

STEP III, 2003 Q3

- 3** If m is a positive integer, show that $(1 + x)^m + (1 - x)^m \neq 0$ for any real x .

The function f is defined by

$$f(x) = \frac{(1 + x)^m - (1 - x)^m}{(1 + x)^m + (1 - x)^m}.$$

Find and simplify an expression for $f'(x)$.

In the case $m = 5$, sketch the curves $y = f(x)$ and $y = \frac{1}{f(x)}$.



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