**Practice AP Questions 2.1-2.4** Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1) If f(x) = , then f’(0) =

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

2) A particle moves along the x-axis in such a way that its position at time t is given by . What is the acceleration of the particle at time t=0?

(A) -4

(B) -2

(C) -3/5

(D) 2

(E) 4

3) Let f be the function given by f(x) = tanx and let g be the function given by g(x) = x2. At what value of x in the interval 0 ≤ x ≤ π do the graphs of f and g have parallel tangent lines?

(A) 0

(B) 0.660

(C) 2.083

(D) 2.194

(E) 2.207

4) Two functions f(x) and g(x) are differentiable. If h(x) = x2g(x) – f(3x + 1), determine the value of h’(x).

(A) 2xg’(x) – 3f’(3x + 1)

(B) 2xg’(x) – f’(3)

(C) x2g’(x) + 2xg(x) – f’(3x + 1)

(D) x2g’(x) + 2xg(x) – 3f’(3x + 1)

(E) x2g’(x) – f’(3x + 1)

5) Let f and g be differentiable functions such that   
 

If h(x) = f(g(x)), then h’(1) =

1. -9 (B) 15 (C) 0 (D) -5 (E) -12

6) If f(x) = (2 + 3x)4, then the fourth derivative of f is

(A) 0 (B) 4!(3) (C) 4!(34) (D) 4!(35) (E) 4!(2 + 3x)

7) The at x = 3 is

(A) -1 (B) 0 (C) 1 (D) 3 (E) nonexistent

8) If y = 7 is a horizontal asymptote of a rational function f, then which of the following must be true?

(A)  (B)  (C)  (D)  (E) 

9) Let f(x) be a continuous and differentiable function. The table below gives the values of f(x) and f’(x), the derivative of f(x), at several values. If g(x) = , what is the value of g’(2)?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x | 1 | 2 | 3 | 4 |
| f(x) | -3 | -8 | -9 | 0 |
| f’(x) | -5 | -4 | 3 | 16 |

(A) -1/8

(B) 0

(C) 1/16

(D) 1/64

(E) 16

10) If f(x) = cos2(x), then f ’’ (π) =

(A) -2 (B) 0 (C) 1 (D) 2 (E) 2π

11) Two particles leave the origin at the same time and move along the y-axis with their respective positions determined by the functions y1 = cos2t and y2 = 4sint for 0 < x < 6. For how many values of t do the particles have the same acceleration?

(A) 0 (B) 1 (C) 2 (D) 3 (E) 4

12) Evaluate  .

(A) 5/2 (B) 5/16 (C) 40 (D) 160 (E) The limit DNE

13) If *f* is continuous on [2, 6], with f(2) = 20 and f(6) = 10, then the Intermediate Value Theorem says which of the following is true?

I. f(x) = 25 does not have a solution on [2, 6]

II. f(x) = 17 has a solution on [2, 6]

III. f(x) = 0 has a solution on [2, 6]

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