

Review of Calculus I

Evaluate each limit statement:

$$1. \lim_{x \rightarrow -3} \frac{x^2 + 4x + 3}{x^2 - 9}$$

$$2. \lim_{x \rightarrow \infty} \frac{x}{-3x + 5}$$

$$3. \lim_{x \rightarrow \infty} \frac{x^2 - 2x}{2x^2 + 3x + 5}$$

$$4. \lim_{x \rightarrow 4} \frac{-5}{(x - 4)^2}$$

$$5. \lim_{x \rightarrow 1^+} \frac{x + 3}{x - 1}$$

$$6. \lim_{x \rightarrow \infty} (\ln x)$$

$$7. \lim_{x \rightarrow -\infty} (e^{-x})$$

Find $\frac{dy}{dx}$ for each function below:

$$8. f(x) = \frac{\cos 3x}{x - \sin 3x}$$

$$9. y = e^{4x} \sqrt{x^4 - 9}$$

$$10. x^2 y - 3 \tan y = 4$$

$$11. y = ex - 9\pi^2 + \ln 3$$

$$12. 2e^x e^y - \cos^3 x + \sin^3 y = 1$$

$$13. y = \sqrt[3]{\sin(e^{5x})}$$

Evaluate each integral:

$$14. \int (3x^4 + \sqrt{x} - \frac{2}{x^4}) dx$$

$$15. \int \sin(3x) dx$$

$$16. \int \sec^2 x dx$$

$$17. \int 2x \sqrt{x^2 - 9} dx$$

$$18. \int x^3 (x^4 - 16)^3 dx$$

$$19. \int \sin^5 x \cos x dx$$

$$20. \int 3x \cos(4x^2) dx$$

$$21. \int \frac{3x^2}{x^3 - 1} dx$$

$$22. \int \frac{dx}{(2x - 3)^4}$$

$$23. \int \frac{\ln x}{x} dx$$

$$24. \int \frac{x^4 - 5}{x^2} dx$$

$$25. \int \frac{e^{2x}}{e^{2x} - 1} dx$$