

# 4.8 #1, 5, 9, 11, 17, 21, 25, 27, 31, 35, 45, 51, 57, 63, 67

$$1) f(x) = 18x^2 \\ F(x) = \frac{18x^3}{3} + C = 6x^3 + C \\ F'(x) = 18x^2 \checkmark$$

$$5) f(x) = 2\cos(x) - 9\sin(x) \\ F(x) = 2\sin(x) + 9\cos(x) + C \\ F'(x) = 2\cos(x) - 9\sin(x) \checkmark$$

- 9) a.  $\rightarrow$  ii  
 b.  $\rightarrow$  iii  
 c.  $\rightarrow$  i  
 d.  $\rightarrow$  iv

$$11) \int (4 - 18x) dx = 4x - \frac{18}{2}x^2 + C \\ = 4x - 9x^2 + C$$

$$17) \int (z^{-4/5} - z^{2/3} + z^{5/4}) dz \\ = 5z^{1/5} - \frac{3}{5}z^{5/3} + \frac{4}{9}z^{9/4} + C$$

$$21) \int \frac{36}{t} dt = \int 36t^{-1} dt \\ = \frac{36}{-1}t^{-2} + C \\ = -\frac{18}{t} + C$$

$$25) \int \frac{x^3 + 3x^2 - 4}{x^2} dx \\ = \int x + 3 - 4x^{-2} dx \\ = \frac{1}{2}x^2 + 3x + 4x^{-1} + C$$

$$27) \int 12\sec(x) + \tan(x) dx \\ = 12\sec(x) + C$$

$$31) \int \sec^2(7-3\theta) d\theta \\ = -\frac{1}{3} \int -3\sec^2(7-3\theta) d\theta \\ = -\frac{1}{3} \tan(7-3\theta) + C$$

$$35) \int \sec(12t) \tan(12t) dt \\ = \frac{1}{12} \int 12\sec(12t) \tan(12t) dt \\ = \frac{1}{12} \sec(12t) + C$$

$$45) \int (4x+13)^2 dx = \frac{1}{12}(4x+13)^3 + C \\ \frac{d}{dx}(\frac{1}{12}(4x+13)^3 + C) \\ = \frac{3}{12}(4x+13)^2(4) \\ = (4x+13)^2 \checkmark$$

$$51) \frac{dy}{dt} = \sqrt{t} \quad y(1) = 1 \\ y(t) = \int t^{1/2} dt \\ = \frac{2}{3}t^{3/2} + C \\ 1 = \frac{2}{3}(1)^{3/2} + C \\ 1 = \frac{2}{3} + C \\ C = \frac{1}{3} \\ y = \frac{2}{3}t^{3/2} + \frac{1}{3}$$

$$57) \frac{dy}{dx} = \cos(5x) \quad y(\pi) = 3 \\ y(x) = \int \cos(5x) dx \\ = \frac{1}{5} \int 5\cos(5x) dx \\ = \frac{1}{5} \sin(5x) + C \\ 3 = \frac{1}{5} \sin(5\pi) + C \\ 3 = C \\ y = \frac{1}{5} \sin(5x) + 3$$

$$63) f''(x) = 12x \quad f'(0) = 1 \quad f(0) = 2 \\ \int 12x dx = 6x^2 + C \\ 1 = 6(0)^2 + C \\ C = 1 \quad f'(x) = 6x^2 + 1 \\ \int 6x^2 + 1 dx = 2x^3 + x + C \\ 2 = 2(0)^3 + 0 + C \\ C = 2 \\ f(x) = 2x^3 + x + 2$$

$$67) f''(t) = t^{-3/2} \quad f'(4) = 1 \quad f(4) = 4 \\ \int t^{-3/2} dt = -2t^{-1/2} + C \\ 1 = -2(4)^{-1/2} + C \\ 1 = -1 + C \Rightarrow C = 2 \quad f'(t) = -\frac{2}{\sqrt{t}} + 2 \\ \int -2t^{-1/2} + 2 dt = -4t^{1/2} + 2t + C \\ 4 = -4(4)^{1/2} + 2(4) + C \\ 4 = -8 + 8 + C \\ C = 4 \quad f(t) = -4\sqrt{t} + 2t + 4$$