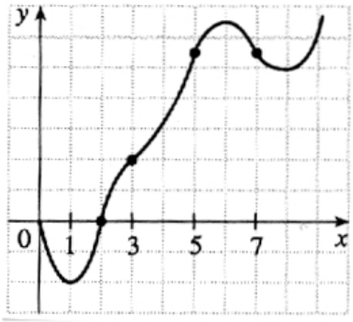
**Name:** _____ **Precalculus Unit 2, Lesson 9**

**Aim: What are odd functions? even functions?**

**I.** Do Now:

1. Given the graph below, find the open intervals where the graph is




(a) increasing _____

(b) decreasing _____

(c) constant _____

2. Given $f(x) = \sqrt{9 - x^2}$

Use an inequality to find the domain.

Graph the function on your calculator and use the graph to help you find the range.

What type of symmetry does this graph have?

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**II.** Development

Some functions are classified as EVEN or ODD.

Even Function: _____

Odd Function: _____

Why is there no special name for a function with symmetry with respect to the *x*-axis?

Algebraic test to determine if a function is even, odd, or neither:

Find $f(-x)$. If, for all $x$,

(i) $f(-x) = f(x)$, then the function is EVEN.

(ii) $f(-x) = -f(x)$, then the function is ODD.

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**III.** Applications. Determine whether each function is odd, even, or neither (i) graphically and (ii) algebraically.

3. $f(x) = x^2$ 4. $f(x) = x^3$ 5. $f(x) = x - 1$ 6. $f(x) = 4$ 7. $f(x) = |x|$

Algebraic Method:

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**IV.** Quick Trick: For *polynomial functions* only (not absolute value or radical functions), if the polynomial is solved for *y* and

All exponents are EVEN, then _____.

All exponents are ODD, then _____.

Exponents are both EVEN and ODD, then _____.

Examples:

(a) $f(x) = x^2 + 7$ (b) $f(x) = x^3 - 4x$ (c) $f(x) = x^4 + 2x^2 + 5$ (d) $f(x) = \sqrt{x}$

HW17
- Read page 35-36.
- p. 38: 60, 68, 69, 70, 72, 73, 76, 80a, 82a, 90