

Name _____

Antiderivatives WS

Find the antiderivative of each function.

1. $f(x) = 5$

2. $f(x) = 5x$

3. $f(x) = x^2$

4. $g(t) = t^2 + t$

5. $f(x) = x^4$

6. $g(t) = t^7 + t^3$

7. $f(q) = 5q^2$

8. $g(x) = 6x^3 + 4$

9. $g(z) = \sqrt{z}$

10. $f(x) = 5x - \sqrt{x}$

11. $h(z) = \frac{1}{z}$

12. $r(t) = \frac{1}{t^2}$

13. $g(z) = \frac{1}{z^3}$

14. $p(t) = t^3 - \frac{t^2}{2} - t$

15. $h(t) = 3t^2 + 7t + 1$

16. $f(t) = 2t^2 + 3t^3 + 4t^4$

17. $h(t) = \cos t$

18. $g(t) = \sin t$

Evaluate the indefinite integrals.

19. $\int 3x \, dx$

20. $\int (4t + 7) \, dt$

21. $\int (8t + 3) \, dt$

22. $\int 6x^2 \, dx$

23. $\int t^{12} \, dt$

24. $\int (x^3 - x) \, dx$

25. $\int (x^2 + 1) \, dx$

26. $\int (x^2 + 4x + 8) \, dx$

27. $\int 5e^x \, dx$

28. $\int e^{2x} \, dx$

29. $\int \cos(4x) \, dx$

30. $\int [10 + 8\sin(2x)] \, dx$

Use the chain rule for integrals formula to find each antiderivative.

$$31. \int \frac{\cos\left(\frac{1}{x}\right)}{x^2} dx$$

$$32. \int \frac{9x^2}{2\sqrt{3x^3+5}} dx$$

$$33. \int 3x^2 \sec^2(x^3) dx$$

$$34. \int (4e^x + 2x)^2 \cdot (4e^x + 2) dx$$

$$35. \int \frac{3x^2 + 2x + 3}{x^3 + x^2 + 3x} dx$$

$$36. \int (6x^2) \sin(2x^3) dx$$

$$37. \int \frac{e^{\sqrt{x}}}{2\sqrt{x}} dx$$

$$38. \int \frac{\sqrt{\ln x}}{x} dx$$

$$39. \int \cos x e^{\sin x} dx$$

$$40. \int \frac{2e^{2x}}{(e^{2x} + 1)^3} dx$$

$$41. \int \frac{2x}{x^2 + 4} dx$$

$$42. \int \frac{(\ln(x) + 2)^2}{x} dx$$

Find a specific function that satisfies the property that $F(0) = 0$.

$$43. f(x) = 3$$

$$44. f(x) = -7x$$

$$45. f(x) = \frac{1}{4}x$$

$$46. f(x) = \sqrt{x}$$

$$47. f(x) = 2 + 4x + 5x^2$$

$$48. f(x) = e^x$$

Find a specific function that satisfies the property that $F(0) = 5$.

$$49. f(x) = x^2 + 4$$

$$50. f(x) = 6x + 5$$

$$51. f(x) = 6e^{3x}$$

$$52. f(x) = 8\sin(2x)$$

$$53. f(x) = \left(x + \frac{1}{\sqrt{x}}\right) dx$$

$$54. f(x) = (4x + 2e^x) dx$$