

$$2.1) a) \int x^2 + 1 + \frac{1}{x^2 + 1} dx = \frac{x^3}{3} + x + \arctan x + C, x \in \mathbb{R}$$

$$b) \int \frac{(x^2 + 3)^2}{x} dx = \frac{x^4}{4} + 3x^2 + 9 \ln|x| + C, x \neq 0$$

$$c) \int \frac{4x - 2\sqrt{x+1}}{\sqrt{x}} dx = \int 4\sqrt{x} - 2 + \frac{1}{\sqrt{x}} dx = \frac{8}{3} x^{\frac{3}{2}} - 2x + 2x^{\frac{1}{2}} + C, x > 0$$

$$2.2) a) \int \sin x - \frac{5}{\cos^2 x} dx = -\cos x - 5 \lg x + C, x \neq \frac{\pi}{2} + k\pi, k \in \mathbb{Z}$$

$$b) \int \frac{3 \sin^2 x}{1 - \cos^2 x} dx = \int \frac{3 \sin^2 x}{\sin^2 x} dx = \int 3 dx = 3x + C, x \neq k\pi, k \in \mathbb{Z}$$

$$c) \int 2^x \cdot 11^x dx = \int 22^x dx = \frac{22^x}{\ln 22} + C, x \in \mathbb{R}$$

$$2.3) a) \int e^{4x} dx = \frac{1}{4} e^{4x} + C, x \in \mathbb{R} \quad b) \int \frac{1}{(x-1)^3} dx = \frac{(x-1)^{-3}}{-3} + C, x \neq 1$$

$$c) \int \frac{1}{\sqrt{x+6}} dx = \frac{(x+6)^{\frac{1}{2}}}{\frac{1}{2}} + C = 2\sqrt{x+6} + C, x > -6$$

$$2.4) \int (4x^3 + 6) \ln x dx = (x^4 + 6x) \cdot \ln x - \int (x^4 + 6x) + \frac{1}{x} dx = (x^4 + 6x) \cdot \ln x - \int (x^3 + 6) dx = (x^4 + 6x) \cdot \ln x - \left(\frac{x^4}{4} + 6x\right) + C, x > 0$$

$$2.5) \int \frac{5 \cos x}{\sin^6 x} dx = \left| \begin{array}{l} \sin x = t \\ \cos x dx = dt \end{array} \right| = \int \frac{5}{t^6} dt = 5 \cdot \frac{t^{-5}}{-5} + C = -\frac{1}{\sin^5 x} + C, x \neq k\pi, k \in \mathbb{Z}$$

$$2.6) \int \frac{4}{x^2 + 2x - 3} dx = \int \frac{1}{x-1} - \frac{1}{x+3} dx = \ln|x-1| - \ln|x+3| + C, x \neq 1, -3$$

$$2.7) \int \frac{3t-2}{t^2-2t+1} dt = \int \frac{3}{t-1} + \frac{1}{(t-1)^2} dt = 3 \ln|t-1| - \frac{1}{t-1} + C = 3 \ln|\ln x - 1| - \frac{1}{\ln x - 1} + C, x > 0, x \neq e$$

$$2.8) \int e^x \cos(2x) dx = e^x \cos(2x) + e^x 2 \sin(2x) - 4 \int e^x \cos(2x) dx$$

$$\int e^x \cos(2x) dx = \frac{1}{5} e^x \cdot (\cos(2x) + 2 \sin(2x)) + C, x \in \mathbb{R}$$

$$2.9) \int \frac{x^2 + 13x - 26}{x^3 - 2x^2 - 4x + 8} dx = \int \frac{4}{x-2} + \frac{1}{(x-2)^2} - \frac{3}{x+2} dx = 4 \ln|x-2| - \frac{1}{x-2} - 3 \ln|x+2| + C, x \neq \pm 2$$

$$2.10) F(x) = \int -\frac{1}{(x+1)^2} dx = \frac{1}{x+1} + C \quad F(0) = 1 + C = -1 \text{ pois } C = -2$$

$$F(x) = \frac{1}{x+1} - 2, x \neq -1$$

