

BC Chapter 8 Review WS #2

1. Find $\int \frac{1}{x(\ln x)^3} dx$

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

3. Find $\int \cot^3 2x dx$

4. Find $\int \frac{1}{x\sqrt{4x^2+16}} dx$

5. Find $\int \frac{x-1}{x^2(x+1)} dx$

6. Find $\lim_{x \rightarrow \infty} x \tan\left(\frac{1}{x}\right)$

7. Find $\lim_{x \rightarrow 0^+} (e^x + x)^{2/x}$

8. $\int_0^2 \frac{1}{\sqrt[3]{x-1}} dx$

9. $\int_1^3 \frac{2}{(x-2)^{8/3}}$

10.

Which of the following gives the value of $\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^{3x}$?

- (A) 0 (B) 1 (C) e (D) e^2 (E) e^3

11.

$$\int_0^{\infty} x^2 e^{-x^3} dx =$$

(A) $-\frac{1}{3}$

(B) 0

(C) $\frac{1}{3}$

(D) 1

(E) Diverges

12.

$$\int_2^{\infty} \frac{x}{\sqrt[3]{x^2 - 2}} dx =$$

(A) $\frac{3 \cdot 2^{2/3}}{4}$

(B) $2^{2/3}$

(C) $-\frac{3 \cdot 2^{2/3}}{4}$

(D) $-\frac{3 \cdot 2^{2/3}}{2}$

(E) Diverges

13. $\int x^2 \sin 2x dx$

14. $\int \frac{x}{\sqrt[3]{4 - x^2}} dx$

15.

$$\int \ln \sqrt{x^2 - 4} \, dx$$

16.
$$\int \arctan 2x \, dx$$

17.
$$\int \cos^3(\pi x - 1) \, dx$$

18.
$$\int \sin^2 \frac{\pi x}{2} \, dx$$

19.
$$\int \sec^4 \frac{x}{2} \, dx$$

20.

$$\int \frac{\sqrt{x^2 - 9}}{x} \, dx, \quad x > 3$$

21. $\int \frac{x^3}{\sqrt{4+x^2}} dx$

22.

$$\int \frac{x-39}{x^2-x-12} dx$$

23.

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

24.

$$\int \frac{4x-2}{3(x-1)^2} dx$$

25.

$$\lim_{x \rightarrow 1} \frac{(\ln x)^2}{x - 1}$$

26.

$$\lim_{x \rightarrow \infty} (\ln x)^{2/x}$$

27.

$$\lim_{x \rightarrow 1^+} (x - 1)^{\ln x}$$

28.

$$\lim_{x \rightarrow 1^+} \left(\frac{2}{\ln x} - \frac{2}{x - 1} \right)$$

Determine whether the improper integral diverges or converges. Evaluate the integral if it converges.

29.

$$\int_0^{16} \frac{1}{\sqrt[4]{x}} dx$$

30.

$$\int_0^2 \frac{7}{x - 2} dx$$

31.

$$\int_1^{\infty} x^2 \ln x dx$$

32.

$$\int_1^{\infty} \frac{\ln x}{x^2} dx$$

33.

$$\int_2^{\infty} \frac{1}{x\sqrt{x^2 - 4}} dx$$