Problems for Section 7.1

Homework #18 Math 211

In Problems 1–26, find an antiderivative.

1. $f(x) = 5$
3. $g(t) = t^2 + t$
5. $f(x) = x^4$
7. $g(x) = 6x^3 + 4$
9. $h(y) = 3y^2 - y^3$
11. $f(x) = 3x^2 + 5$
13. $p(x) = x^2 - 6x + 17$
15. $f(x) = 5x - \sqrt{x}$
17. $h(z) = \frac{1}{z}$
19. $g(z) = \frac{1}{z^3}$
21. $f(x) = x^6 - \frac{1}{7x^6}$
23. $g(t) = e^{-3t}$
25. $g(t) = 5 + \cos t$

In Problems 27–32, find an antiderivative $F(x)$ with $F'(x) = f(x)$ and $F(0) = 0$. Is there only one possible solution?

27. $f(x) = 3$
29. $f(x) = 2 + 4x + 5x^2$
31. $f(x) = \sqrt{x}$

Find the indefinite integrals in Problems 33–62.

33. $\int (5x + 7)\, dx$
35. $\int 6x^2\, dx$
37. $\int (x + 1)^2\, dx$
39. $\int (t^2 + 5t + 1)\, dt$
41. $\int (t^3 + 6t^2)\, dt$
43. $\int 3\sqrt{w}\, dw$
45. $\int \left(\frac{3}{t} - \frac{2}{t^2}\right) dt$
47. $\int \left(x + \frac{1}{\sqrt{x}}\right) dx$
49. $\int (e^x + 5)\, dx$
51. $\int e^{3r}\, dr$
53. $\int \sin t\, dt$
55. $\int 100e^{4x} dx$
57. $\int (3\cos x - 7\sin x)\, dx$

For Problems 63–66, find an antiderivative $F(x)$ with $F'(x) = f(x)$ and $F(0) = 5$.

63. $f(x) = 6x - 5$
65. $f(x) = 8\sin(2x)$

For Problems 63–66, find an antiderivative $F(x)$ with $F'(x) = f(x)$ and $F(0) = 5$.

67. A firm's marginal cost function is $MC = 3q^2 + 4q + 6$. Find the total cost function if the fixed costs are 200.

Solutions

Section 7.1

1 $5x$

3 $t^3/3 + t^2/2$

5 $x^5/5$

7 $3x^4/2 + 4x$

9 $y^3 - y^4/4$

11 $x^3 + 5x$

13 $(x^3/3) - 3x^2 + 17x$

15 $5x^2/2 - 2x^{3/2}/3$

17 $\ln|z|$

19 $-1/2z^2$

21 $F(x) = x^7/7 + x^{-5}/35 + C$

23 $-e^{-3t}/3$

25 $G(t) = 5t + \sin t + C$

27 $F(x) = 3x$
(only possibility)

29 $F(x) = 2x + 2x^2 + (5/3)x^3$
(only possibility)

31 $F(x) = (2/3)x^{3/2}$
(only possibility)

33 $(5/2)x^2 + 7x + C$

35 $2x^3 + C$

37 $(x+1)^3/3 + C$

39 $t^3/3 + 5t^2/2 + t + C$

41 $t^4/4 + 2t^3 + C$

43 $2w^{3/2} + C$

45 $3\ln|t| + \dfrac{2}{t} + C$

47 $x^2/2 + 2x^{1/2} + C$

49 $e^x + 5x + C$

51 $e^{3r}/3 + C$

53 $-\cos t + C$

55 $25e^{4x} + C$

57 $3\sin x + 7\cos x + C$

59 $\frac{1}{2}\sin(x^2+4) + C$

61 $10x - 4\cos(2x) + C$

63 $F(x) = 3x^2 - 5x + 5$

65 $F(x) = -4\cos(2x) + 9$

67 $q^3 + 2q^2 + 6q + 200$