

MATH 116: ENTRANCE GATEWAY

1. Find the derivative of $p(x) = 5x^3 - 3x^2 + \pi$.

a. $\frac{5x^4}{4} - x^3 + \pi x + C$

b. $15x^3 - 6x^2 + \pi$

c. $5x^2 - 3x$

d. $15x^2 - 6x + \pi$

e. $15x^2 - 6x$

2. Find the most general form of $\int 5x^3 - 3x^2 + \pi \, dx$.

a. $\frac{5x^4}{4} - x^3 + \pi x + C$

b. $5x^4 - x^3 + \pi x + C$

c. $\frac{5x^4}{4} - x^3 + \pi x$

d. $15x^2 - 6x$

e. $\frac{5x^4}{4} - x^3 + \frac{\pi^2}{2} + C$

3. Evaluate $\lim_{x \rightarrow \infty} \frac{-9x^3 + 2x + 1}{12x^3 + 15x^2 + 7x + 8}$.

a. 0

b. 1

c. $\frac{3}{4}$

d. $-\frac{3}{4}$

e. Does not exist.

4. Use areas to determine the value of $\int_0^9 \sqrt{81 - x^2} \, dx$.

a. $\frac{9\pi}{4}$

b. $\frac{81\pi}{4}$

c. $\frac{81}{2}$

d. $\frac{81}{4}$

e. $\frac{81\pi}{2}$

5. Evaluate $\lim_{x \rightarrow 0} \frac{\sin(3x)}{7x}$.

a. 0

b. 1

c. $\frac{3}{7}$

d. $\frac{1}{7}$

e. $\frac{7}{3}$

6. Find the first derivative of $x^3 \tan(x)$.

a. $x^3 \sec^2(x) + 3x^2 \tan(x)$

b. $x^3 \sec(x) \tan(x) + 3x^2 \tan(x)$

c. $x^3 \tan(x) + 3x^2 \sec^2(x)$

d. $3x^2 \tan(x)$

e. $3x^2 \sec^2(x)$

7. Determine the value of $\int_0^1 x^2 \sin(\pi(x^3 + 1)) dx$.

a. $-\frac{2}{\pi}$

b. $-\frac{2}{3\pi}$

c. $\frac{1}{3\pi}$

d. $\frac{2}{3\pi}$

e. 0

8. Evaluate $\lim_{x \rightarrow -4} \frac{x^2 + 2x - 8}{2x^2 + 13x + 20}$.

a. 0

b. 1

c. 2

d. $\frac{1}{2}$

e. Does not exist

9. Find the first derivative of $f(x) = \cos(\sin(x))$.

a. $\sin(\sin(x))$

b. $-\sin(\sin(x))$

c. $-\cos(x) \cos(\sin(x))$

d. $-\cos(x) \sin(\sin(x))$

e. $\cos^2(x) - \sin^2(x)$