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

$$f(x) = -2x^2 - x + 2$$

on the interval [1,3].

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

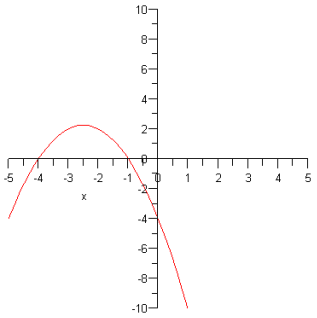
2) The function

$$f(x) = 3x^3 + 2e^{(2x)}$$

is invertible. Give the derivative of f^{-1} at $x = 2$.

a) $9 + 4e^2$ b) 4 c) $\frac{1}{9 + 4e^2}$ d) 1 e) $\frac{1}{4}$

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



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

a) -4 b) -1 c) $\frac{-5}{2}$ d) *There is no such value of x.* e) 1

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

5) Given

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

Determine

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

a) 10 b) -3 c) *There is not enough information.* d) -6 e) 5

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

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

a) $(-1.357, 5.779)$ b) $(0.2457, -.3908)$ c) $(-1.357, 5.713)$ d) $(0.2457, -.3216)$ e) $(-1.357, -.3908)$

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

a) 19.71 b) 12.54 c) 16.71 d) 18.02182670 e) 18.71

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

9) What is the approximate instantaneous rate of change of the function

$$f(t) = \int_0^{8t} \cos(x)\,dx$$

at $t = \pi/7$?

a) $-.9009$ b) -7.207 c) 3.473 d) 0.4341 e) -1.030

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

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

12) A particle moves with acceleration

$$a(t) = 3t^2 - 2t$$

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

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

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 5 square meters and the radius is increasing at the rate of 1/3 meters per minute?

a) 5.271 b) 1.700 c) 1.667 d) 1.080 e) 2.714

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

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

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

a) 1.649 b) 1. c) −1. d) 0.5458 e) 0.6065

15) A rough approximation for ln(5) is 1.609. Use this approximation and differentials to approximate ln(128/25).

a) 1.633 b) 1.621 c) 1.632 d) 1.585 e) 1.597

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) −9 b) 13 c) −17 d) −11 e) −14

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

a) $f(x) = \frac{2x^2+1}{x^2-1}$ b) $f(x) = \ln(2x+2)$ c) $f(x) = e^{(x-1)} + 2$ d) $f(x) = \arctan(x-1) + 2 - \frac{1}{2}\pi$ e) $f(x) = \frac{x-1}{2x+2}$

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