

AP Calculus

Calculator Practice #2

1)

Let g be the function given by $g(x) = \int_0^x \sin(t^2) dt$ for $-1 \leq x \leq 3$. On which of the following intervals is g decreasing?

- (A) $-1 \leq x \leq 0$
- (B) $0 \leq x \leq 1.772$
- (C) $1.253 \leq x \leq 2.171$
- (D) $1.772 \leq x \leq 2.507$
- (E) $2.802 \leq x \leq 3$

2)

A particle moves along the x -axis so that at any time $t > 0$, its acceleration is given by $a(t) = \ln(1 + 2^t)$. If the velocity of the particle is 2 at time $t = 1$, then the velocity of the particle at time $t = 2$ is

- (A) 0.462
- (B) 1.609
- (C) 2.555
- (D) 2.886
- (E) 3.346

3)

The function f has first derivative given by $f'(x) = \frac{\sqrt{x}}{1+x+x^3}$. What is the x -coordinate of the inflection point of the graph of f ?

- (A) 1.008
- (B) 0.473
- (C) 0
- (D) -0.278
- (E) The graph of f has no inflection point.

4)

The velocity, in ft/sec, of a particle moving along the x -axis is given by the function $v(t) = e^t + te^t$. What is the average velocity of the particle from time $t = 0$ to time $t = 3$?

- (A) 20.086 ft/sec
- (B) 26.447 ft/sec
- (C) 32.809 ft/sec
- (D) 40.671 ft/sec
- (E) 79.342 ft/sec

5)

Let f be the function with derivative given by $f'(x) = \sin(x^2 + 1)$. How many relative extrema does f have on the interval $2 < x < 4$?

- (A) One
- (B) Two
- (C) Three
- (D) Four
- (E) Five

6)

A particle moves along the x -axis so that at any time $t \geq 0$, its velocity is given by $v(t) = 3 + 4.1 \cos(0.9t)$. What is the acceleration of the particle at time $t = 4$?

- (A) -2.016
- (B) -0.677
- (C) 1.633
- (D) 1.814
- (E) 2.978

7)

The rate of change of the altitude of a hot-air balloon is given by $r(t) = t^3 - 4t^2 + 6$ for $0 \leq t \leq 8$. Which of the following expressions gives the change in altitude of the balloon during the time the altitude is decreasing?

(A) $\int_{1.572}^{3.514} r(t) dt$

(B) $\int_0^8 r(t) dt$

(C) $\int_0^{2.667} r(t) dt$

(D) $\int_{1.572}^{3.514} r'(t) dt$

(E) $\int_0^{2.667} r'(t) dt$

8)

At time $t \geq 0$, the acceleration of a particle moving on the x -axis is $a(t) = t + \sin t$. At $t = 0$, the velocity of the particle is -2 . For what value t will the velocity of the particle be zero?

- (A) 1.02 (B) 1.48 (C) 1.85 (D) 2.81 (E) 3.14

9)

If the derivative of f is given by $f'(x) = e^x - 3x^2$, at which of the following values of x does f have a relative maximum value?

- (A) -0.46 (B) 0.20 (C) 0.91 (D) 0.95 (E) 3.73

10)

Let f be the function given by $f(x) = 2e^{4x^2}$. For what value of x is the slope of the line tangent to the graph of f at $(x, f(x))$ equal to 3?

- (A) 0.168 (B) 0.276 (C) 0.318 (D) 0.342 (E) 0.551

11)

The graph of the function $y = x^3 + 6x^2 + 7x - 2\cos x$ changes concavity at $x =$

- (A) -1.58 (B) -1.63 (C) -1.67 (D) -1.89 (E) -2.33

12)

Let $F(x)$ be an antiderivative of $\frac{(\ln x)^3}{x}$. If $F(1) = 0$, then $F(9) =$

- (A) 0.048 (B) 0.144 (C) 5.827 (D) 23.308 (E) 1,640.250

13)

The first derivative of the function f is given by $f'(x) = \frac{\cos^2 x}{x} - \frac{1}{5}$. How many critical values does f have on the open interval $(0, 10)$?

- (A) One
(B) Three
(C) Four
(D) Five
(E) Seven

14)

Let f be the function given by $f(x) = 3e^{2x}$ and let g be the function given by $g(x) = 6x^3$. At what value of x do the graphs of f and g have parallel tangent lines?

- (A) -0.701
(B) -0.567
(C) -0.391
(D) -0.302
(E) -0.258

Answers

1. d
2. e
3. b
4. a
5. d
6. c
7. a
8. b
9. c
10. a
11. d
12. c
13. b
14. c