Advanced Algebra ¾   Name:_____

Curve Fitting

We have learned about a lot of different types of functions, each which produces a different curve as a graph (lines count as curves, too). Each situation will give you a few points that you need to connect with the given type of curve. They will start out easier and get more complicated as you go. **Find the equation of the curve that matches each situation.**

1. Linear
    a. A line goes through the points (2, -5) and (4, 4)

    b. You set up a savings account that automatically deposits money from your checking account every month. After 5 months you have $300 in your account, and after 8 months you have $480.

2. Quadratic
    a. A parabola has a vertex of (5, 10) and passes through (1,4)

    b. You kick a soccer ball and it lands on the ground 40 feet away from you. It reached a maximum height of 12 feet.

3. Absolute Value
    a. An absolute value curve has a vertex of (-2, -3) and passes through (-4, -9)

    b. The Great Pyramid in Egypt is 455 feet tall and is 756 feet wide at the base. Model a cross-section of the Great Pyramid with an Absolute Value Curve.

4. Cubic
    a. A cubic function has an inflection point of (-1, 1) and passes through (1, 9)

    b. A person's weight is roughly a cubic function of their height. I am 74 inches tall and weigh 210 pounds. My brother is 77 inches tall and weighs 236.59 pounds. Assume the curve also goes through the point (0,0).

5. Rational
    a. A rational function's asymptotes intersect at the point (3, 5). The curve passes through the point (4, 4).

    b. The relationship between pressure and volume of a gas in a rigid container, held at constant temperature, can be modeled with a rational function. If the volume of a container of air is 100 ml, then the pressure is .78 kJ/cm^2. If the volume is reduced to 50 ml, then the pressure increases to 1.56 kJ/cm^2. (Think about what the asymptotes MUST be!)

6. Exponential
    a. An exponential function has an asymptote of y = 1 and passes through the points (0, 5) and (3 , 17)

    b. Mr. Maurer is growing bacteria for some insidious science experiment. There are 24 bacteria in a culture after 3 hours, and after 6 hours there are 192 bacteria.

7. Sine/Cosine
    a. A trigonometric function has a maximum of (1, 5) and a minimum of (3, 1). Find as many functions as apply.

    b. A car tire is approximately 24 inches in diameter. The car is traveling at such a speed that the tire makes 3 rotations every second.

8. Sine/Cosine
    a. A trigonometric function has a midline of y = -3, an amplitude of 2, and a period of 5. Find as many functions as apply

    b. On its shortest day, December 20th, Portland gets about 6 hours of sunlight. On its longest day, June 20th, Portland gets about 18 hours. Find as many functions as apply.