

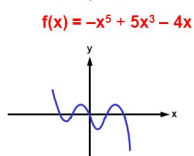
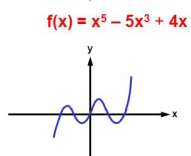
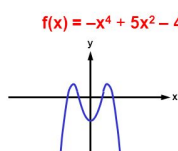
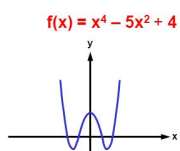
$$f(x) = (x - 5)^2 + 1$$

## Lesson 3.02: Characteristics of Polynomial Functions



### Learning Goals:

- I can identify properties of any polynomial function.



## Definitions:

A **leading coefficient** is the coefficient of the term with the highest exponent for powers of  $x$  in the polynomial expression or function.

For example, 4 is the leading coefficient in the polynomial function:

$$f(x) = -2x + 4x^3 + 7$$

$$f(x) = 4x^3 - 2x + 7$$

A **turning point** is a point on a curve where the relation changes from increasing to decreasing, and vice versa. ( For an example see pg. 30 )



An **absolute maximum** is synonymous with global maximum.

An **absolute minimum** is synonymous with global minimum. (For an example see pg. 131 )

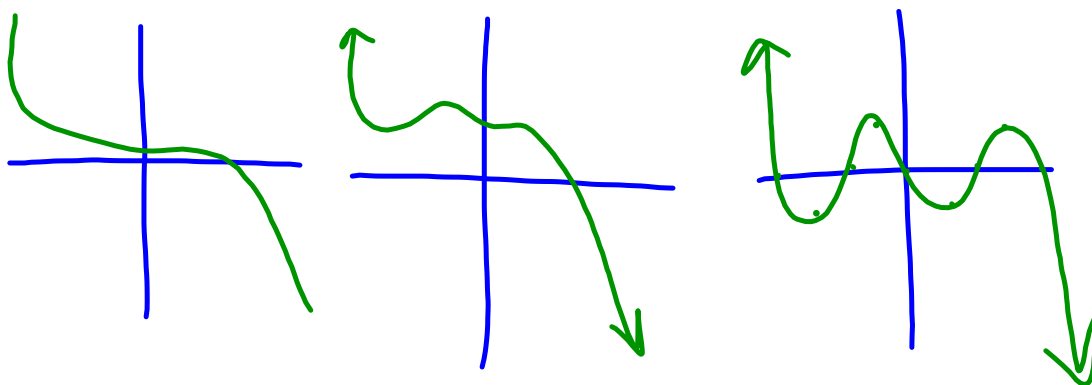
## Investigation:

For each of the following types of functions, use graphing software to complete the graphs, sketch the graphs in your notes, and then answer the questions a-d for each set of functions. See the next page for a table you can use!

1. **Quadratic** – polynomial of degree 2. Make sure one of them has 3 terms.  $x^2 - 3x + 3$
2. **Cubic** – polynomial of degree 3, with positive leading coefficients. Make sure one of them has 4 terms.  $2x^3$
3. **Quartic** – polynomial of degree 4, with positive leading coefficients. Make sure one of them has 5 terms.
4. **Quintic** – polynomial of degree 5, with negative leading coefficients. Make sure one of them has 6 terms.

### Questions

- a) Graph 3 different polynomials. Sketch them in your notes.
- b) What is their end behaviour?
- c) What is the maximum number of turning points?
- d) What is the maximum number of x -intercepts?



**Homework:**

Read and STUDY p.135

pg. 136- 138

#1ab, 2ab, 3, 4abf, 5, 7ad, 10, 13, 14, 16

