

9.7 Integrating Other Integrands Of The Form x^a , $a \in \mathbb{Q}$

EXAMPLE:

Integrate $f(x) = \frac{1}{\sqrt{x}}$

$$\begin{aligned} f(x) &= \frac{1}{\sqrt{x}} \\ &= \frac{1}{x^{\frac{1}{2}}} \\ &= x^{-\frac{1}{2}} \\ \Rightarrow \int f(x) dx &= \int (x^{-\frac{1}{2}}) dx \\ &= \left[\frac{x^{\frac{1}{2}}}{\frac{1}{2}} \right] + c \\ &= \left[\frac{x^{\frac{1}{2}}}{\frac{1}{2}} \right] + c \\ &= \left[\frac{x^{\frac{1}{2}}}{1} \times \frac{2}{1} \right] + c \\ &= 2x^{\frac{1}{2}} + c \\ &= 2\sqrt{x} + c \end{aligned}$$

EXAMPLE:

Integrate $g(x) = x^{\frac{3}{2}}$

$$\begin{aligned} g(x) &= x^{\frac{3}{2}} \\ \Rightarrow \int g(x) dx &= \int (x^{\frac{3}{2}}) dx \\ &= \left[\frac{x^{\frac{5}{2}}}{\frac{5}{2}} \right] + c \\ &= \left[\frac{x^{\frac{5}{2}}}{\frac{5}{2}} \right] + c \\ &= \left[\frac{x^{\frac{5}{2}}}{1} \times \frac{2}{5} \right] + c \\ &= \frac{2}{5}x^{\frac{5}{2}} + c \end{aligned}$$

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