

$$\begin{aligned}
 8. \int (x-1)^3 dx &= \int (x^3 - 3x^2 + 3x - 1) dx \\
 &= \int x^3 dx - \int 3x^2 dx + \int 3x dx - \int 1 dx \\
 &= \frac{1}{4}x^4 - x^3 + \frac{3}{2}x^2 - x + C
 \end{aligned}$$

$$\begin{aligned}
 10. \int \frac{x^2 + x + 1}{\sqrt{x}} dx &= \int \frac{x^2}{x^{1/2}} dx + \int \frac{x}{x^{1/2}} dx + \int \frac{1}{x^{1/2}} dx \\
 &= \int x^{3/2} dx + \int x^{1/2} dx + \int x^{-1/2} dx \\
 &= \frac{2}{5} x^{\frac{3}{2} + \frac{2}{5}} + \frac{2}{3} x^{\frac{3}{2}} + 2x^{1/2} + C
 \end{aligned}$$

more Integral rules (undoing chain rule)

$$\int (ax+b)^n dx = \frac{1}{a} \left(\frac{1}{n+1} (ax+b)^{n+1} \right) + C$$

$$\begin{aligned} \text{Ex} \int (3x+1)^4 dx &= \frac{1}{3} \left(\frac{1}{5} (3x+1)^5 \right) + C \\ &= \frac{1}{15} (3x+1)^5 + C \end{aligned}$$

$$\begin{aligned} \text{check: } \frac{15}{15} (3x+1)^4 &+ \text{O} \\ (3x+1)^4 &+ 0 \end{aligned}$$

$$\int e^{ax+b} dx = \frac{1}{a} e^{ax+b} + C$$

Ex) $\int e^{2x+5} dx = \frac{1}{2} e^{2x+5} + C$

$$\int \frac{1}{ax+b} dx = \frac{1}{a} \ln(ax+b) + C$$

Ex) $\int \frac{3}{4x-2} dx = 3 \int \frac{1}{4x-2} dx$
 $= 3\left(\frac{1}{4}\right) \ln(4x-2) + C$
 $= \frac{3}{4} \ln(4x-2) + C$

Ex)

$$\int \frac{1}{(6x+3)^4} dx$$

$$\frac{1}{u} = u^{-1}$$

$$\frac{1}{u^4} = u^{-4}$$

$$= \int (6x+3)^{-4} dx$$

$$= \frac{1}{6} \left(\frac{1}{-3} (6x+3)^{-3} \right) + C$$

$$= -\frac{1}{18} (6x+3)^{-3} + C$$

HW4 9E p.300 2-12 even