

1.5 Symmetry in Polynomial Functions Worksheet with solutions

This document was composed and formatted by Annie Bernatchez.

The course material originated from www.jensenmath.ca

1) Determine whether each function is even, odd, or neither. Does it have line symmetry about the y -axis, point symmetry about the origin, or neither?

a) $y = x^4 - x^2$

Even, line symmetry about the y -axis

b) $y = -2x^3 + 5x$

Odd, point symmetry about the origin

c) $y = -4x^5 + 2x^2$

Neither

d) $y = x(2x + 1)^2(x - 4)$

Neither

$$x(2x + 1)^2(x - 4) = 4x^4 - 12x^3 - 15x^2 - 4x$$

e) $y = -2x^6 + x^4 + 8$

Even, line symmetry about the y -axis

2) State whether each function is even or odd. Verify algebraically.

a) $f(x) = x^4 - 13x^2 + 36$

Even

$$f(-x) = (-x)^4 - 13(-x)^2 + 36 = x^4 - 13x^2 + 36$$

So $f(-x) = f(x)$.

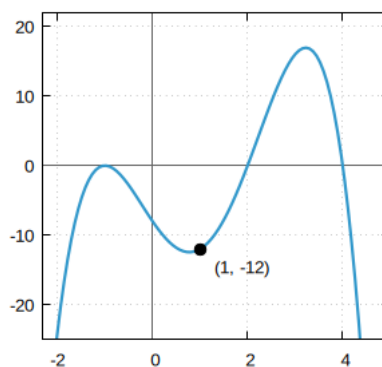
b) $g(x) = 6x^5 - 7x^3 - 3x$

Odd

$$g(-x) = 6(-x)^5 - 7(-x)^3 - 3(-x) = -6x^5 + 7x^3 + 3x$$

So $g(-x) = -g(x)$.

3) Use the given graph to state:



a) x -intercepts

The zeros are -1 (order 2), 2 , and 4

b) number of turning points

3

c) least possible degree

4

d) any symmetry present; even or odd function?

No symmetry, neither

e) the intervals where $f(x) < 0$

$$x \in (-\infty, -1) \cup (-1, 2) \cup (4, \infty)$$

4) Label each function as even, odd, or neither

