(1) $\displaystyle\int \frac{14-2\sqrt{x}+3xe^x}{7x}\,dx$ (2) $\displaystyle\int \frac{4\sqrt[4]{x}-5\sqrt{x}+4x^3}{\sqrt[3]{x}}\,dx$ (3) $\displaystyle\int \frac{6\sqrt{x}-5x^2}{30\sqrt[3]{x}}\,dx$

(4) $\displaystyle\int (4\sqrt{x}-3x^3)^2\,dx$ (5) $\displaystyle\int \frac{(5x+3\sqrt{x})^2}{x^2}\,dx$ (6) $\displaystyle\int \frac{\sqrt[5]{x}+x^3e^x+6x^5}{3x^3}\,dx$

(7) $\displaystyle\int \frac{6\sqrt[5]{x^2}+3\sqrt[3]{x^4}-8x^4}{2\sqrt{x}}\,dx$ (8) $\displaystyle\int \frac{9x^5-12\sqrt[3]{x}}{30\sqrt{x^5}}\,dx$ (9) $\displaystyle\int (8\sqrt[4]{x}+2x^2)^2\,dx$

(10) $\displaystyle\int \frac{(3x^2-\sqrt[3]{x})^2}{3x^2}\,dx$ (11) $\displaystyle\int (3x^{-1}+4)^2\,dx$ (12) $\displaystyle\int \sqrt[3]{x}(3x-2\sqrt{x}+6)\,dx$

(13) $\displaystyle\int (2x^2+9)^2\,dx$ (14) $\displaystyle\int (3\sqrt{x}+4x)^2\,dx$ (15) $\displaystyle\int [4x-\sqrt[3]{x}(2x-5x^2)]\,dx$

(16) $\displaystyle\int \frac{(3+5x)(x^2+1)^2}{2x}\,dx$ (17) $\displaystyle\int_1^4 \left(\frac{2}{x\sqrt{x}}-5\sqrt{x}\right)\,dx$ (18) $\displaystyle\int_1^8 \left(6\sqrt[3]{x}-\frac{8}{\sqrt[3]{x^2}}\right)\,dx$

(19) $\displaystyle\int_{-1}^0 \sqrt[3]{x}(3-x^2)\,dx$ (20) $\displaystyle\int_{-8}^1 x^3(4-\sqrt[3]{x})\,dx$

(21) Given $f''(x)=30x^4+12x$; $f'(0)=5$; $f(0)=-7$, find $f(x)$.

(22) Given $f''(x)=24x^2-18x$; $f'(-1)=2$; $f(1)=4$, find $f(x)$.

(23) Given $f''(x)=60\sqrt{x}-48x$; $f'(1)=25$; $f(4)=30$, find $f(x)$.

(24) Find the cost function given $\dfrac{dC}{dx}=5x-\dfrac{1}{x}$ and 10 units cost \$94.20.

(25) Find the cost function given $\dfrac{dC}{dx}=\dfrac{1}{x}+2x$ and 7 units cost \$58.40.

(26) Find the demand function at $x=90$ given $\dfrac{dR}{dx}=x^2-2x+3$.

(27) Find the profit function at $x=100$ given that $\dfrac{dP}{dx}=2x+20$ and profit on 20 items is \$50.

(28) Given $\dfrac{dy}{dt}=\dfrac{\sqrt{t^3}-t}{\sqrt{t^3}}$, find the function y that satisfies the condition $y(9)=4$.

(29) Given $\dfrac{dy}{dx}=2x^{-2}+3x^{-1}-1$, find the function y that satisfies the condition $y(1)=0$.

(30) Given $f''(x)=18x-6x^2$, find the function $f(x)$ that satisfies the conditions $f'(1)=20$ and $f(1)=15$.

(31) Given $\dfrac{dy}{dt}=\dfrac{\sqrt[3]{t^2}-4}{\sqrt[3]{t^2}}$, find the function y that satisfies the condition $y(-8)=4$.

(32) Given $\dfrac{dy}{dx}=4x^{-3}+5x^{-1}+3$, Find the function y that satisfies the condition $y(1)=3$.

(33) Given $f''(x)=12x^2-6x$, find the function $f(x)$ that satisfies the conditions $f'(1)=8$ and $f(-1)=5$.

(34) Find the average cost function given that the marginal cost is $0.3x^2+6x+100$ and that 10 units cost \$3000.

(35) Find the demand function given that the marginal revenue is $9x^2 + 0.1x + 500$ and that the revenue from 10 units is \$8500.

(36) Find the cost function given that the marginal cost is $12x^2 + 20e^{2x}$ and that the fixed costs are \$1000.

(37) Find the demand function at $x = 16$ units given that the marginal revenue is $6\sqrt{x} + 8x + 500$.

ANSWERS:

1. $2\ln|x| - \frac{4}{7}\sqrt{x} + \frac{3}{7}e^x + C$
2. $\frac{48}{11}x^{11/12} - \frac{30}{7}x^{7/6} + \frac{12}{11}x^{11/3} + C$
3. $\frac{6}{35}x^{7/6} - \frac{1}{16}x^{8/3} + C$
4. $8x^2 - \frac{16}{3}x^{9/2} + \frac{9}{7}x^7 + C$
5. $25x + 60\sqrt{x} + 9\ln|x| + C$
6. $\frac{-5}{27x^{9/5}} + \frac{1}{3}e^x + \frac{2}{3}x^3 + C$
7. $\frac{10}{3}x^{9/10} + \frac{9}{11}x^{11/6} - \frac{8}{9}x^{9/2} + C$
8. $\frac{3}{35}x^{7/2} + \frac{12}{35x^{7/6}} + C$
9. $\frac{128}{3}x^{3/2} + \frac{128}{13}x^{13/4} + \frac{4}{5}x^5 + C$
10. $\frac{-1}{x^{1/3}} - \frac{3}{2}x^{4/3} + x^3 + C$
11. $\frac{-9}{x} + 24\ln|x| + 16x + C$
12. $\frac{9}{7}x^{7/3} - \frac{12}{11}x^{11/6} + \frac{9}{2}x^{4/3} + C$
13. $\frac{4}{5}x^5 + 12x^3 + 81x + C$
14. $\frac{9}{2}x^2 + \frac{48}{5}x^{5/2} + \frac{16}{3}x^3 + C$
15. $2x^2 - \frac{6}{7}x^{7/3} + \frac{3}{2}x^{10/3} + C$
16. $\frac{1}{2}x^5 + \frac{3}{8}x^4 + \frac{5}{3}x^3 + \frac{3}{2}x^2 + \frac{5}{2}x + \frac{3}{2}\ln|x| + C$
17. $\dfrac{-64}{3}$
18. $\dfrac{87}{2}$
19. $\dfrac{-39}{20}$
20. $\dfrac{-77814}{13}$
21. $f(x) = x^6 + 2x^3 + 5x - 7$
22. $f(x) = 2x^4 - 3x^3 + 19x - 14$
23. $f(x) = 16x^{5/2} - 8x^3 + 9x - 6$
24. $C = \frac{5}{2}x^2 - \ln|x| - 153.50$
25. $C = \ln|x| + x^2 + 7.45$
26. $p(90) = \$2613$
27. $P(100) = \$11250$
28. $y = t - 2\sqrt{t} + 1$
29. $y = 3\ln|x| - x - \frac{2}{x} + 3$
30. $f(x) = -\frac{1}{2}x^4 + 3x^3 + 13x - \frac{1}{2}$
31. $y = t - 12\sqrt[3]{t} - 12$
32. $y = 5\ln|x| + 3x - \frac{2}{x^2} + 2$
33. $f(x) = x^4 - x^3 + 7x + 10$
34. $\overline{C} = 0.1x^2 + 3x + 100 + \frac{1600}{x}$
35. $p = 3x^2 + 0.05x + 500 + \frac{495}{x}$
36. $C = 4x^3 + 10e^{2x} + 990$
37. $p(16) = \$580$