

$$\frac{35}{(782)} \int_{-\frac{\pi}{3}}^{\frac{\pi}{2}} (2\sin 2x - \cos 3x) dx = -\cos 2x - \frac{\sin 3x}{3} \Big|_{-\frac{\pi}{3}}^{\frac{\pi}{2}} = (-1-0) - (-(-0.5)-0) = -1\frac{1}{2}$$

$$\frac{37}{(782)} \int_0^{\pi} (1 + \cos x) dx = x + \sin x \Big|_0^{\pi} = \pi$$

$$\frac{39}{(782)} \int_{-\frac{\pi}{4}}^{\pi} (\sin 2x - 2x) dx = -\frac{\cos 2x}{2} - x^2 \Big|_{-\frac{\pi}{4}}^{\pi} = \left(-\frac{1}{2} - \pi^2\right) - \left(-\frac{1}{2} - (-\frac{\pi}{4})^2\right) = 0$$

$$\frac{41}{(782)} \int_{-\frac{\pi}{4}}^{\pi/4} \frac{dx}{\cos^2 x} = \tan x \Big|_{-\pi/4}^{\pi/4} = 1 - (-1) = 2$$

$$\frac{43}{(782)} \int_0^{\pi} \sin^2 x dx = \int_0^{\pi} \frac{1 - \cos 2x}{2} dx = \frac{1}{2}x - \frac{\sin 2x}{4} \Big|_0^{\pi} = \frac{1}{2}\pi$$

$$\frac{45}{(782)} \int_0^3 \frac{x^3 - x^2 + 2}{x+1} dx = \int_0^3 (x^2 - 2x + 2) dx = \frac{x^3}{3} - x^2 + 2x \Big|_0^3 = 9 - 9 + 6 = 6$$

$$\frac{46}{(782)} \int_2^4 \frac{x^3 - 3x^2 + 2}{x-1} dx = \int_2^4 (x^2 - 2x - 2) dx = \frac{x^3}{3} - x^2 - 2x \Big|_2^4 = \left(\frac{64}{3} - 16 - 8\right) - \left(\frac{8}{3} - 4 - 4\right) = 2\frac{2}{3}$$

$$\frac{49}{(782)} \int_0^3 \frac{3x}{\sqrt{x^2+16}} dx = \left[\begin{array}{l} u = x^2+16 \\ du = 2x dx \end{array} \right] = \int_{16}^{25} \frac{1.5 du}{\sqrt{u}} = 2 \cdot 1.5 \sqrt{u} \Big|_{16}^{25} = 3\sqrt{u} \Big|_{16}^{25} = 3(5-4) = 3$$

$$\frac{51}{(782)} \int_{\pi/6}^{\pi/2} \sin^2 x \cos x dx = \left[\begin{array}{l} u = \sin x \\ du = \cos x dx \\ \pi/6 \rightarrow 1/2 \\ \pi/2 \rightarrow 1 \end{array} \right] = \int_{1/2}^1 u^2 du = \frac{u^3}{3} \Big|_{1/2}^1 = \frac{1}{3} - \frac{1}{24} = \frac{7}{24}$$

$$\frac{52}{(782)} \int_0^{\pi/3} \frac{\sin x}{\cos^2 x} dx = \left[\begin{array}{l} u = \cos x \\ du = -\sin x dx \\ \pi/3 \rightarrow 1/2 \\ 0 \rightarrow 1 \end{array} \right] = \int_1^{1/2} \frac{-du}{u^2} = \frac{1}{u} \Big|_1^{1/2} = -1 = -$$

$$\frac{54}{(782)} -3 = \int_1^a (2x-6) dx = x^2 - 6x \Big|_1^a = (a^2 - 6a) - (1 - 6) = a^2 - 6a + 5$$

$$a^2 - 6a + 8 = 0$$

$$a = 4, a = 2$$