

Evaluate  $\int_{-2}^1 \frac{4-x^2}{x-2} dx$

\* Looking at the question, it seems like we have to perform long division followed by partial fraction decomposition. But, there is an easier way.

\* All conditions to use Fundamental theorem of calculus are met.

$$\bullet F(x) = \int \frac{4-x^2}{x-2} dx$$

$$= \int \frac{(2-x)(2+x)}{(x-2)} dx$$

$$= \int \frac{-(\cancel{x-2})(2+x)}{\cancel{x-2}} dx$$

$$= - \int (2+x) dx$$

$$= -2x - \frac{x^2}{2} + C$$

and, 1

$$\int_{-2}^1 \frac{4-x^2}{x-2} dx = \left[ F(x) \right]_{-2}^1 = \left[ -2x - \frac{x^2}{2} \right]_{-2}^1$$

$$= -2 - \frac{1}{2} - \left( 4 - 2 \right)$$

$$= -\frac{9}{2} ,,$$