

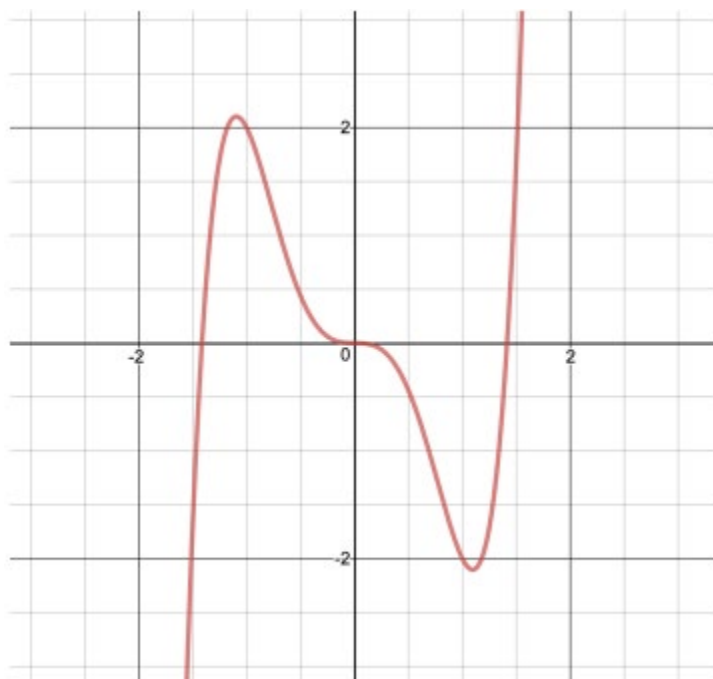
MAT151 – College Algebra/Functions

Written Homework #3 - Polynomial and Rational Functions

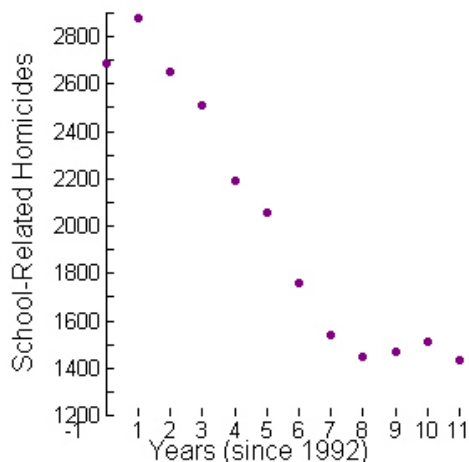
Name: _____

1. (20 points) For the graph given,

- Label the concavities, inflection points and relative extrema.
- Label any relative extrema as absolute (if they exist)
- Describe the end behavior of the function.
- Explain what degree polynomial the graph could be and why.



2. (20 points) Based on data from the 1992-93 through 2003-04 school years, the number of school-related homicides of students between the ages of 5 to 18 years is shown in the graph. Based on the scatter plot, which type of function will best model the data and why?



3. (10 points) Find the vertical asymptotes of the rational function $f(x) = \frac{(x-1)(x+12)}{(x-12)(x+1)}$.
Show your work.

4. (10 points) Find the horizontal asymptote of the rational function $f(x) = \frac{3x^2-3x-6}{-2x^2+8x+16}$.
Show your work.

5. (20 points: 6+7+7) At Brunswick Kyrene Lanes in Chandler, Arizona, the cost for weekend bowling is \$4.99 per game. Shoe rental is \$4.25. (Source: www.bowlbrunswick.com)

The rational function $a(g) = \frac{4.99g + 4.25}{g}$ gives the average cost per game g (including shoe rental).

- What is the average cost per game when 10 games are played?
- Graph the average cost per game function using the practical domain of $[0, 20]$.
- As the number of games increases, what happens to the average cost per game?

6. (20 points: 7+7+6) The table shows U.S. exports of canned and frozen vegetables between 1990 and 2005. (Source: Statistical Abstract of the United States, 2007, Table 819).

Years (since 1990) t	Exports of vegetables (in thousand metric tons) V
0	529
5	892
10	1112
12	1065
13	1010
14	1048
15	1083

- Use quartic regression to find the function model that best fits the data.
- Use the model to estimate the amount of frozen and canned vegetables exported in 2020.
- Based on the coefficient of determination r^2 , does the model fit the data well? Explain.