Page 567, Exercise 26

Evaluate the integral,
\[ \int_{0}^{\pi} 2x \cos x \, dx. \]

Using integration by parts we will make the following assignments.

\[ u = 2x \quad v = \sin x \]
\[ du = 2 \, dx \quad dv = \cos x \, dx \]

Then
\[ \int_{0}^{\pi} 2x \cos x \, dx = 2x \sin x \Big|_{0}^{\pi} - \int_{0}^{\pi} 2 \sin x \, dx \]
\[ = -2 \int_{0}^{\pi} \sin x \, dx \]
\[ = 2 \cos x \Big|_{0}^{\pi} \]
\[ = 2 \cos \pi - 2 \cos 0 \]
\[ = -4 \]

Page 567, Exercise 36

Evaluate the integral,
\[ \int e^{\sqrt{x}} \, dx. \]

Before attempting any technique of integration we will rewrite the integrand in a different, but equivalent form.
\[ \int e^{\sqrt{x}} \, dx = \int e^{\sqrt{x}} \sqrt{x} \, dx \]

Using integration by parts we will make the following assignments.

\[ u = \sqrt{x} \quad v = 2e^{\sqrt{x}} \]
\[ du = \frac{1}{2\sqrt{x}} \, dx \quad dv = \frac{1}{\sqrt{x}} e^{\sqrt{x}} \, dx \]

Then
\[ \int e^{\sqrt{x}} \, dx = 2\sqrt{x}e^{\sqrt{x}} - \int \frac{2}{2\sqrt{x}} e^{\sqrt{x}} \, dx \]
\[ = 2\sqrt{x}e^{\sqrt{x}} - \int \frac{1}{\sqrt{x}} e^{\sqrt{x}} \, dx \]
\[ = 2\sqrt{x}e^{\sqrt{x}} - 2e^{\sqrt{x}} + C \]
\[ = 2e^{\sqrt{x}}(\sqrt{x} - 1) + C \]