

$$11.) f(t) = 3 \sin(t^2) \\ f'(t) = 3 \cos(t^2) \cdot 2t \\ = 6t \cos(t^2)$$

$$12.) g(\theta) = \cos(\theta^2 + \theta) \\ g'(\theta) = -\sin(\theta^2 + \theta) \cdot (2\theta + 1)$$

$$13.) f(x) = (x^2 - 2) \tan x \\ f'(x) = (2x) \tan x + (x^2 - 2) \sec^2 x$$

$$14.) f(x) = \frac{\tan x}{x} \\ f'(x) = \frac{(\sec^2 x)x - 1 \cdot \tan x}{x^2}$$

$$15.) h(t) = \frac{t+1}{t} \\ h'(t) = \frac{1 \cdot t - (t+1) \cdot 1}{t^2} \\ = \frac{t - t - 1}{t^2} \\ = \frac{-1}{t^2}$$

$$17.) \frac{1}{4} \int 4 \cos(4t+2) dt \\ u = 4t+2 \\ du = 4dt \\ \frac{1}{4} \int \cos u du = \frac{1}{4} \sin u + C \\ = \frac{1}{4} \sin(4t+2) + C$$

$$18.) -\frac{1}{5} \int 5x^4 e^{-x^5} dx = -\frac{1}{5} \int e^u du \\ u = -x^5 \\ du = -5x^4 dx \\ = -\frac{1}{5} e^u + C \\ = -\frac{1}{5} e^{-x^5} + C$$

$$19.) \int_0^2 (6x^2 - x) dx \\ = \left[\frac{6x^3}{3} - \frac{x^2}{2} \right]_0^2 = \left[2x^3 - \frac{x^2}{2} \right]_0^2 \\ = \left(2(2)^3 - \frac{2^2}{2} \right) - \left(2 \cdot 0^3 - \frac{0^2}{2} \right) \\ = 16 - 2 = 14$$

$$20.) \int_4^9 \frac{1}{\sqrt{t}} dt \\ = \int_4^9 t^{-1/2} dt = \left[\frac{t^{1/2}}{1/2} \right]_4^9 = \left[2\sqrt{t} \right]_4^9 = 2\sqrt{9} - 2\sqrt{4} \\ = 6 - 4 = 2$$