

# [11-08-30-T11]

## Polynomial functions

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- [1] Consider the function  $f$  defined by  $f(x) = x^4$ .
- (a) What is the domain of  $f$  ?
  - (b) What is the range of  $f$  ?
  - (c) Show that  $f$  is an even function.
  - (d) Prove that  $f$  is increasing on the interval  $[0, \infty)$ .
- [2] Consider the function  $f$  defined by  $f(x) = 4x - x^3$ .
- (a) Find the roots of  $f$  ?
  - (b) What is the range of  $f$  ?
  - (c) Show that  $f$  is an odd function.
  - (d) Sketch the graph of  $f$  for  $x > 0$  and complete the graph ( $x < 0$ ) by using the symmetry of  $f$ ?
- [3] Compare the graph of  $y = x^4$  to  $y = x^2$  for  $0 < x < 1$ .
- [4] Prove that for any odd number  $n$ ,  $f(x) = x^n$  is an odd function.