

HW 29: Quiz Review (3.1- 3.6 Chain Rule/Trig Derivatives/Simplifying)

Find $\frac{dy}{dx}$.

1. $y = \frac{2x^2}{\sqrt{3x^2 - 2}}$

2. $y = x^2(4x^3 - 3)^6$

3. $y = \csc(3x^2 + 2)$

4. $y = (4x^2 - 2x^3 + 1)^{-3}$

5. $y = x^2 \sec(3x)$

6. $y = \frac{\sin x}{1 - \csc x}$

7. $y = 3x(x^2 + 6x)^3$

8. $y = \tan^4\left(\frac{4}{x^3}\right)$

9. $y = \left(\frac{x+2}{3x+1}\right)^7$

10. $y = \frac{x}{\sqrt{1-x^2}}$

11. $y = \cos(\sin 5x)$

12. Write the equation of the tangent and normal line for $y = 3\cos x - 2$ at $x = \frac{\pi}{2}$

Quiz Review (3.1-3.6) Answers:

$$1. y' = \frac{6x^3 - 8x}{(3x^2 - 2)^{3/2}} = \frac{2x(3x^2 - 4)}{(3x^2 - 2)^{3/2}}$$

$$2. y' = (4x^3 - 3)^5(80x^4 - 6x)$$

$$3. y' = -6x \csc(3x^2 + 2) \cot(3x^2 + 2)$$

$$4. y' = \frac{-24x + 18x^2}{(4x^2 - 2x^3 + 1)^4} = \frac{-6x(4 - 3x)}{(4x^2 - 2x^3 + 1)^4}$$

$$5. y' = 3x^2 \sec(3x) \tan(3x) + 2x \sec(3x) = x \sec(3x) \cdot [3x \tan(3x) + 2]$$

$$6. y' = \frac{(1 - \csc x)(\cos x) - (\sin x)(\csc x \cot x)}{(1 - \csc x)^2} = \frac{\cos x - 2 \cot x}{(1 - \csc x)^2}$$

$$7. y' = (x^2 + 6x)^2(21x^2 + 72x)$$

$$8. y' = \left(\frac{-48}{x^4}\right) \tan^3\left(\frac{4}{x^3}\right) \sec^2\left(\frac{4}{x^3}\right)$$

$$9. y' = \frac{-35}{(3x+1)^2} \cdot \left(\frac{x+2}{3x+1}\right)^6 = \frac{-35(x+2)^6}{(3x+1)^8} \text{ is the better answer!}$$

$$10. y' = \frac{1}{(1-x^2)^{3/2}}$$

$$11. y' = -5 \sin(\sin 5x) \cos 5x$$

$$12. \text{ Tangent: } y = -3x + \frac{3\pi}{2} - 2$$

$$\text{ Normal: } y = \frac{1}{3}x - \frac{\pi}{6} - 2$$