

Polynomial Assignment: Due Saturday before 3pm

Name(s): _____

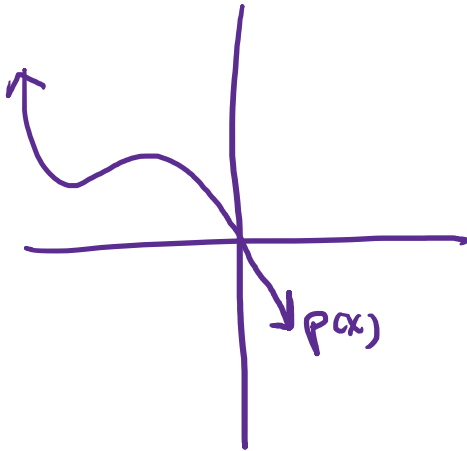
**Remember to each include a 300-word paragraph describing what your partner did when submitting work with a partner. Only one assignment is needed but both partners need to write an explanation what the other did.

This assessment is focused on the following competencies:

- **Thinking & Understanding:** Do you know the major characteristics of a polynomial from the equation and a graph? Do you understand how to divide polynomials? Do you understand how the remainder theorem works?
- **Communicating & Representing:** Can you express/illustrate characteristics of a polynomial. Can I understand your division work by glancing at it? Can you describe and justify characteristics of a polynomial and say what you intend?

1. (3.1; Thinking) What is wrong with the sketch of the following polynomial? Note there are many things wrong with the graph, describe the 2 or 3 most obvious mistakes.

$$p(x) = x^4 - 3x^3 + x^2 + 1$$



2. (3.1; Communicating) If a polynomial has degree n , what can be said about the maximum and minimum number of zeros? Justification is needed to support your conclusion.

3. (3.2; Communicating) Use long division to write the following quotient as a polynomial plus a remainder in the form

$$\frac{P(x)}{x-a} = Q(x) + \frac{R}{x-a}$$

$$\frac{2x^4 - x^3 - 2x - 3}{x - 2}$$

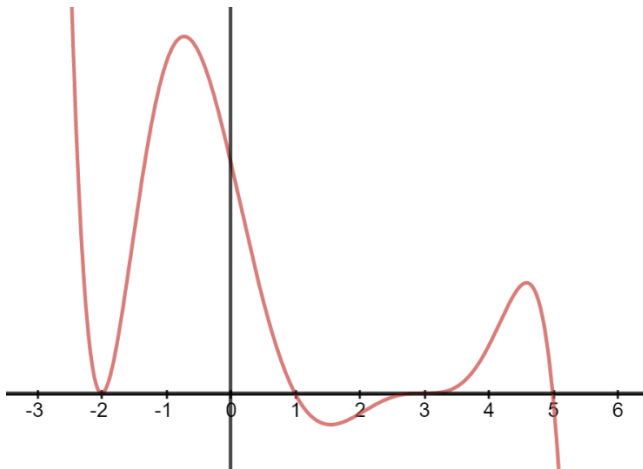
4. (3.2; Communicating) Use synthetic division to simplify

$$\frac{x^5 + 4x^4 - 2x^2 - 7x + 4}{x + 4}$$

5. (3.2; Thinking) Write the following quotient as a polynomial plus a remainder as in #3

$$\frac{x^4 + 3x^2 - x + 1}{x^2 + 1}$$

6. (3.4; Thinking) Build an equation for the following polynomial. Use technology to graph your equation and confirm it looks accurate. Include a picture of your graph. Note that the scale has been omitted for the y-axis.



7. (3.2; Thinking) Determine an equation to the polynomial $p(x)$ such that the following properties are satisfied
- $p(x)$ has a remainder of 1 when divided by $x - 1$
 - $p(x)$ has a remainder of 2 when divided by $x - 2$
 - $p(x)$ is cubic and monic (the x^3 has coefficient 1)

Note there are infinitely many solutions and a great solution would show why.

8. (3.3 & 3.4; Communicating) A particle is travelling along a number line (positive to the right; negative to the left) with velocity

$$v(t) = t^3 - 4t^2 - 3t + 18$$

Where t is time. On what interval(s) is the particle's velocity positive? (when is it moving to the right?)

The acceleration for the same particle is

$$a(t) = 3t^2 - 8t - 3$$

What interval(s) is the particle's acceleration negative? (when is it being pushed toward the left?)