

Name _____

G Block

October 30, 2001

Honors Pre-Calculus Test

Sections 2.1–2.4, 2.8

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Part A (30%) _____
Part B (40%) _____
Part C (30%) _____
overall _____

Write complete, fully explained solutions, except where directions say otherwise. If you use your graphing calculator for a significant step, tell what you did on the calculator.

Part A. Linear and quadratic functions

1. Write an equation for the quadratic function that has vertex $(-1, 2)$ and contains the point $(3, -6)$.

2. Suppose that a linear regression has a correlation coefficient $r \approx -0.98$. What does this tell you about the data set?

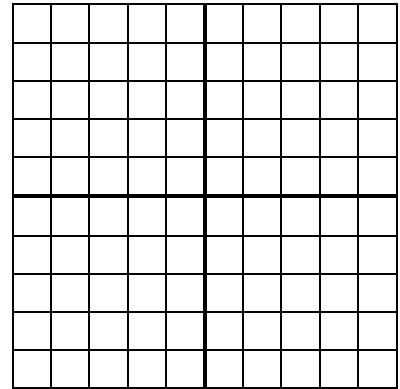
3. An apartment rental company has 800 units available for rent. Of these, 500 are currently rented at \$900 per month. A market survey indicates that each \$10 decrease in monthly rent would result in 12 additional rentals.

What rent will produce the maximum revenue for the rental company? How many apartments would be occupied, and what would the revenue be?

Part B. Polynomials and their zeros

1. Given:

- $P(x)$ is a polynomial of degree 3.
 - $(x + 3)^2$ is a factor of $P(x)$.
 - $P(0) = 2$ and $P(4) = 0$.
- a. Make a rough sketch of the graph of $P(x)$. It must have the correct intercepts and the correct general shape.
- b. Write an equation for $P(x)$.



2. Let $g(x) = 2x^3 - 2x^2 + 2x - 1$, where x is real.
- a. Without using your calculator, prove that $g(x)$ has a zero.
- b. Without using your calculator, prove that $g(x)$ has an irrational zero.
- c. Using your calculator, find a decimal approximation of the zero of $g(x)$.

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3. Consider this division problem: $\frac{2x^3 - 2x^2 + 2x - 1}{x - 3}$

a. Without dividing, predict what the remainder will be. Tell how you get your answer.

b. Perform the division using a method of your choice.

c. Using only addition and multiplication, write an equation that relates the dividend, divisor, quotient, and remainder of this division problem.

