

Name _____

Honors Algebra II

Unit 4 – Polynomial Functions (Graphing)

WS – Function Symmetry Practice

For the following, determine whether the function's symmetry is even, odd, or neither and how that relates to the graph. Show your work!

1. $f(x) = 3x^4 - 6x^2$

2. $f(x) = x^3 - 3x^2 + 2$

3. $f(x) = -x^6 - 2x^4$

4. $f(x) = x^4 - 2x^2 + 3$

5. $f(x) = x^3 - 3x^2 + 5$

6. $f(x) = x^4 + x^3 - 3x^2$

7. $f(x) = x^3 - 8x + 2$

8. $f(x) = 2x^3 - 3x^2 - 12x$

9. $f(x) = -x^2 - 8$

10. $f(x) = 1 - 5x^2 - 3x^4$

11. $f(x) = x^2 - 4x$

12. $f(x) = -2x^3 - 7x + 6$

1. $f(x) = 3x^4 - 6x^2 \Rightarrow$ even? $f(-x) = f(x)$

$$f(-x) = 3(-x)^4 - 6(-x)^2$$
$$= 3x^4 - 6x^2$$

$f(-x) = f(x)$, so $f(x)$ has even symmetry

2. $f(x) = x^3 - 3x^2 + 2 \Rightarrow$ odd? $f(-x) = -f(x)$

$$f(-x) = (-x)^3 - 3(-x)^2 + 2$$
$$= -x^3 - 3x^2 + 2$$

$f(-x) \neq -f(x)$, so $f(x)$ has neither even nor odd symmetry.

3. $f(x) = -x^6 - 2x^4 \Rightarrow$ even? $f(-x) = f(x)$

$$f(-x) = -(-x)^6 - 2(-x)^4$$
$$= -x^6 - 2x^4$$

$f(-x) = f(x)$, so $f(x)$ has even symmetry

4. $f(x) = x^4 - 2x^2 + 3 \Rightarrow$ even? $f(-x) = f(x)$

$$f(-x) = (-x)^4 - 2(-x)^2 + 3$$
$$= x^4 - 2x^2 + 3$$

$f(-x) = f(x)$, so $f(x)$ has even symmetry

5. $f(x) = x^3 - 3x^2 + 5 \Rightarrow$ odd? $f(-x) = -f(x)$

$$f(-x) = (-x)^3 - 3(-x)^2 + 5$$
$$= -x^3 - 3x^2 + 5$$

$f(-x) \neq -f(x)$, so $f(x)$ has neither even nor odd symmetry.

6. $f(x) = x^4 + x^3 - 3x^2 \Rightarrow$ even? $f(-x) = f(x)$

$$f(-x) = (-x)^4 + (-x)^3 - 3(-x)^2$$
$$= x^4 - x^3 - 3x^2$$

$f(-x) \neq f(x)$, so $f(x)$ has neither even nor odd symmetry.

7. $f(x) = x^3 - 8x + 2 \Rightarrow$ odd? $f(-x) = -f(x)$

$$f(-x) = (-x)^3 - 8(-x) + 2$$
$$= -x^3 + 8x + 2$$

$f(-x) \neq -f(x)$, so $f(x)$ has neither even nor odd symmetry.

8. $f(x) = 2x^3 - 3x^2 - 12x \Rightarrow$ odd? $f(-x) = -f(x)$

$$f(-x) = 2(-x)^3 - 3(-x)^2 - 12(-x)$$
$$= -2x^3 - 3x^2 + 12x$$

$f(-x) \neq -f(x)$, so $f(x)$ has neither even nor odd symmetry.

9. $f(x) = -x^2 - 8 \Rightarrow$ even? $f(-x) = f(x)$

$$f(-x) = -(-x)^2 - 8$$
$$= -x^2 - 8$$

$f(-x) = f(x)$, so $f(x)$ has even symmetry.

10. $f(x) = 1 - 5x^2 - 3x^4 \Rightarrow$ even? $f(-x) = f(x)$

$$f(-x) = 1 - 5(-x)^2 - 3(-x)^4$$
$$= 1 - 5x^2 - 3x^4$$

$f(-x) = f(x)$, so $f(x)$ has even symmetry.

11. $f(x) = x^2 - 4x \Rightarrow$ even? $f(-x) = f(x)$

$$f(-x) = (-x)^2 - 4(-x)$$

$$= x^2 + 4x$$

$f(-x) \neq f(x)$, so $f(x)$ has neither even nor odd
Symmetry.

12. $f(x) = -2x^3 - 7x + 6 \Rightarrow$ odd? $f(-x) = -f(x)$

$$f(-x) = -2(-x)^3 - 7(-x) + 6$$

$$= 2x^3 + 7x + 6$$

$f(-x) \neq -f(x)$, so $f(x)$ has neither even nor
odd Symmetry.