AP Calculus Practice Exam
AB Version - Section I - Part B

Calculators ARE Permitted On This Portion Of The Exam
17 Questions - 50 Minutes

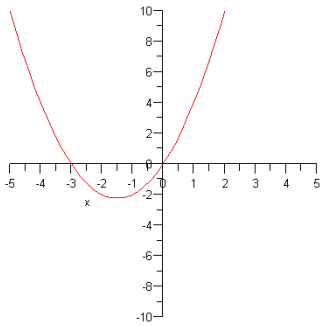
1) Give a value of *c* that satisfies the conclusion of the Mean Value Theorem for Derivatives for the function $f(x) = x^2 - x - 2$ on the interval [1,3].

a) $\frac{5}{4}$ b) 2 c) $\frac{3}{2}$ d) $\frac{1}{2}$ e) $\frac{9}{4}$

2) The function $f(x) = 3x^3 + 3e^{(2x)}$ is invertible. Give the derivative of f^{-1} at $x = 3$.

a) $9 + 6e^2$ b)6 c) $\frac{1}{9 + 6e^2}$ d)1 e) $\frac{1}{6}$

3) The **derivative** of *f* is graphed below.



Give a value of *x* where *f* has a local minimum.

a) 1 b) $\frac{-3}{2}$ c) *There is no such value of x.* d) 0 e) -3

4) Let

$$f(x) = \begin{cases} -x + 5 & x < -2 \\ x^2 + 1 & -2 \le x \text{ and } x \le 1 \\ 2x^3 - 1 & 1 \le x \end{cases}$$

Which of the following is (are) true?
1) *f* is continuous at *x* = -2.
2) *f* is differentiable at *x* = 1.
3) *f* has a local minimum at *x* = 0.
4) *f* has an absolute maximum at *x* = -2.

a) 2 only b) 2 and 4 c) 3 only d) 1 and 3 e) 1 and 4

5) Given

$$\left[\int_0^{50} 5\,f(x)\,dx = 4,\ \int_2^{50} f(x)\,dx = -3\right]$$

Determine

$$\int_0^2 f(x)\,dx$$

a) $\frac{-11}{5}$ b) $\frac{19}{5}$ c) *There is not enough information.* d) $\frac{38}{5}$ e) $\frac{-22}{5}$

6) Give the approximate location of a local maximum for the function

$$f(x) = 5x^3 + 4x^2 - 2x$$

a) $(-.7189, 1.584)$ b) $(0.1855, -.2015)$ c) $(-.7189, 1.647)$ d) $(0.1855, -.1386)$ e) $(-.7189, -.2015)$

7) Give the approximate average value of the function $f(x) = 2x\ln(2x)$ over the interval [1,4].

a) 6.269 b) 8.360 c) 9.360 d) 9.010913348 e) 7.360

8) The region enclosed by the graphs of

$$[y = x^3 - 1,\ y = x - 1]$$

is rotated around the *y*-axis to generate a solid. What is the volume of the solid?

a) 1.047 b) 0.7855 c) 0.8380 d) 2.356 e) 1.676

9) What is the approximate instantaneous rate of change of the function $f(t) = \int_0^{8t} \cos(x)\,dx$ at $t = \pi/3$?

a) −1.333 b) −6.928 c) −.8660 d) −4. e) −.5000

10) What is the error when the integral $\int_0^1 \sin(\pi x)\,dx$ is approximated by the Trapezoidal rule with $n = 3$?

a) 0.059 b) 0.051 c) 0.032 d) 0.109 e) 0.011

11) The amount of money in a bank account is increasing at the rate of

$$R(t) = 10000\,e^{(0.06t)}$$

dollars per year, where *t* is measured in years. If $t = 0$ corresponds to the year 2005, then what is the approximate total amount of increase from 2005 to 2007.

a) $16,250 b) $18,350 c) $32,560 d) $21,250 e) $4,500

12) A particle moves with acceleration $a(t) = 4t^2 - 2t$

and its initial velocity is 0. For how many values of *t* does the particle change direction?

a) 0 b) 2 c) 3 d) 4 e) 1

13) At what approximate rate (in cubic meters per minute) is the volume of a sphere changing at the instant when the surface area is 3 square meters and the radius is increasing at the rate of 1/5 meters per minute?

a) 1.228 b) 1.905 c) 0.6484 d) 0.6000 e) 0.6200

14) A rectangle has one side on the *x*-axis and the upper two vertices on the graph of

$$y = e^{(-3x^2)}$$

Give a decimal approximation to the maximum possible area for this rectangle.

a) 0.8163 b) 0.4950 c) −.8163 d) 1.346 e) 0.4455

15) A rough approximation for ln(5) is 1.609. Use this approximation and differentials to approximate ln(257/50).

a) 1.637 b) 1.623 c) 1.636 d) 1.581 e) 1.595

16) The function

$$f(x) = \begin{cases} nx^3 - x & x \le 1 \\ mx^2 + 5 & 1 < x \end{cases}$$

is differentiable everywhere. What is *n*?

a) −11 b) −14 c) 13 d) −17 e) −9

17) Which of the following functions has a vertical asymptote at $x = -1$ and a horizontal asymptote at $y = 2$?

a) $f(x) = e^{(x-1)} + 2$ b) $f(x) = \ln(2x + 2)$ c) $f(x) = \dfrac{2x^2 + 1}{x^2 - 1}$

d) $f(x) = \arctan(x - 1) + 2 - \dfrac{1}{2}\pi$ e) $f(x) = \dfrac{x - 1}{2x + 2}$

1) b)
2) e)
3) d)
4) c)
5) b)
6) c)
7) b)
8) e)
9) d)
10) a)
11) d)
12) e)
13) d)
14) b)
15) a)
16) a)
17) c)