

1.  $\frac{d}{dx} \cos^2(x^3) =$

A)  $6x^2 \sin(x^3) \cos(x^3)$

B)  $6x^2 \cos(x^3)$

C)  $\sin^2(x^3)$

D)  $-6x^2 \sin(x^3) \cos(x^3)$

E)  $-2 \sin(x^3) \cos(x^3)$

2. An equation of the line tangent to the graph of  $y = \cos(2x)$  at  $x = \frac{\pi}{4}$  is

A)  $y - 1 = -\left(x - \frac{\pi}{4}\right)$

B)  $y - 1 = -2\left(x - \frac{\pi}{4}\right)$

C)  $y = 2\left(x - \frac{\pi}{4}\right)$

D)  $y = -\left(x - \frac{\pi}{4}\right)$

E)  $y = -2\left(x - \frac{\pi}{4}\right)$

3. If  $x^2 + y^2 = 25$ , what is the value of  $\frac{d^2y}{dx^2}$  at the point (4,3)?

A)  $-\frac{25}{27}$

B)  $-\frac{7}{27}$

C)  $\frac{7}{27}$

D)  $\frac{3}{4}$

E)  $\frac{25}{27}$

4. What is the slope of the line tangent to the curve  $3y^2 - 2x^2 = 6 - 2xy$  at the point (3,2)?

A) 0

B)  $\frac{4}{9}$

C)  $\frac{7}{9}$

D)  $\frac{6}{7}$

E)  $\frac{5}{3}$

5. If  $f(x) = \frac{e^{2x}}{2x}$ , then  $f'(x) =$

- A) 1
- B)  $\frac{e^{2x}(1-2x)}{2x^2}$
- C)  $e^{2x}$
- D)  $\frac{e^{2x}(2x+1)}{x^2}$
- E)  $\frac{e^{2x}(2x-1)}{2x^2}$

6. If  $x^2 + xy = 10$ , then when  $x = 2$ ,  $\frac{dy}{dx} =$

- A)  $-\frac{7}{2}$
- B) -2
- C)  $\frac{2}{7}$
- D)  $\frac{3}{2}$
- E)  $\frac{7}{2}$

7. If  $f(x) = \sin(e^{-x})$ , then  $f'(x) =$

- A)  $-\cos(e^{-x})$
- B)  $\cos(e^{-x}) + e^{-x}$
- C)  $\cos(e^{-x}) - e^{-x}$
- D)  $e^{-x} \cos(e^{-x})$
- E)  $-e^{-x} \cos(e^{-x})$

8. If  $f(x) = \ln(x + 4 + e^{-3x})$ , then  $f'(0)$  is

- A)  $-\frac{2}{5}$
- B)  $\frac{1}{5}$
- C)  $\frac{1}{4}$
- D)  $\frac{2}{5}$
- E) nonexistent

9. Let  $f$  be the function defined by  $f(x) = x^3 + x$ . If  $g(x) = f^{-1}(x)$  and  $g(2) = 1$ , what is the value of  $g'(2)$ ?

A)  $\frac{1}{13}$

B)  $\frac{1}{4}$

C)  $\frac{7}{4}$

D) 4

E) 13

10. If  $f(x) = e^{(2/x)}$ , then  $f'(x) =$

A)  $2e^{(2/x)} \ln x$

B)  $e^{(2/x)}$

C)  $e^{(-2/x^2)}$

D)  $-\frac{2}{x^2} e^{(2/x)}$

E)  $-2x^2 e^{(2/x)}$

11. If  $f(x) = x^2 + 2x$ , then  $\frac{d}{dx}(f(\ln x)) =$

A)  $\frac{2\ln x + 2}{x}$

B)  $2x \ln x + 2x$

C)  $2\ln x + 2$

D)  $2\ln x + \frac{2}{x}$

E)  $\frac{2x + 2}{x}$

12. If  $\sin(xy) = x$ , then  $\frac{dy}{dx} =$

A)  $\frac{1}{\cos(xy)}$

B)  $\frac{1}{x \cos(xy)}$

C)  $\frac{1 - \cos(xy)}{\cos(xy)}$

D)  $\frac{1 - y \cos(xy)}{x \cos(xy)}$

E)  $\frac{y(1 - \cos(xy))}{x}$