8

The table shows the probability distribution for a random variable X in a Bernoulli experiment. The random variable has only two possible values: 0 represents failure and 1 represents success.

x	0	1
$P(X = x)$	0.6	0.4

If six Bernoulli experiments are conducted, determine the probability of getting exactly two successes.

(A) 0.138

(B) 0.160

(C) 0.311

(D) 0.360

QUESTION 9

Determine the gradient of the line perpendicular to the tangent to the graph of $y = \ln(4x)$ at the point (0.8, 1.163).

(A) −1.25

(B) −0.80

(C) 0.80

(D) 1.25

QUESTION 10

The outside air temperature, T (°C), on a particular day at a certain location is modelled by the function

$$T = 25 - 7\cos\left(\frac{\pi t}{12}\right),\ 0 \le t \le 24,$$

where t is the time (hours) since 6:00 am.

The rate of change of temperature at 11:30 am is

(A) 1.833

(B) 1.817

(C) 0.334

(D) 0.239