

Ch 8 Review

Pg 475

$$\# 4 \int x e^{-12x} dx$$

$$u = x \quad dv = e^{-12x} dx$$
$$du = dx \quad v = -\frac{1}{12} e^{-12x}$$

$$= x \left( -\frac{1}{12} e^{-12x} \right) - \int -\frac{1}{12} e^{-12x} dx$$

$$= -\frac{x e^{-12x}}{12} + \frac{1}{12} \left( \frac{-1}{12} \right) e^{-12x} + C$$

$$= -\frac{1}{12} e^{-12x} \left[ x + \frac{1}{12} \right] + C$$

$$= -\frac{1}{12} e^{-12x} \left[ \frac{12x + 1}{12} \right] + C$$

$$= -\frac{e^{-12x}}{144} [12x + 1] + C$$

$$13. \int_0^1 x^2 e^{4x} dx$$

$$u = x^2 \quad dv = e^{4x} dx$$

$$du = 2x dx \quad v = \frac{1}{4} e^{4x}$$

$$= \left[ x \cdot \frac{1}{4} e^{4x} \right]_0^1 - \int_0^1 \frac{1}{4} e^{4x} \cdot 2x dx$$

$$= \left[ \frac{x e^{4x}}{4} \right]_0^1 - \int_0^1 \frac{x e^{4x}}{2} dx$$

$$u = \frac{x}{2} \quad dv = e^{4x} dx$$

$$du = \frac{1}{2} dx \quad v = \frac{1}{4} e^{4x}$$

$$= \frac{(1) e^{4(1)}}{4} - 0 - \left[ \frac{x \cdot \frac{1}{4} e^{4x}}{2} - \int_0^1 \frac{1}{4} e^{4x} \cdot \frac{1}{2} dx \right]$$

Integration by parts again

$$= \left[ \frac{e^4}{4} - \frac{x e^{4x}}{8} \right]_0^1 + \int_0^1 \frac{1}{8} e^{4x} dx$$

$$= \left[ \frac{e^4}{4} - \frac{(1) e^4}{8} + \frac{1}{8} \cdot \frac{1}{4} e^{4x} \right]_0^1$$

$$= \left[ \frac{e^4}{4} - \frac{e^4}{8} + \frac{e^{4x}}{32} \right]_0^1$$

$$= \frac{8e^4}{32} - \frac{4e^4}{32} + \frac{e^4}{32} - \frac{e^0}{32}$$

$$= \frac{5e^4 - 1}{32}$$

Pg AP8 -1

$$2. \int x e^{5x} dx$$

$$u = x \quad dv = e^{5x} dx$$

$$du = dx \quad v = \frac{1}{5} e^{5x}$$

$$= x \cdot \frac{1}{5} e^{5x} - \int \frac{1}{5} e^{5x} dx$$

$$= \frac{x e^{5x}}{5} - \frac{1}{5} \cdot \frac{1}{5} e^{5x} + C$$

$$= \frac{5x e^{5x}}{25} - \frac{e^{5x}}{25} + C$$

$$= \frac{e^{5x}}{25} (5x - 1) + C$$

$$5. M_3 \int_5^{11} \sqrt{x^2 + 1} dx \quad \Delta x = \frac{11-5}{3} = 2$$

$$C_1 = 5 + (1 - \frac{1}{2})(2) = 6$$

$$C_2 = 5 + (2 - \frac{1}{2})(2) = 8$$

$$C_3 = 5 + (3 - \frac{1}{2})(2) = 10$$

$$M_3 = 2 [f(6) + f(8) + f(10)]$$

$$= 2 [\sqrt{36+1} + \sqrt{64+1} + \sqrt{100+1}] \quad C$$

$$= 2 [\sqrt{37} + \sqrt{65} + \sqrt{101}]$$

$$6. \int_1^2 f(x) dx$$

$$= \frac{(4+6)(.2)}{2} + \frac{(10+6)(.4)}{2} + \frac{(16+10)(.1)}{2} + \frac{(16+20)(.3)}{2}$$
$$= 1 + 3.2 + 1.3 + 5.4$$
$$= 10.9$$

AP8 -4

$$2a) \int_1^2 f(x) dx \quad n=2$$

$$[1, 1.4] \quad [1.4, 2]$$

$$\int_1^2 f(x) dx = (1.4-1) \cdot f(1.2) + (2-1.4) \cdot f(1.7)$$
$$= (.4)(6) + (.6)(2)$$
$$= 2.4 + 1.2$$
$$= 3.6$$

$$b) \int_1^2 f(x) dx = \frac{(12+6)(.2)}{2} + \frac{(6+4)(.2)}{2} + \frac{(4+2)(.3)}{2} + \frac{(2+8)(.3)}{2}$$
$$= 1.8 + 1 + .9 + 1.5$$
$$= 5.2$$