4.8 Notes
Analyzing Graphs of Polynomial Functions

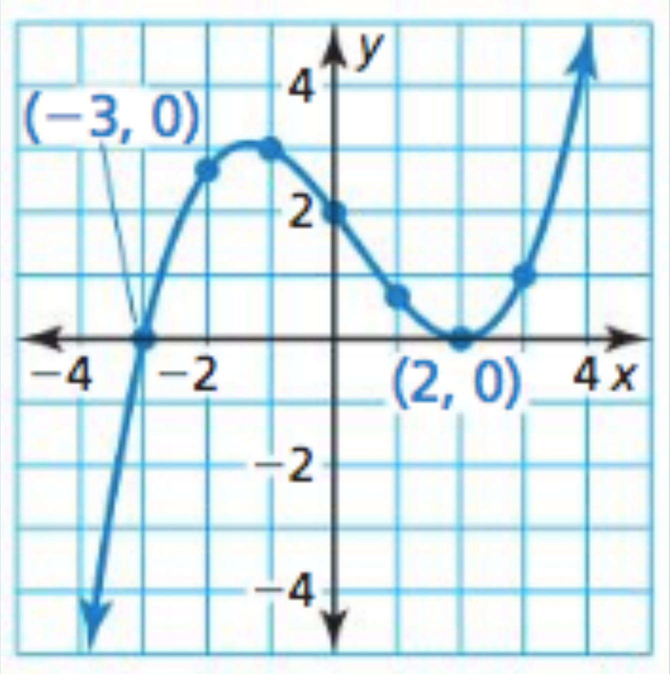
Learning Targets:

- I can find turning points and identify local maximums and local minimums of graphs and polynomial functions.
- I can identify even and odd functions

Zeros

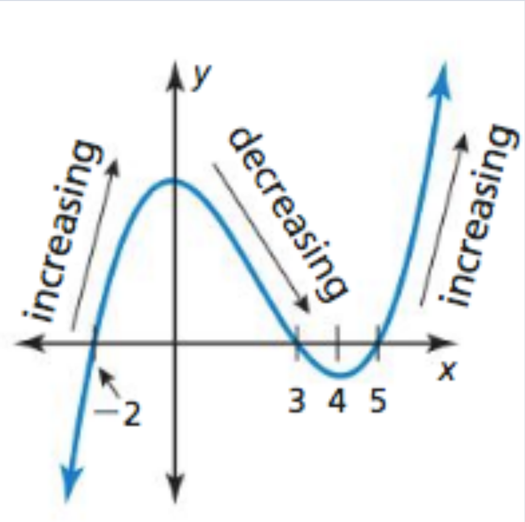
Just like before, the **zeros** of a polynomial are its x-intercepts.

Here, the zeros are -3 and 2.



Turning Points

Polynomial functions have **turning points**, where the function changes from decreasing to increasing, or increasing to decreasing.

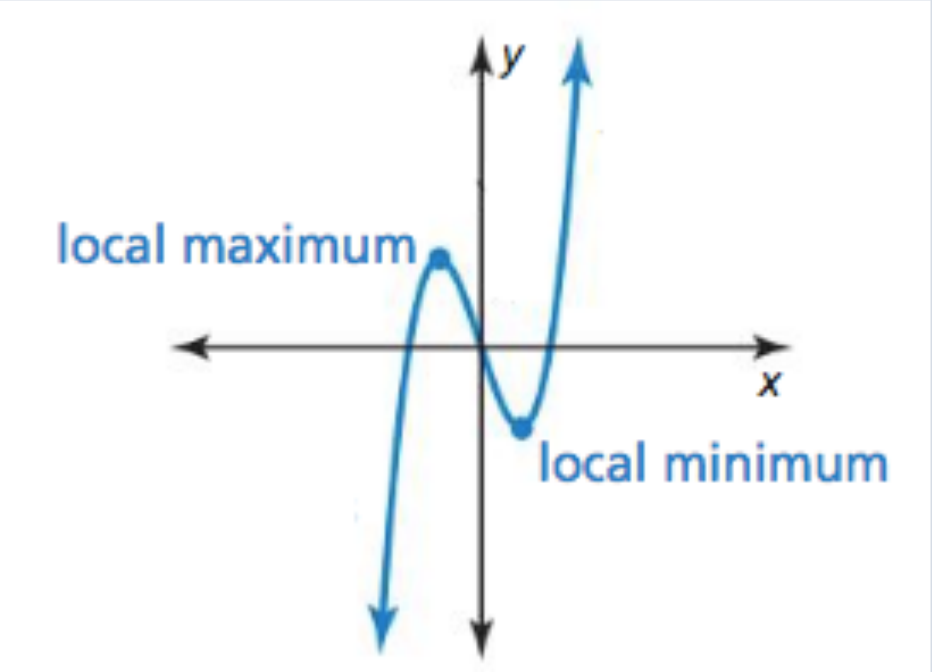


Think of it like a rollercoaster going up and down.

Turning Points

These turning points are also called **local minimums** or **local maximums**.

Another name for them are **relative minimums** or **relative maximums**.



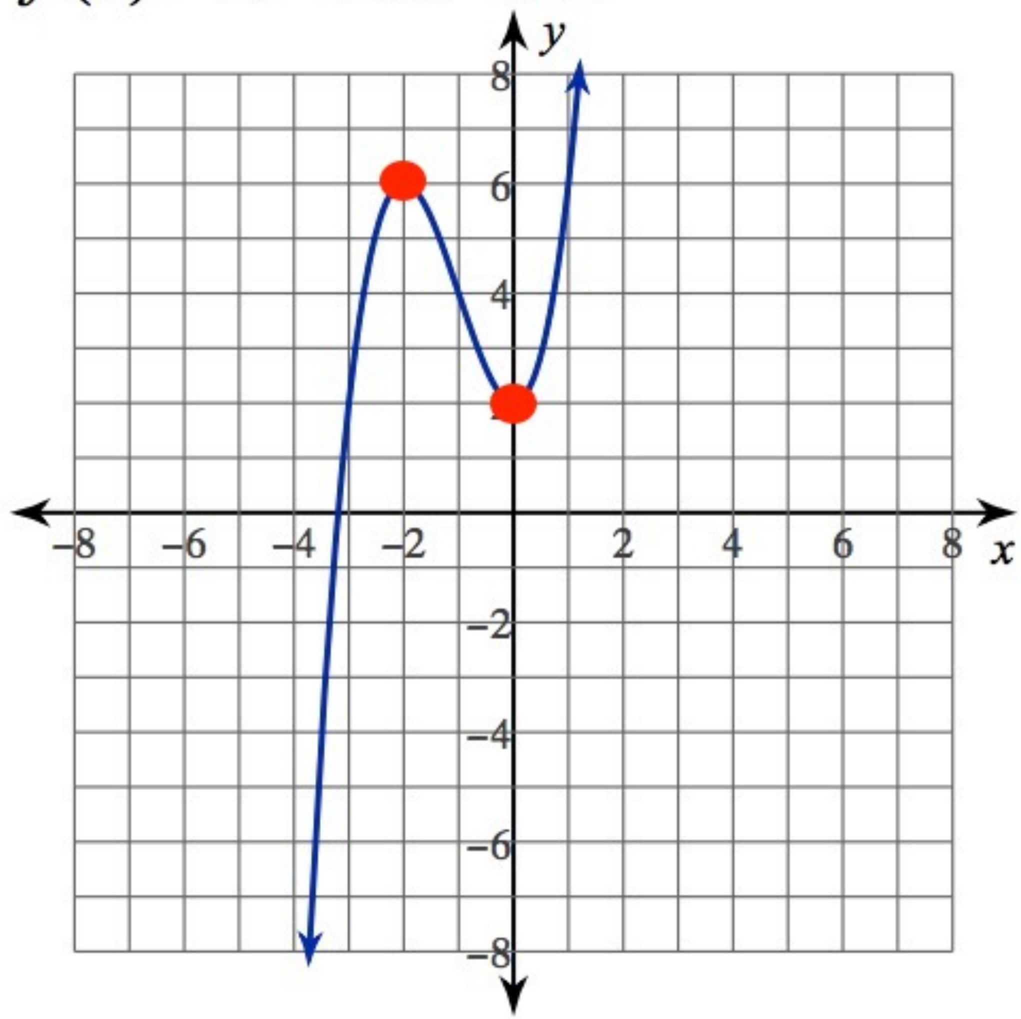
Examples:

Find the local max and local min points of the function.

Local max: $(-2, 6)$

Local min: $(0, 2)$

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



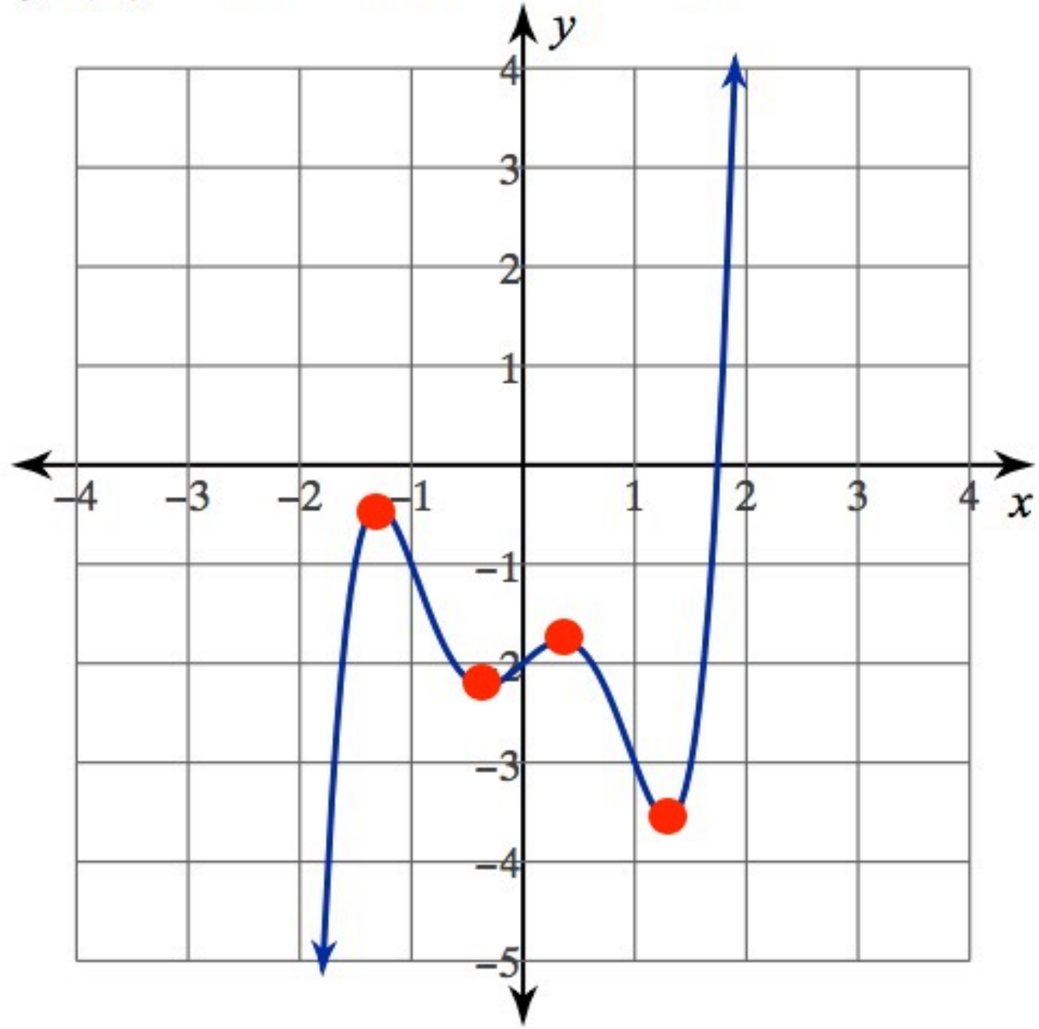
Examples:

Find the local max and local min points of the function.

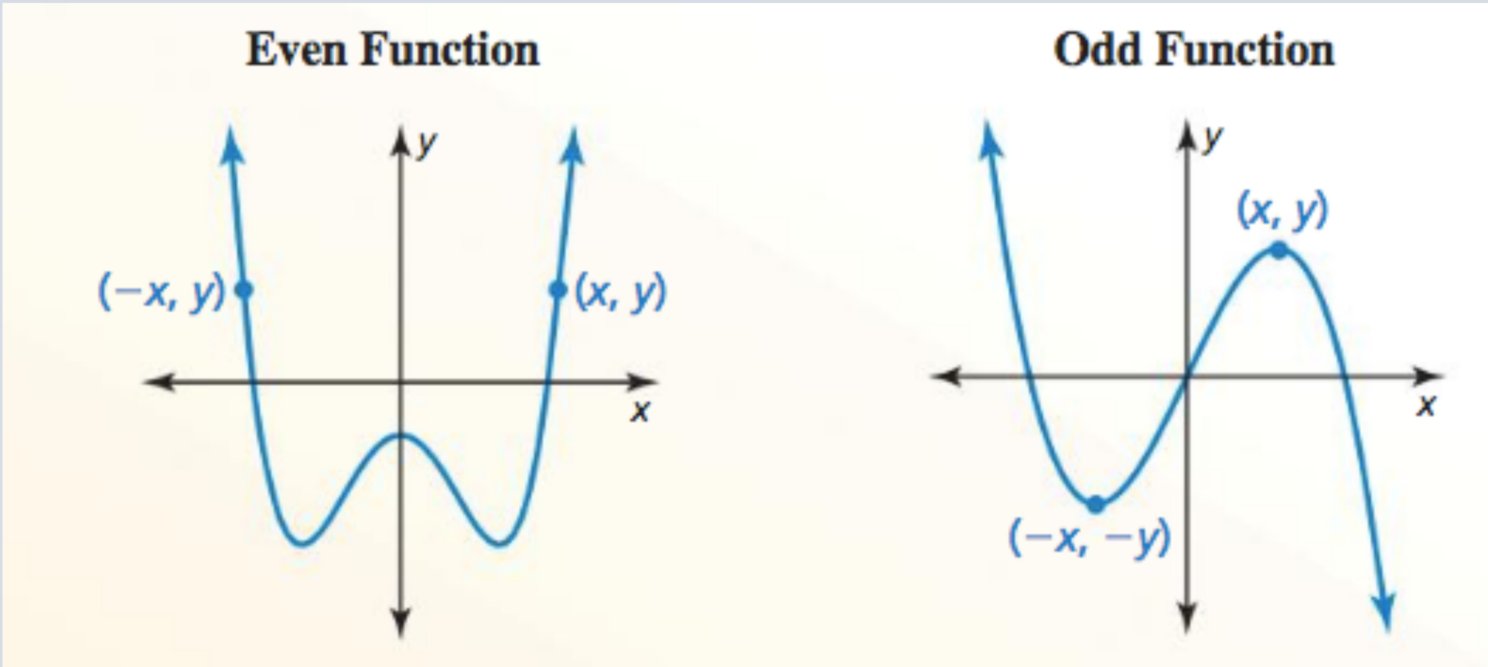
Local max: $(-1.3, -0.4)$
$(0.4, -1.8)$

Local min: $(-0.5, -2.1)$
$(1.3, -3.5)$

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



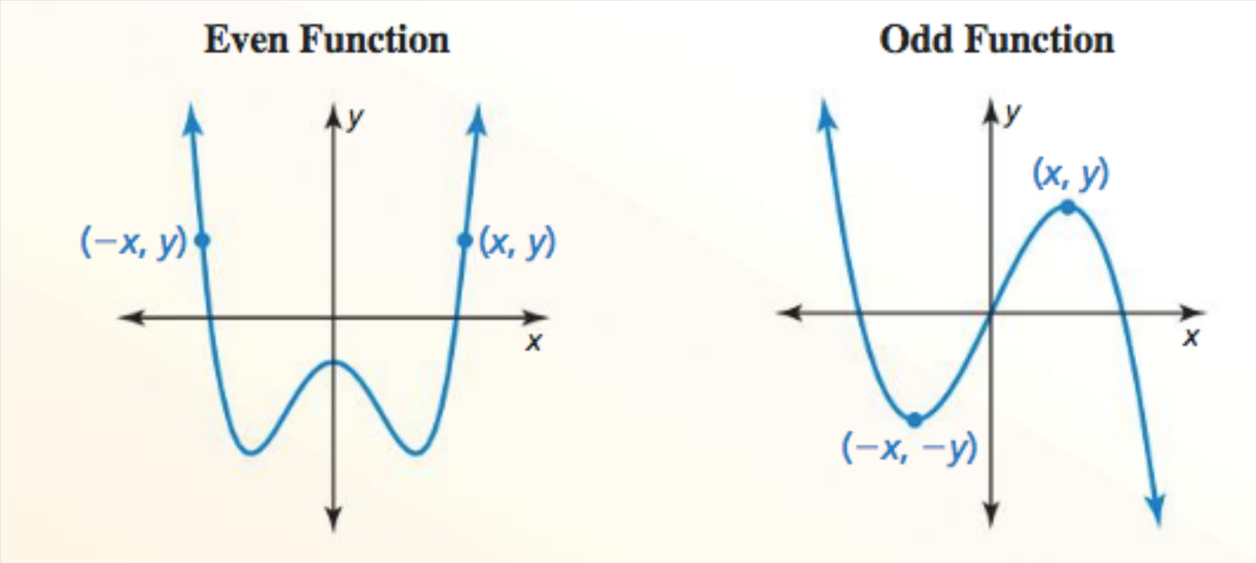
Even and Odd Functions



For a function to be even or odd, it must have symmetry through the origin.

- Even functions , have *reflectional symmetry*.
- Odd functions , have *rotational symmetry*.

Even and Odd Functions



- In an even function, every point (x, y) has a matching point $(-x, y)$.

Examples: $(4, 3)$ & $(-4, 3)$

$(2, 9)$ & $(-2, 9)$

- In an odd function, every point (x, y) has a matching point $(-x, -y)$.

Examples: $(4, 3)$ & $(-4, -3)$

$(2, 9)$ & $(-2, -9)$