

Integration – Calculus AB

Find the general solution of each differential solution.

1. $\frac{dy}{dt} = 3t^2$

2. $\frac{dr}{d\theta} = \pi$

3. $\frac{dy}{dx} = x^{3/2}$

9. $\int \frac{1}{(3x)^2} dx$

10. $\int (2x-4)^2 dx$

11. $\int (x+3) dx$

12. $\int (2x-3x^2) dx$

13. $\int (4x^3 + 6x^2 - 1) dx$

14. $\int \frac{1}{x^4} dx$

15. $\int \sqrt[3]{x^2} dx$

16. $\int \frac{1}{x^3} dx$

17. $\int \frac{x^2 + x + 1}{\sqrt{x}} dx$

Integrate

4. $\int \sqrt[3]{x} dx$

5. $\int \frac{1}{x^2} dx$

6. $\int \frac{1}{x\sqrt{x}} dx$

7. $\int x(x^2 + 3) dx$

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

Integrate each.

18. $\int (2\sin x + 3\cos x) dx$

19. $\int (t^2 - \sin t) dt$

20. $\int (1 - \csc t \cot t) dt$

21. $\int (2\sec^2 x - \sin x) dx$

22. $\int \sec x (\tan x - \sec x) dx$

23. $\int \frac{\cos x}{1 - \cos^2 x} dx$

Solve the differential equation.

24. $f'(x) = 4x, f(0) = 6$

25. $g'(x) = 6x^2, g(0) = -1$

26. $h'(t) = 8t^3 + 5, h(1) = -4$

27. $f''(x) = 2, f'(2) = 5, f(2) = 10$

28. $f''(x) = \sin x, f'(0) = 1, f(0) = 6$

29. $f''(x) = x^{-3/2}, f'(4) = 2, f(0) = 0$

ANSWERS!

1. $y = t^3 + C$

2. $r = \pi\theta + C$

3. $y = \frac{2}{5}x^{5/2} + C$

4. $\frac{3}{4}x^{4/3} + C$

5. $-\frac{1}{x} + C$

6. $\frac{-2}{\sqrt{x}} + C$

7. $\frac{1}{4}x^4 + \frac{3}{2}x^2 + C$

8. $\frac{-1}{4x^2} + C$

9. $-\frac{1}{9x} + C$

10. $\frac{4}{3}x^3 - 8x^2 + 16x + C$

11. $\frac{1}{2}x^2 + x + C$

12. $x^2 - x^3 + C$

13. $x^4 + 2x^3 - x + C$

14. $\frac{-1}{3x^3} + C$

15. $\frac{3}{5}x^{5/3} + C$

16. $-\frac{1}{2x^2} + C$

17. $\frac{2}{15}\sqrt{x}(3x^2 + 5x + 15) + C$

18. $-2\cos x + 3\sin x + C$

19. $\frac{1}{3}t^3 + \cos t + C$

20. $t + \csc t + C$

21. $2\tan x + \cos x + C$

22. $\sec x - \tan x + C$

23. $-\csc x + C$

24. $f(x) = 2x^2 + 6$

25. $f(x) = 2x^3 - 1$

26. $h(t) = 2t^4 + 5t - 11$

27. $f(x) = x^2 + x + 4$

28. $f(x) = -\sin x + 2x + 6$

29. $f(x) = 4\sqrt{x} + 3x$