

$$1a) \int (2x+3)^2 dx$$

$$\frac{1}{3} (2x+3)^3 \cdot \frac{1}{2} + C$$

$$\underline{\underline{\frac{1}{6} (2x+3)^3 + C}}$$

$$b) \int 2(5x-1)^{-3} dx$$

$$- (5x-1)^{-2} \cdot \frac{1}{5} + C$$

$$-\frac{1}{5} (5x-1)^{-2} + C$$

$$2a) \int (5x-3)^{\frac{1}{2}} dx$$

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

$$\underline{\underline{\frac{2}{15} (5x-3)^{\frac{3}{2}} + C}}$$

$$b) \int e^{2x+3} dx$$

$$\underline{\underline{\frac{1}{2} e^{2x+3} + C}}$$

$$3a) \int e^{3-x} dx$$

$$\underline{\underline{-e^{3-x} + C}}$$

$$b) \int \frac{1}{2x+1} dx$$

$$\underline{\underline{\frac{1}{2} \ln |2x+1| + C}}$$

4/

$$\int_1^2 \frac{2}{3x+5} dx$$

$$\left[\frac{2}{3} \ln |3x+5| \right]_1^2$$

$$\frac{2}{3} \ln 11 - \frac{2}{3} \ln 8$$

$$\underline{\underline{\frac{2}{3} \ln 11 - \ln 4}} \quad \text{units}^2$$

5/

$$\int_0^1 10(2x+1)^{-3} dx$$

$$\left[-5(2x+1)^{-2} \cdot \frac{1}{2} \right]_0^1$$

$$\left[-\frac{5}{2}(2x+1)^{-2} \right]_0^1$$

$$\left[-\frac{5}{2}(3)^{-2} \right] - \left[-\frac{5}{2}(1)^{-2} \right]$$

$$= \underline{\underline{\frac{20}{9}}} \quad \text{units}^2$$

6a)

$$\frac{3x}{(x+1)(x-2)} = \frac{A}{x+1} + \frac{B}{x-2}$$

$$3x = A(x-2) + B(x+1)$$

Let $x = 2$

$$6 = 3B$$

$$B = 2$$

Let $x = -1$

$$-3 = -3A$$

$$A = 1$$

$$\frac{1}{x+1} + \frac{2}{x-2}$$

b/

$$\int \left(\frac{1}{x+1} + \frac{2}{x-2} \right) dx$$

$$|x+1| + 2|x-2| + C$$

7/

$$\frac{2x^2 + 3x + 7}{(x+1)^2(x+3)} = \frac{A}{x+1} + \frac{B}{(x+1)^2} + \frac{C}{x+3}$$

$$2x^2 + 3x + 7 = A(x+1)(x+3) + B(x+3) + C(x+1)^2$$

$$\text{Let } x = -1$$

$$6 = 2B$$

$$B = 3$$

$$\text{Let } x = -3$$

$$16 = 4C$$

$$C = 4$$

$$\text{Let } x = 0$$

$$7 = 3A + 3B + C$$

$$7 = 3A + 9 + 4$$

$$-6 = 3A$$

$$A = -2$$

$$\int_0^5 \left(\frac{3}{(x+1)^2} + \frac{4}{x+3} - \frac{2}{x+1} \right) dx$$

$$\int_0^5 3(x+1)^{-2} + \frac{4}{x+3} - \frac{2}{x+1} dx$$

$$\left[-3(x+1)^{-1} + 4 \ln|x+3| - 2 \ln|x+1| \right]_0^5$$

$$\left[-\frac{1}{2} + 4 \ln 8 - 2 \ln 6 \right] - \left[-3 + 4 \ln 3 - 2 \ln 1 \right]$$

$$\frac{5}{2} + 4 \ln 8 - 2 \ln 6 - 4 \ln 3$$

$$\frac{5}{2} + 12 \ln 2 - 2 \ln 6 - 4 \ln 3$$