Dr Oliver Mathematics
Differentiation: Part 1

1. If

$$\mathrm{f}(x) = \frac{x-1}{x+1} \text{ for all } x \neq -1,$$

what is $\mathrm{f}'(1)$?

Solution

$$u = x - 1 \Rightarrow \frac{\mathrm{d}u}{\mathrm{d}x} = 1$$
$$v = x + 1 \Rightarrow \frac{\mathrm{d}u}{\mathrm{d}x} = 1$$

Now,

$$\mathrm{f}(x) = \frac{x-1}{x+1} \Rightarrow \mathrm{f}'(x) = \frac{(x+1)\cdot 1 - (x-1)\cdot 1}{(x+1)^2}$$
$$\Rightarrow \mathrm{f}'(x) = \frac{2}{(x+1)^2}$$

and

$$\mathrm{f}'(1) = \frac{2}{(1+1)^2}$$
$$= \frac{2}{4}$$
$$= \underline{\underline{\tfrac{1}{2}}}.$$