

PRINTABLE VERSION

Quiz 9

Question 1

Differentiate the function: $f(x) = (x^2 - 3)^4$

- a) ☐ $f'(x) = 8x(x^2 - 3)^3$
- b) ☐ $f'(x) = 4(x^2 - 3)^3$
- c) ☐ $f'(x) = 4x(2x)^3$
- d) ☐ $f'(x) = 8(x^2 - 3)^3$
- e) ☐ $f'(x) = 2x(x^2 - 3)^3$

Question 2

Calculate the derivative of the given function: $f(x) = 10x^3 \cot(x)$

- a) ☐ $f'(x) = 30x^2 \csc(x) - 10x^3 \csc(x) \cot(x)$
- b) ☐ $f'(x) = 30x^2 \csc(x) \cot(x)$
- c) ☐ $f'(x) = -30x^2 \csc^2(x)$
- d) ☐ $f'(x) = 30x^2 \csc^2(x)$
- e) ☐ $f'(x) = 30x^2 \cot(x) - 10x^3 \csc^2(x)$

Question 3

Determine the value(s) of x for which $f'(x) = 0$ given that $f(x) = (-x^2 + 9)^2$

- a) ☐ $x = \frac{1}{3}$ and $x = -\frac{1}{3}$
- b) ☐ $x = 0$
- c) ☐ $x = 0, x = \frac{1}{3}$ and $x = -\frac{1}{3}$
- d) ☐ $x = 0, x = 3$ and $x = -3$

- e) ☐ $x = 3$ and $x = -3$

Question 4

Determine the value(s) of x for which $f'(x) > 0$ given that $f(x) = (-16x^2 + 36)^2$

- a) ☐ $\left(-\frac{3}{2}, \frac{3}{2}\right)$
- b) ☐ $\left(-\infty, -\frac{3}{2}\right) \cup \left(0, \frac{3}{2}\right)$
- c) ☐ $\left(-\infty, -\frac{3}{2}\right) \cup \left(\frac{3}{2}, \infty\right)$
- d) ☐ $\left(-\frac{3}{2}, 0\right) \cup \left(0, \frac{3}{2}\right)$
- e) ☐ $\left(-\frac{3}{2}, 0\right) \cup \left(\frac{3}{2}, \infty\right)$

Question 5

Find $\frac{dy}{dx}$ given $y = \sqrt{6x^5 + 11}$.

- a) ☐ $\frac{dy}{dx} = \frac{-30x^4}{\sqrt{6x^5 + 11}}$
- b) ☐ $\frac{dy}{dx} = \frac{15x^4}{\sqrt{6x^5 + 11}}$
- c) ☐ $\frac{dy}{dx} = 30x^4 \sqrt{6x^5 + 11}$
- d) ☐ $\frac{dy}{dx} = 15x^4 \sqrt{6x^5 + 11}$
- e) ☐ $\frac{dy}{dx} = \frac{30x^4}{\sqrt{6x^5 + 11}}$

Question 6

Find $\frac{dy}{dx}$ given $5x^3 + 5y^3 - 2xy = 0$.

- a) ☐ $\frac{dy}{dx} = -\frac{5x + y}{x + 5y}$

b) ☐ $\frac{dy}{dx} = \frac{15x^2 + 2y}{15y^2 - 2x}$

c) ☐ $\frac{dy}{dx} = \frac{-15x^2 + 2y}{15y^2 - 2x}$

d) ☐ $\frac{dy}{dx} = \frac{-5x + y}{-x + 5y}$

e) ☐ $\frac{dy}{dx} = \frac{-4x + 5y}{4y - 5x}$

Question 7

Find $\frac{dy}{dx}$ given $(5x - y)^2 - 2y = 2$.

a) ☐ $\frac{dy}{dx} = \frac{25x - 5y}{-y + 5x - 1}$

b) ☐ $\frac{dy}{dx} = \frac{-25x + 5y}{-y + 5x + 1}$

c) ☐ $\frac{dy}{dx} = \frac{2x - 10y}{-25y + 5x - 1}$

d) ☐ $\frac{dy}{dx} = \frac{x - 5y}{-25y + 5x - 1}$

e) ☐ $\frac{dy}{dx} = \frac{25x - 5y}{-y + 5x + 1}$

Question 8

Find $\frac{dy}{dx}$ given $\tan(xy) = 5x + 2y$.

a) ☐ $\frac{dy}{dx} = \frac{5 + y \sec^2(xy)}{x \sec^2(xy) - 2y}$

b) ☐ $\frac{dy}{dx} = \frac{5 - y \sec^2(xy)}{x \sec^2(xy) - 2}$

c) ☐ $\frac{dy}{dx} = \frac{5 - y \sec^2(xy)}{x \sec^2(xy) + 2}$

d) ☐ $\frac{dy}{dx} = \frac{5 - y \sec^2(xy)}{x \sec(xy) \tan(xy) - 2}$

e) ☐ $\frac{dy}{dx} = \frac{5 - y \sec(xy) \tan(xy)}{x \sec(xy) \tan(xy) - 2}$

Question 9

Find $\frac{d^2y}{dx^2}$ in terms of x and y given $xy + 2y^2 = 6$.

a) ☐ $\frac{d^2y}{dx^2} = \frac{-y}{4y + x}$

b) ☐ $\frac{d^2y}{dx^2} = \frac{-y - 6}{4y + x}$

c) ☐ $\frac{d^2y}{dx^2} = \frac{-y + 4x + 6}{x}$

d) ☐ $\frac{d^2y}{dx^2} = \frac{2xy + 4y^2}{(4y + x)^3}$

e) ☐ $\frac{d^2y}{dx^2} = \frac{2xy + 4y^2 + 12x - 144}{(4y + x)^3}$

Question 10

Compute $\frac{d^2y}{dx^2}$ at the point $(3, 2)$ given $x^2 - y^2 = 5$.

a) ☐ $\frac{5}{8}$

b) ☐ $-\frac{5}{4}$

c) ☐ $-\frac{15}{8}$

d) ☐ $-\frac{5}{8}$

e) ☐ $\frac{5}{4}$

Question 11

Find the equation of the tangent line to the curve at the point $\left(-\frac{\sqrt{2}}{2}, \frac{\pi}{4}\right)$ given $x - \cos(5y) = 0$.

a) ☐ $y = \frac{-2\sqrt{2}}{5} \left(x + \frac{\sqrt{2}}{2} \right) + \frac{\pi}{4}$

b) ☐ $y = -\frac{\sqrt{2}}{5} \left(x + \frac{\sqrt{2}}{2} \right) + \frac{\pi}{4}$

c) ☐ $y = \frac{5\sqrt{2}}{2} \left(x + \frac{\sqrt{2}}{2} \right) + \frac{\pi}{4}$

d) ☐ $y = \frac{\sqrt{2}}{5} \left(x + \frac{\sqrt{2}}{2} \right) + \frac{\pi}{4}$

e) ☐ $y = \frac{-5\sqrt{2}}{2} \left(x + \frac{\sqrt{2}}{2} \right) + \frac{\pi}{4}$

Question 12

Find $\frac{dy}{dx}$ given $\frac{5x}{\sqrt{x^2+5}}$.

a) ☐ $\frac{dy}{dx} = \frac{25}{\sqrt{x^2+5}}$

b) ☐ $\frac{dy}{dx} = \frac{25}{(x^2+5)^{3/2}}$

c) ☐ $\frac{dy}{dx} = \frac{25x}{(x^2+5)^{3/2}}$

d) ☐ $\frac{dy}{dx} = \frac{25x^2}{\sqrt{x^2+5}}$

e) ☐ $\frac{dy}{dx} = \frac{-25}{(x^2+5)^{3/2}}$