

Mathematical Methods with TI-Nspire™ CX CAS

Exam-Style Questions

Part 4: Widgets

Webinar questions and student revision questions

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Each of the questions included here can be solved using the TI-Nspire CX CAS technology.

Question 1

The amount of drug, D milligrams, in the bloodstream at time t hours after it is administered is given by

$$D = 3e^{-0.2t}, 0 \leq t \leq 3.$$

The average amount of drug in milligrams present in the bloodstream over the first 3 hours after it was administered is closest to:

- A. 0.45 B. 1.50 C. 2.25 D. 2.26 E. 2.30

Response:

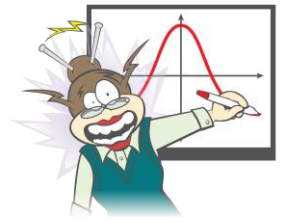
Question 2

Let $g : R \rightarrow R, g(x) = x^3 - 3x^2 - 45x + 5$.

(a) Find $g'(x)$.

(b) Determine the coordinates and the nature of the stationary points on the graph of $y = g(x)$.

Response:



Question 3

Let $f : R \rightarrow R, f(x) = x^4 - 5x^2 + 3$.

State the values of x for which the graph of $y = f(x)$ is strictly increasing.

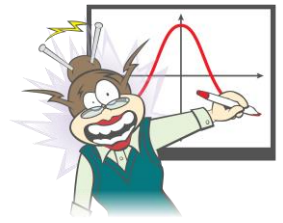
Response:

Question 4

A test consists of 10 multiple choice questions, each with 5 alternatives for the answer. A student who has not studied for the test chooses the answers at random. Find the probability that they get:

- (a) exactly 3 answers correct.
 - (b) at most 3 answers correct.
 - (c) at least 1 answer correct given that they get at most 3 answers correct.
- Give all answers correct to 3 decimal places.

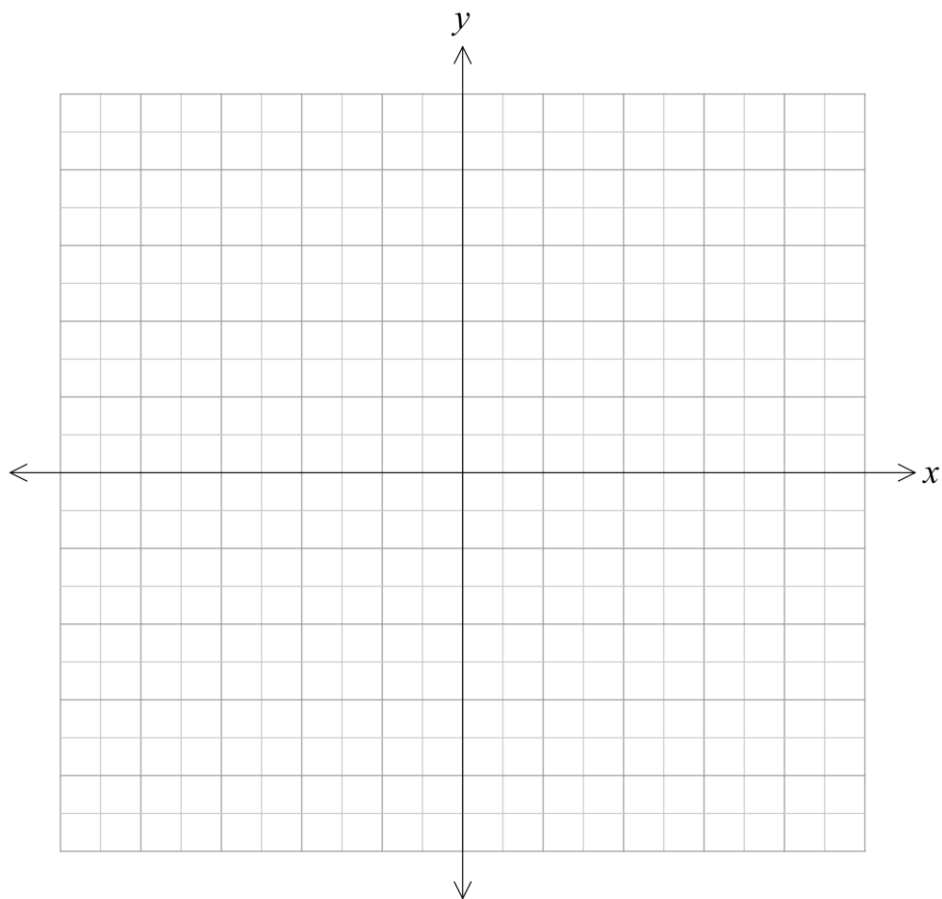
Response:

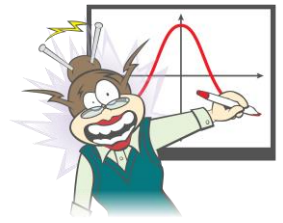


Question 5

Sketch the graph of $y = 3 - 3\sin\left(2x - \frac{\pi}{6}\right)$, $-\frac{\pi}{2} < x \leq \pi$, labelling the coordinates of all stationary points, axial intercepts and endpoints.

Response:





Question 6

A particle moves in a straight line so that its velocity in metres per second, is given by

$$v(t) = 3t^2 - 2t, t \geq 0.$$

- (a) If the particle initially starts 2 metres to the right of a fixed origin, O, find the position of the particle after 3 seconds?
- (b) When is the acceleration of the particle 6 ms^{-2} ?

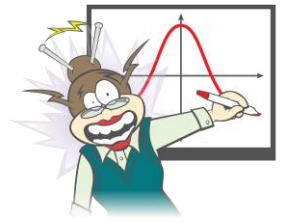
Response:

Question 7

Let $g : R \rightarrow R, g(x) = \frac{9x^2(a-x)}{4a}$ where a is a positive real number.

Find the coordinates of the local maximum of g in terms of a .

Response:



Question 8

Let $h: R \rightarrow R, h(x) = -x^3 - 2x^2 + 4x + 3$.

- Find the product of the x -intercepts.
- Find the distance between the stationary points correct to 2 decimal places.

Response:

Question 9

The population of koalas in a National Park is increasing according to the following model,

$$\frac{dP}{dt} = 20e^{-\frac{t}{5}}, 0 \leq t \leq 15,$$

where P is the number koalas in the National Park after t years.

- If initially there were 40 koalas in the National Park, find the rule for the number of koalas in the National Park after t years.
- Find the number of koalas in the National Park after 10 years. Give your answer to the nearest koala.

Response:
