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| Test 1Dusty Wilson Math 111 No work = no credit  No Symbolic Calculators | **Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  *Why are numbers beautiful? It's like asking why is Beethoven's Ninth Symphony beautiful. If you don't see why, someone can't tell you. I know numbers are beautiful. If they aren't beautiful, nothing is.*  Paul Erdos (1913 - 1996)  Hungarian mathematician |

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| Warm-ups (1 pt each): | =\_\_\_\_\_ | =\_\_\_\_\_ | =\_\_\_\_\_ |

(1 pt) Based upon the quote above, how did Erdos explain the beauty of numbers? Answer using complete English sentences.

(4 pts) Solve 

(4 pts) Find and interpret market equilibrium for the following supply and demand functions:  and .

(4 pts) Suppose a manufacturer models its monthly costs with  where *x* is in hundreds of units produced in a month and *C* is in dollars.

1. Find and interpret the *C*-intercept.
2. Find and interpret the slope.

(4 pts) The table gives the percent of the U.S. population that is foreign born.

1. Find a cubic model for the data where *x* is given in years since 1900. Give your answer to three significant digits.

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| Year | % born abroad |
| 1900 | 13.6 |
| 1910 | 14.7 |
| 1920 | 13.2 |
| 1930 | 11.6 |
| 1940 | 8.8 |
| 1950 | 6.9 |
| 1960 | 5.4 |
| 1970 | 4.7 |
| 1980 | 6.2 |
| 1990 | 8 |
| 2000 | 10.4 |
| 2002 | 11.5 |

1. Find and interpret 

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| (4 pts) Consider   1. Evaluate 2. Carefully sketch a graph of |  |

(4 pts) Find a good viewing window for 

(4 pts) Solve  using any method.

(8 pts) A certain company has fixed costs of $15,000 for its product and variable costs given by dollars per unit, where *x* is the total number of units. The selling price of the product is given by dollars per unit.

1. Formulate the functions for total cost, revenue, and profit.
2. Algebraically find and interpret the break even points.

1. Algebraically find and interpret the level of production and sales that maximizes profit.
2. Find and interpret the profit (or loss) at the production level found in (c.)