

MAT 104

Mechanics Department

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19/ENG091007

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1 $x^2 \sin x$

$$u = x^2 \quad dv = \sin x$$

$$\int u dv = uv - \int v du$$

$$\frac{du}{dx} = 2x \quad dv = -\cos x \quad \frac{dv}{dx} = 2x$$

$$-x^2 \cos x - \int -\cos x \cdot 2x dx$$

$$-x^2 \cos x - \int -2x \cos x dx$$

$$u = -2x \quad dv = \cos x$$

$$\frac{du}{dx} = -2 \quad v = \sin x$$

$$-x^2 \cos x - 2x \sin x + 2 \int \sin x dx$$

$$-x^2 \cos x - 2x \sin x - 2(-\cos x) + C$$

$$-x^2 \cos x - 2x \sin x + 2 \cos x + C$$

$$2 \cdot \int 3te^{2t} dt = \left(\frac{3}{2} te^{2t} - \frac{3e^{2t}}{4} \right) + C$$

$$3 \int 2x^2 \ln x dx = \frac{2}{3} x^3 \left(\ln x - \frac{1}{3} \right) + C$$

$$4 \int \frac{(2x - 3x^2)}{(1-x)} dx$$

$$\begin{array}{r}
 3x + 1 \\
 \hline
 -x + 1 \sqrt{-3x^2 + 2x} \\
 \underline{-3x^2 + 3x} \\
 \phantom{\underline{-3x^2 + 3x}} -x + 1
 \end{array}$$

$$\int (3x + 1) dx + \int \left(\frac{-1}{-x+1} \right) dx$$

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