A.P. Calculus BC Test Two
Section One
Multiple-Choice
Calculators Allowed

Time—40 minutes

Number of Questions—15

The scoring for this section is determined by the formula

$$[C - (0.25 \times I)] \times 1.8$$

where C is the number of correct responses and I is the number of incorrect responses. An unanswered question earns zero points. The maximum possible points earned on this section is 27, which represents 50% of the total test score.

Directions: Solve each of the following problems, using the available space for scratch work. After examining the form of the choices, decide which is the best of the choices given and fill in the corresponding choice on your answer sheet. Do not spend too much time on any one problem.

Good Luck!

NAME:

1. If $F(x)$ be defined below. Which of the following statements about F are true?

$$F(x) = \begin{cases} \dfrac{x^2+x}{x} & x \neq 0 \\ 1 & x = 0 \end{cases}$$

I. F is defined at $x = 0$.
II. $\lim_{x\to 0} F(x)$ exists.
III. F is continuous at $x = 0$.
IV. F is differentiable at $x = 0$.

A) I only
B) II only
C) I, II, and III only
D) I, III, and IV only
E) I, II, III, and IV

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2. If $y = \ln\left(x\sqrt{x^2+1}\right)$, then $y' =$

A) $1 + \dfrac{x}{x^2+1}$
B) $1 + \dfrac{1}{x\sqrt{x^2+1}}$
C) $\dfrac{2x^2+1}{x\sqrt{x^2+1}}$
D) $\dfrac{2x^2+1}{x(x^2+1)}$
E) $\dfrac{x^2+x+1}{x(x^2+1)}$

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3. If $y = \ln(x^2+y^2)$, then the value of $\dfrac{dy}{dx}$ at the point $(1,0)$ is

A) 0
B) -1
C) 1
D) 2
E) undefined

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4. If $y = \sec^2 \sqrt{x}$, then $y' =$

A) $\dfrac{\sec \sqrt{x} \tan \sqrt{x}}{\sqrt{x}}$

B) $\dfrac{\tan \sqrt{x}}{\sqrt{x}}$

C) $2 \sec \sqrt{x} \tan^2 \sqrt{x}$

D) $\dfrac{\sec^2 \sqrt{x} \tan \sqrt{x}}{\sqrt{x}}$

E) $2 \sec^2 \sqrt{x} \tan \sqrt{x}$

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5. Find an approximate equation of the line tangent to the graph of $y = x \csc x$ at the point when $x = \frac{\pi}{6}$.

A) $y = 1.50x - 0.18$

B) $y = 0.19x + 10.5$

C) $y = 5.37x - 1.77$

D) $y = 0.19x + 0.95$

E) $y = 3.81x - 0.95$

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6. Let $T(x) = e^{\sin x}$. Which of the following expressions has the largest value?

A) $T(\pi/2)$

B) $T(\pi)$

C) $T'(\pi/2)$

D) $T'(\pi)$

E) $T'(0)$

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7. The tangent line to the curve $3x^4 - 10x + 3$ at $x = 1$ intersects the x-axis at the point

A) $(-6, 0)$

B) $(-4, 0)$

C) $(0, -6)$

D) $(3, 0)$

E) $(4, 0)$

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8. If $y = \sin 11x \cos 11x$, then the derivative of y is

A) $11 \cos 11x$

B) $11 \cos 22x$

C) $\sin^2 11x - \cos^2 11x$

D) $-121 \sin^2 11x$

E) $-121 \sin 11x \cos 11x$

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9. The average rate of change of the differentiable function f from $(3, f(3))$ to $(x, f(x))$ is given by $\dfrac{x^2 - x - 6}{x - 3}$. The value of $f'(3)$ is

A) 0

B) 1

C) 3

D) 5

E) undefined

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10. When a wholsale produce market has x crates of lettuce available on a given day, it charges p dollars per crate as determined by the supply equation $px - 20p - 6x + 40 = 0$. If the daily supply is decreasing at the rate of 8 crates per day, at what rate is the price changing when the supply is 100 crates?

A) not changing

B) increasing at \$0.10 per day

C) decreasing at \$0.10 per day

D) increasing at \$1.00 per day

E) decreasing at \$1.00 per day

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11. If $f(x) = \dfrac{e^x}{x+1}$ and $g(x) = \dfrac{x}{x+1}$, then $f'(x) = g'(x)$ at $x =$

A) 0.563

B) 0.565

C) 0.567

D) 0.569

E) 0.571

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12. Suppose a particle is moving along a coordinate line and its position at time t is given by $s(t) = \dfrac{9t^2}{t^2+2}$. For what value of t in the interval $[1, 4]$ is the instantaneous velocity equal to the average velocity?

A) 2.00

B) 2.11

C) 2.22

D) 2.33

E) 2.44

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13. If $g(t) = \dfrac{\ln t}{e^t}$, then $g'(t) =$

A) $\dfrac{1 - \ln t}{e^t}$

B) $\dfrac{1 - t \ln t}{e^t}$

C) $\dfrac{t \ln t - 1}{te^t}$

D) $\dfrac{1 - t \ln t}{te^t}$

E) $\dfrac{1 - e^t \ln t}{e^{2t}}$

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14. If $f(x) = \dfrac{4}{x} + 2$ and g is the inverse of f, then $g'(10) =$

A) -16

B) $-\frac{1}{2}$

C) $-\frac{1}{16}$

D) $\frac{1}{2}$

E) 16

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15. Which of the following is an approximate equation of the tangent line to the graph of $f(x) = \sin(\cos x)$ at $x = \pi/2$?

A) $y = x - 1.57$

B) $y = -x + 1.57$

C) $y = 1.57$

D) $y = 0.84x - 1.32$

E) $y = 0.54x - 0.85$