

# Calculus I

## Integrals reducing to integrals of rational monomials, part 2

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## Example

Integrate.

$$\begin{aligned}
 \int \left( x^{\frac{3}{2}} - \frac{1}{x^{\frac{1}{3}}} \right)^2 dx &= \int \left( x^{\frac{3}{2}} - x^{-\frac{1}{3}} \right)^2 dx \\
 &= \int \left( \left( x^{\frac{3}{2}} \right)^2 - 2x^{\frac{3}{2}}x^{-\frac{1}{3}} + \left( x^{-\frac{1}{3}} \right)^2 \right) dx \\
 &= \int \left( x^3 - 2x^{\frac{3}{2}-\frac{1}{3}} + x^{-\frac{2}{3}} \right) dx \\
 &= \int \left( x^3 - 2x^{\frac{7}{6}} + x^{-\frac{2}{3}} \right) dx \\
 &= \frac{x^4}{4} - 2 \frac{x^{\frac{7}{6}+1}}{\frac{7}{6}+1} + \frac{x^{-\frac{2}{3}+1}}{-\frac{2}{3}+1} + C \\
 &= \frac{x^4}{4} - \frac{2x^{\frac{13}{6}}}{\frac{13}{6}} + \frac{x^{\frac{1}{3}}}{\frac{1}{3}} + C \\
 &= \frac{x^4}{4} - \frac{12x^{\frac{13}{6}}}{13} + 3x^{\frac{1}{3}} + C
 \end{aligned}$$