

Write the solution to each derivative from memory. For any you do not remember, make a point to memorize them before attempting new material in Calculus II.

1. $\frac{d}{dx} [x^5]$
2. $\frac{d}{dx} [\sqrt{x}]$
3. $\frac{d}{dx} \left[\frac{1}{x^4} \right]$
4. $\frac{d}{dx} [\sin x]$
5. $\frac{d}{dx} [\cos x]$
6. $\frac{d}{dx} [\tan x]$
7. $\frac{d}{dx} [\csc x]$
8. $\frac{d}{dx} [\sec x]$
9. $\frac{d}{dx} [\cot x]$
10. $\frac{d}{dx} [e^x]$
11. $\frac{d}{dx} [\ln(x)]$
12. $\frac{d}{dx} [\arcsin x]$
13. $\frac{d}{dx} [\arctan x]$

Evaluate each derivative.

14. $\frac{d}{dx} [x^3 \sin x]$
15. $\frac{d}{dx} \left[\frac{x^2}{3x^3 + 8} \right]$
16. $\frac{d}{dx} [e^{3x}]$
17. $\frac{d}{dx} [\ln(x^5 + 7)]$
18. $\frac{d}{dx} [\cos^2 x]$
19. $\frac{d}{dx} [\arcsin x^2]$

Write the solution to each integral from memory.

20. $\int x^5 dx$
21. $\int \sqrt[3]{x} dx$
22. $\int e^x dx$
23. $\int \frac{1}{x} dx$
24. $\int \frac{1}{x^2} dx$
25. $\int \frac{1}{\sqrt{x}} dx$

26. $\int \sin x dx$
27. $\int \cos x dx$
28. $\int \sec^2 x dx$
29. $\int \csc^2 x dx$
30. $\int \sec x \tan x dx$
31. $\int \csc x \cot x dx$
32. $\int \tan x dx$
33. $\int \cot x dx$
34. $\int \sec x dx$
35. $\int \csc x dx$

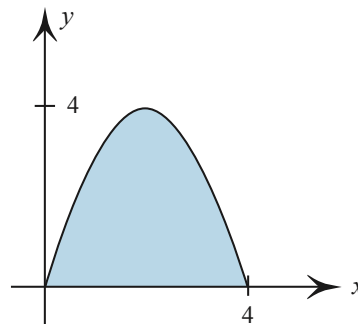
Evaluate each integral using substitution.

36. $\int x\sqrt{x^2 + 36} dx$
37. $\int \frac{x^2}{x^3 - 27} dx$
38. $\int \sec^2(\pi x) dx$
39. $\int (\sin x)e^{\cos x} dx$
40. $\int \frac{1}{x^{2/3}\sqrt{x^{1/3} + 9}} dx$

Evaluate each definite integral.

41. $\int_0^4 \sqrt{x} dx$
42. $\int_1^e \frac{\ln(x)}{x} dx$
43. $\int_1^{16} \frac{1}{\sqrt{x}(1 + \sqrt{x})^2} dx$

44. Determine the area of the shaded region shown with $y = x(4 - x)$.



Answers

1. $5x^4$ 2. $\frac{1}{2\sqrt{x}}$ 3. $-\frac{4}{x^5}$ 4. $\cos x$
5. $-\sin x$ 6. $\sec^2 x$ 7. $-\csc x \cot x$
8. $\sec x \tan x$ 9. $-\csc^2 x$ 10. e^x
11. $\frac{1}{x}$ 12. $\frac{1}{\sqrt{1-x^2}}$ 13. $\frac{1}{1+x^2}$
14. $x^2(3\sin x + x\cos x)$ 15. $\frac{x(16-3x^3)}{(3x^3+8)^2}$
16. $3e^{3x}$ 17. $\frac{5x^4}{x^5+7}$ 18. $-2\cos x \sin x$
19. $\frac{2x}{\sqrt{1-x^4}}$ 20. $\frac{x^6}{6} + C$ 21. $\frac{3\sqrt[3]{x^4}}{4} + C$
22. $e^x + C$ 23. $\ln|x| + C$ 24. $-\frac{1}{x} + C$
25. $2\sqrt{x} + C$ 26. $-\cos x + C$ 27. $\sin x + C$
28. $\tan x + C$ 29. $-\cot x + C$ 30. $\sec x + C$
31. $-\csc x + C$ 32. $-\ln|\cos x| + C$
33. $\ln|\sin x| + C$ 34. $\ln|\sec x + \tan x| + C$
35. $-\ln|\csc x + \cot x| + C$
36. $\frac{1}{3}(x^2 + 36)^{3/2} + C$
37. $\frac{1}{3}\ln|x^3 - 27| + C$ 38. $\frac{1}{\pi}\tan \pi x + C$
39. $-e^{\cos x} + C$ 40. $6\sqrt{x^{1/3} + 9} + C$
41. $\frac{16}{3}$ 42. $\frac{1}{2}$ 43. $\frac{3}{5}$ 44. $\frac{32}{3}$