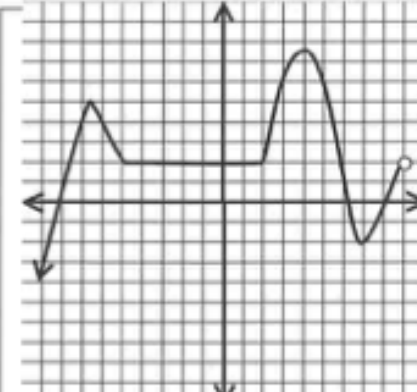


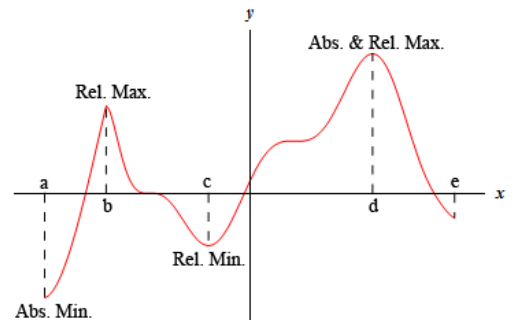
A. Extrema:

	<p>The graph is...</p> <p>increasing on an interval if the y-value _____ as the x-value increases.</p> <p>decreasing on an interval if the y-value _____ as the x-value increases.</p> <p>constant on an interval if the y-value _____ as the x-value increases.</p> <p><i>Remember to describe the interval with x-values, not y!</i></p>	<p>Local or Relative Extrema</p> <p>A graph has a local maximum at c if $f(c)$ _____ $f(x)$ for an interval around c.</p> <p>A graph has a local minimum at c if $f(c)$ _____ $f(x)$ for an interval around c.</p> <p><i>Note: these only occur at transitions between increasing and decreasing.</i></p>
--	---	--

Relative Minimum:

Relative Maximum:

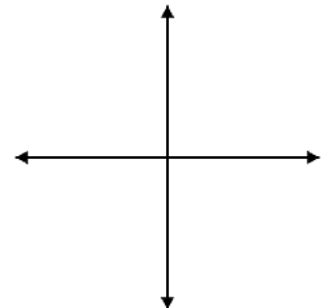
Absolute Min/Max:



Finding Min/Max with a calculator (or desmos.com in a pinch) and sketching a graph.

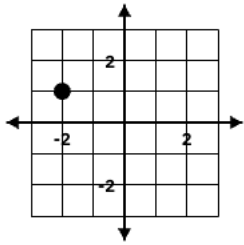
Ex. $f(x) = x^2 - x^4$

- Enter the equation in Y_1
- Press Graph
- Identify if the graph has a relative maximum, relative minimum, or both.
- Open the Calculate function (2nd _____)
- Select Option 3: _____ or Option 4: _____.
- Move the blinking cursor to the left of the relative maximum or minimum.
- Press Enter.
- Move the blinking cursor to the right of the relative maximum or minimum.
- Press Enter.
- Move the blinking cursor as close as possible to the relative maximum or minimum.
- Press Enter.
- Record the relative maximum or minimum as an ordered pair.
- Repeat, if necessary.

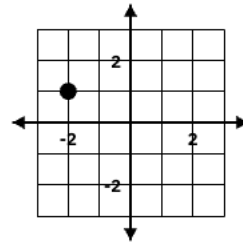


B. Symmetry from Geometry!

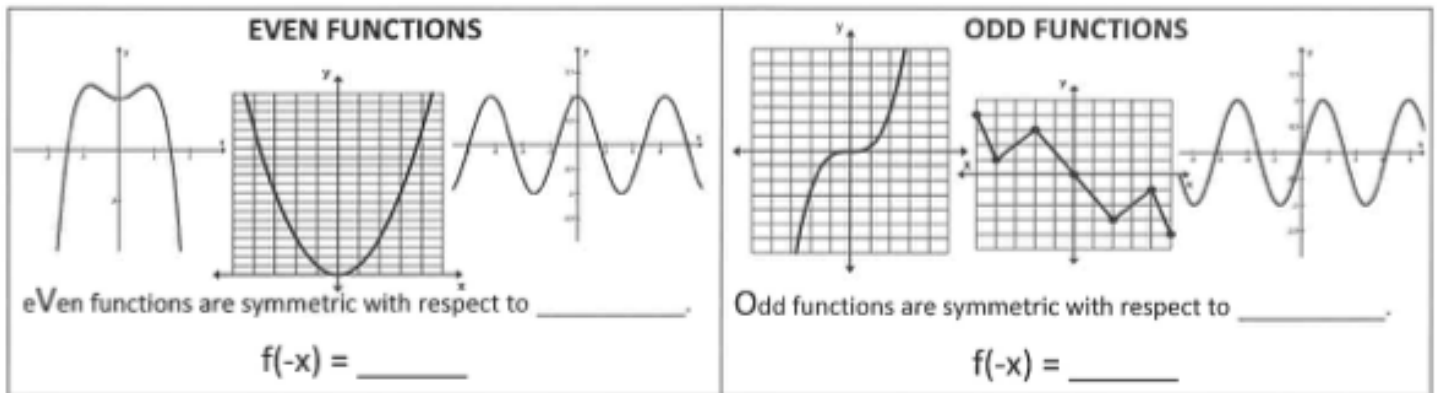
Reflection over the y-axis



Rotation 180° around the origin



C. Even/Odd Functions



What functions have we studied that are even? Odd?

Determine if a function is even or odd algebraically.

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

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

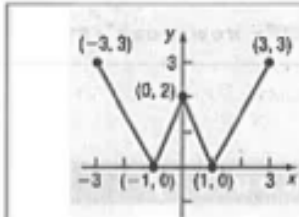
Ex 3. $f(x) = 2x^3 + 1$

Ex 4. $f(x) = -\frac{1}{2}x\sqrt{4 - x^2}$

For each of the following,

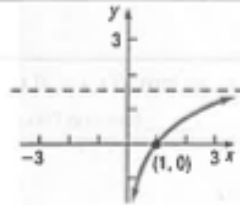
Find a) the intercepts b) the domain and range c) the intervals on which it is increasing, decreasing, or constant
 d) any local extrema e) whether the function is even, odd, or neither.

1.



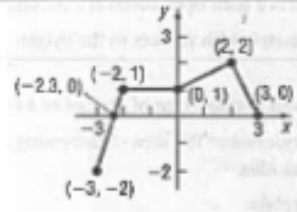
a) x- int: _____ y-int _____
 b) D: _____ R: _____
 c) Inc: _____
 Dec: _____
 Constant: _____
 d) Local max: _____
 Local min: _____
 e) Even Odd Neither

2.



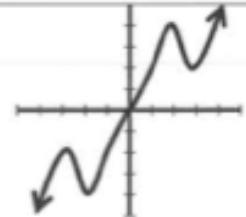
a) x- int: _____ y-int _____
 b) D: _____ R: _____
 c) Inc: _____
 Dec: _____
 Constant: _____
 d) Local max: _____
 Local min: _____
 e) Even Odd Neither

3.



a) x- int: _____ y-int _____
 b) D: _____ R: _____
 c) Inc: _____
 Dec: _____
 Constant: _____
 d) Local max: _____
 Local min: _____
 e) Even Odd Neither

4.



a) x- int: _____ y-int _____
 b) D: _____ R: _____
 c) Inc: _____
 Dec: _____
 Constant: _____
 d) Local max: _____
 Local min: _____
 e) Even Odd Neither

Sketch the graph of each function on graph paper. Approximate and classify the relative extrema to the nearest thousandth (3 decimal places).

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

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

7. $f(x) = -x^5 + 3x^3 + 1$

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

Also, p. 38 (38, 40, 42, 74-86 evens) on your own paper. Show all the work for (80-86 e).