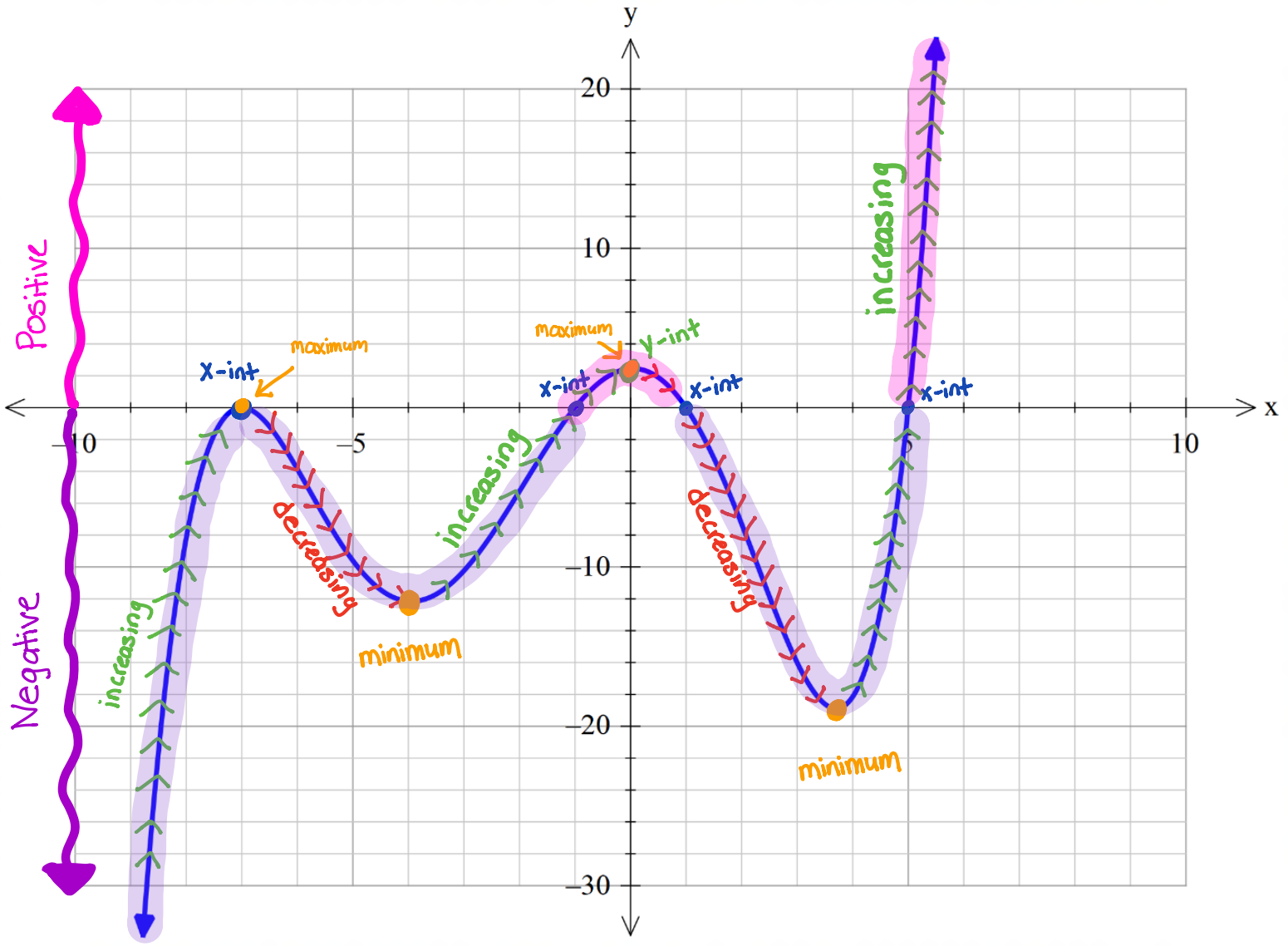
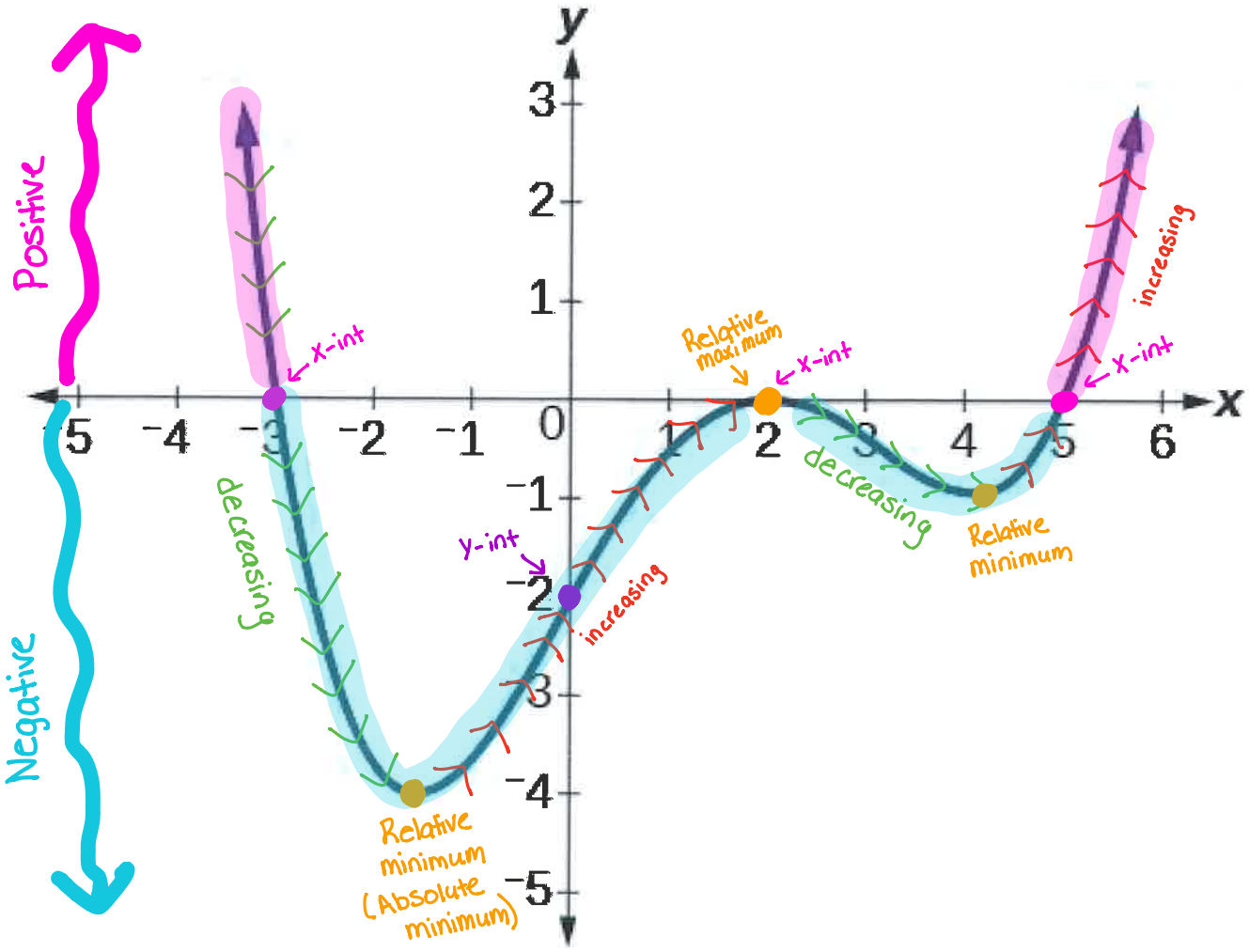
Do now:

Directions: Write down everything you notice about this graph. Try to utilize as much mathematics vocabulary as you can.



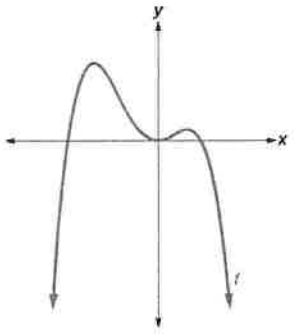
Label each of the following key features of the given polynomial graph.

- x-intercept(s)
- y-intercept:
- Increasing
- Decreasing
- Positive
- Negative
- Relative Maximum
- Relative Minimum
- Absolute Minimum
- Absolute Maximum
- Domain $(-\infty, \infty)$
- Range $[-4, \infty)$



Graphs of polynomials Vocabulary

1. The zeros of a function are the x-intercepts; where $f(x) = 0$.



2. The y-intercept of a function is the value $f(0)$.

3. Intervals on which $f(x)$ is positive or negative:
   - $f(x) > 0$ is where the graph of $f(x)$ is above the x-axis
   - $f(x) < 0$ is where the graph of $f(x)$ is below the x-axis

4. Intervals on which $f(x)$ is increasing or decreasing:
   - $f(x)$ is increasing where as x increases y increases; the function has a positive average rate of change
   - $f(x)$ is decreasing where as x increases y decreases; the function has a negative average rate of change

5. Maximums and Minimums:
   - The absolute maximum is the highest function value, the largest y-value of the function.
   - The absolute minimum is the lowest function value, the smallest y-value of the function.
   - A relative maximum is the function value greater than all surrounding y-values.
   - A relative minimum is the function value less than all surrounding y-values.

6. Domain and Range:
   - The domain of a function is the set of all x-values for which the function is defined.
   - The range of a function is the set of all y-values for which the function is defined.

Equations of Polynomials Vocabulary Terms

Polynomial- an algebraic expression consisting of one or more unlike terms.

Monomial- an algebraic expression consisting of one term.

Binomial- an algebraic expression consisting of two unlike terms.

Trinomial- an algebraic expression consisting of three unlike terms.

Degree of a Polynomial- the monomial term with the highest degree.
Example: $2x^3 + 5x - 1$ is a 3rd degree polynomial

Standard Form- list the highest degree monomial and continue in descending order.
Example: $-1 + 2x^3 + 5x$ should be expressed as $2x^3 + 5x - 1$

Leading Term- highest degree monomial.
Example: The leading term of $2x^3 + 5x - 1$ is $2x^3$

Leading Coefficient- coefficient of the highest degree.
Example: The leading coefficient of $2x^3 + 5x - 1$ is 2.

Constant Term- any term with no variable
Example: 2, -7, $\frac{2}{3}$

Practice Problems

1. Which word describes the polynomial: $3x^2 + 4x + 2$?

   [1] monomial [3] trinomial

   [2] binomial [4] linear

2. What is the degree of the polynomial: $-8a^4 + 4a^5 - 9a + 12$?

   Biggest exponent!

   [1] 5 [3] 3

   [2] 2 [4] 4

3. Circle the leading coefficient of the polynomial, $4x - 3x^2 + 5$.

4. Circle the constant term of the polynomial, $4x - 3x^2 + 5$

5. Circle the choice that represents the following polynomial in standard form: $6x - 7x^2 + 4x^3 - 2$?

   [1] $-2 + 6x - 7x^2 + 4x^3$ [3] $4x^3 + 6x - 7x^2 - 2$

   [2] $-7x^2 + 4x^3 + 6x - 2$ [4] $4x^3 - 7x^2 + 6x - 2$