Sec. 4.8 page 321 (1-7, 11-13, 17-21, 24, 28-31, 34, 41, 42)

① $f(x) = \frac{1}{2} + \frac{3}{4}x^2 - \frac{4}{5}x^3$

$F(x) = \frac{1}{2}x + \frac{1}{4}x^3 - \frac{1}{5}x^4 + C$

② $f(x) = 8x^9 - 3x^6 + 12x^3$

$F(x) = \frac{4}{5}x^{10} - \frac{3}{7}x^7 + 3x^4 + C$

③ $f(x) = (x+1)(2x-1)$

$f(x) = 2x^2 + 2x - x - 1 = 2x^2 + x - 1$

$F(x) = \frac{2}{3}x^3 + \frac{1}{2}x^2 - x + C$

④ $f(x) = x(2-x)^2$

$f(x) = x(4 - 4x + x^2) = 4x - 4x^2 + x^3$

$F(x) = 2x^2 - \frac{4}{3}x^3 + \frac{1}{4}x^4 + C$

⑤ $f(x) = 5x^{1/4} - 7x^{3/4}$

$F(x) = \frac{5x^{5/4}}{5/4} - \frac{7x^{7/4}}{7/4} = 4x^{5/4} - 4x^{7/4} + C$

$F(x) = 4x(x^{1/4} - x^{3/4}) + C$

⑥ $f(x) = 2x + 3x^{1.7}$

$F(x) = x^2 + \frac{3x^{2.7}}{2.7} = x^2 + \frac{10}{9}x^{2.7} + C$

⑦ $f(x) = 6\sqrt{x} - \sqrt[6]{x} = 6x^{1/2} - x^{1/6}$

$F(x) = \frac{6x^{3/2}}{3/2} - \frac{x^{7/6}}{7/6} + C = 4x^{3/2} - \frac{6}{7}x^{7/6} + C$

$= x(4\sqrt{x} - \frac{6}{7}\sqrt[6]{x}) + C$

(11) $f(u) = \frac{u^4 + 3\sqrt{u}}{u^2} = u^2 + 3u^{-3/2}$

$F(u) = \frac{1}{3}u^3 - \frac{3u^{-1/2}}{1/2} + C = \frac{1}{3}u^3 - 6u^{-1/2} + C$

(12) $f(x) = 3e^x + 7\sec^2 x$

$F(x) = 3e^x + 7\tan x + C$

(13) $g(\theta) = \cos\theta - 5\sin\theta$

$G(\theta) = \sin\theta + 5\cos\theta + C$

(17) $f(x) = 5x^4 - 2x^5 \qquad F(0) = 4$

$F(x) = x^5 - \frac{1}{3}x^6 + C$

$4 = C$

$\therefore F(x) = x^5 - \frac{1}{3}x^6 + 4$

(18) $f(x) = 4 - 3(1+x^2)^{-1} \qquad F(1) = 0$

$F(x) = 4x - 3\arctan x + C$

$0 = 4(1) - 3\arctan(1) + C$

$C \approx 1.64$

$\therefore F(x) = 4x - 3\arctan x + 1.64$

(19) $f''(x) = 6x + 12x^2$

$f'(x) = 3x^2 + 4x^3 + C$

$f(x) = x^3 + x^4 + Cx + D$

(20) $f''(x) = 2 + x^3 + x^6$

$f'(x) = 2x + \frac{1}{4}x^4 + \frac{1}{7}x^7 + C$

$f(x) = x^2 + \frac{1}{20}x^5 + \frac{1}{56}x^8 + Cx + D$

(21) $f''(x) = \frac{2}{3}x^{2/3}$

$f'(x) = \frac{\frac{2}{3}x^{5/3}}{5/3} + C = \frac{2}{5}x^{5/3} + C$

$f(x) = \frac{\frac{2}{5}x^{8/3}}{8/3} + Cx = \frac{3}{20}x^{8/3} + Cx + D$

(24) $f'(x) = 8x^3 + 12x + 3, \quad f(1) = 6$

$f(x) = 2x^4 + 6x^2 + 3x + C$

$6 = 2 + 6 + 3 + C$

$6 = 11 + C \Rightarrow C = -5$

$\therefore f(x) = 2x^4 + 6x^2 + 3x - 5$

(28) $f'(x) = 4/\sqrt{1-x^2} \quad f(\frac{1}{2}) = 1$

$f(x) = 4\arcsin x + C$

$1 = 4\arcsin \frac{1}{2} + C$

$1 = 2.0944 + C$

$C = -1.0944$

$\therefore f(x) = 4\arcsin x - 1.0944$

(29) $f''(x) = -2 + 12x - 12x^2$ $f(0) = 4$, $f'(0) = 12$

$f'(x) = -2x + 6x^2 - 4x^3 + C$

$12 = C$

$f'(x) = -2x + 6x^2 - 4x^3 + 12$

$f(x) = -x^2 + 2x^3 - x^4 + 12x + D$

$4 = D$

$\therefore f(x) = -x^2 + 2x^3 - x^4 + 12x + 4$

(30) $f''(x) = 8x^3 + 5$ $f(1) = 0$ $f'(1) = 8$

$f'(x) = 2x^4 + 5x + C$

$8 = 2 + 5 + C$

$C = 1$

$f'(x) = 2x^4 + 5x + 1$

$f(x) = \frac{2}{5}x^5 + \frac{5}{2}x^2 + x + D$

$0 = \frac{2}{5} + \frac{5}{2} + 1 + D$

$0 = \frac{39}{10} + D$

$D = -3.9$

$\therefore f(x) = \frac{2}{5}x^5 + \frac{5}{2}x^2 + x - 3.9$

(31) $f''(\theta) = \sin\theta + \cos\theta$ $f(0) = 3$ $f'(0) = 4$

$f'(\theta) = -\cos\theta + \sin\theta + C$

$4 = -1 + 0 + C$

$C = 5$

$f'(\theta) = -\cos\theta + \sin\theta + 5$

$f(\theta) = \sin\theta - \cos\theta + 5x + D$

$3 = 0 - 1 + 0 + D$

$D = 4$ $\therefore f(x) = \sin\theta - \cos\theta + 5\theta + 4$

(34) $s''(t) = 2e^t + 3\sin t \quad s(0)=0 \quad s(\pi)=0$

$s'(t) = 2e^t - 3\cos t + C$

$s(t) = 2e^t - 3\sin t + Cx + D$

$0 = 2 - 0 + 0 + D$

$D = -2$

$0 = 2e^{\pi} - 3(0) + C\pi - 2$

$C = \frac{2 - 2e^{\pi}}{\pi} \approx -14.1$

$\therefore s(t) = 2e^t - 3\sin t - 14.1t - 2$

(41) $v(t) = \sin t - \cos t \quad s(0) = 0m$

$s(t) = -\cos t - \sin t + C$

$0 = -1 + C$

$C = 1$

$\therefore s(t) = -\cos t - \sin t + 1$

(42) $a(t) = 5 + 4t - 2t^2 \quad v(0) = 3 m/s \quad s(0) = 10m$

$v(t) = 5t + 2t^2 - \frac{2}{3}t^3 + C$

$3 = 0 + 0 - 0 + C$

$v(t) = 5t + 2t^2 - \frac{2}{3}t^3 + 3$

$s(t) = \frac{5}{2}t^2 + \frac{2}{3}t^3 - \frac{1}{6}t^4 + 3t + D \quad \Rightarrow D = 3$

$\therefore s(t) = \frac{5}{2}t^2 + \frac{2}{3}t^3 - \frac{1}{6}t^4 + 3t + 3$