

Chapter 8 Practice Test

Use Algebraic Notation AND Show All of Your Work

Evaluate each integral. If you use a **substitution and/or change of variable technique**, be sure to state $u =$, $\frac{du}{dx} =$, and $dx =$ in each process. (*Be careful with your notation, and show your integration steps clearly.*)

1. Integrate: $\int \frac{1}{\cos(\theta)-1} d\theta$

$$\int \frac{1}{\cos(\theta)-1} d\theta =$$

2. Integrate: $\int e^x \cos(x) dx$

$$\int e^x \cos(x) dx =$$

3. Integrate: $\int_0^{\frac{\pi}{4}} e^{-x} \cos(x) dx$

$$\int_0^{\frac{\pi}{4}} e^{-x} \cos(x) dx =$$

4. Integrate: $\int \cos(2x)\cos(3x) dx$

$$\int \cos(2x)\cos(3x) dx =$$

5. Integrate: $\int \sin^2(x)\cos^2(x)dx$

$$\int \sin^2(x)\cos^2(x)dx =$$

6. Integrate: $\int_0^3 \frac{x^3}{\sqrt{x^2+9}} dx$

$$\int_0^3 \frac{x^3}{\sqrt{x^2+9}} dx =$$

7. Integrate: $\int \frac{\sqrt{x^2 - 4}}{x} dx$

$$\int \frac{\sqrt{x^2 - 4}}{x} dx =$$

8. Evaluate the integral: $\int \frac{x^3 - x + 3}{x^2 + x - 2} dx$

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

9. Evaluate the integral: $\int \frac{2x-3}{(x-1)^2} dx$

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

For #10 and #11: (a) Describe the type of indeterminate form that is obtained by **initial** direct substitution. (b) Use “L’Hôpital’s Rule” to evaluate the limit. (c) Use a graphing utility to graph the original function in the limit over an appropriate interval and verify your result.

10. $\lim_{x \rightarrow 1} \frac{\ln(x)}{x-1} =$

(c) $y = \frac{\ln(x)}{x-1}$



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

(a) Initial Indeterminate form =

11. $\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^x =$

(c) $y = \left(1 + \frac{1}{x}\right)^x$



$\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^x =$

(a) Initial Indeterminate form =

For #12 and #13: (a) Explain **why** the integral is, or is not improper. (b) Evaluate the integral. (c) Determine whether or not it converges or diverges. (d) Use a graphing utility to graph the integrand as a function over the appropriate interval, *shading the relevant area*, and verify your result.

12. $\int_0^{\infty} x e^{-\frac{x^2}{2}} dx =$

(d) $y = x e^{-\frac{x^2}{2}}$ over $[0, \infty)$



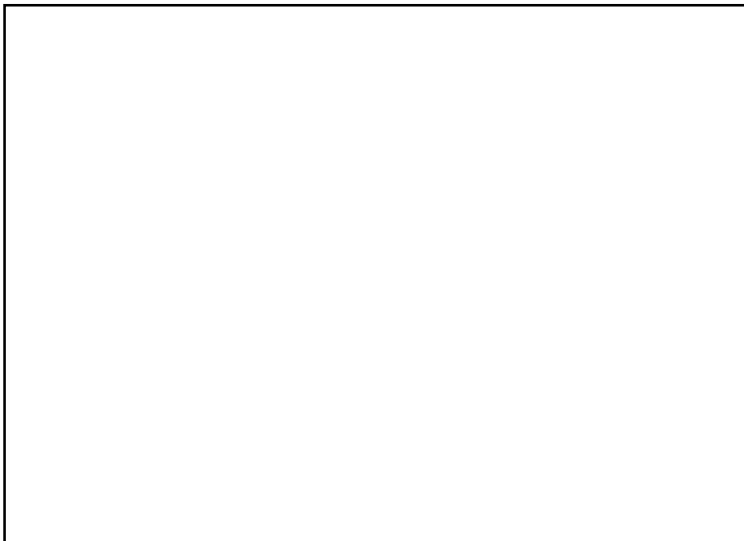
(a) Improper, or Not Improper \Leftrightarrow

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

(c) Converges, or Diverges

13. $\int_0^6 \frac{4}{\sqrt{6-x}} dx =$

(d) $y = \frac{4}{\sqrt{6-x}}$ over $[0,6)$



(a) Improper, or Not Improper \Leftrightarrow

$$\int_0^6 \frac{4}{\sqrt{6-x}} dx =$$

(c) Converges, or Diverges

14. Evaluate the integral: $\int \sec^6(3x)dx$

$$\int \sec^6(3x)dx =$$

15. Evaluate the integral: $\int \tan^6(x) dx$

$$\int \tan^6(x) dx =$$

16. Evaluate the integral: $\int \tan^3\left(\frac{\pi x}{2}\right)\sec^2\left(\frac{\pi x}{2}\right)dx$

$$\int \tan^3\left(\frac{\pi x}{2}\right)\sec^2\left(\frac{\pi x}{2}\right)dx =$$

17. Evaluate the integral: $\int \frac{\tan^2(x)}{\sec^5(x)} dx$

$$\int \frac{\tan^2(x)}{\sec^5(x)} dx =$$

18. Evaluate the integral: $\int \sin(-4x)\cos(3x) dx$

$$\int \sin(-4x)\cos(3x) dx =$$
