**Math 161**
**Polynomial and Rational Functions Worksheet**

Find the zeros, relative minima and maxima, domain and range of the function:

1. $x^3 + x + 5$

2. $x^2 + 10 - x^5$

Divide:

3. $(3x^3 + 4x^2 + 4) \div (x - 3)$

Determine if the numbers are zeros of the function:

4. 3, 2, ½; $f(x) = 3x^3 + 11x^2 - 2x + 8$

5. Find all the possible zeros of the function: $f(x) = 4x^5 + 3x^3 - 2x + 12$

6. Find the polynomial with the following zeros: i, 1 + i, 2

Factor:

7. $x^4 + 6x^3 + 17x^2 + 36x + 66$

Find the x and y intercepts, find the vertical and horizontal asymptotes, and graph the function:

8. $\dfrac{x - 1}{x^2 + 3x - 4}$

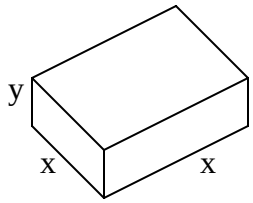
9. $\dfrac{2x + x^3 + 1}{x^2 + 12x + 20}$

Solve:

10. x2 –5 > -4x

11. $\dfrac{2x}{x^2 - 9} - \dfrac{x}{x^2 + x - 12} < \dfrac{3x}{x^2 + 7x + 12}$

12. A rectangular open-top box with a square base is been designed. The box should hold 108 cubic centimeters.




a. Express the surface area S as a function of the length x of a side of the base.
b. Graph the function.
c. Estimate the minimum surface area required for the box and give the dimensions of the box.

13. There a n people in a room. The number of possible handshakes by all the people in the room is given by the function below. What is the number of people to have at least 201 possible handshakes?

$$N(n) = \frac{n(n-1)}{2}$$

14. The population P, in thousands, of Lordburg is given by the below equation where t is time in months. Find the interval on which population was 40 thousand or greater.

$$P(t) = \frac{400t}{2t^2 - 9}$$