**Test #2 Review**

**(Covers Ch 3 and Ch 4)**

**Sec 3.1:** Quadratic Functions and Inequalities

* Be able to convert a standard quadratic equation into vertex form by completing the square.
* Find the vertex, x and y intercepts, axis of symmetry, domain and range, and graph quadratic equations.
* Solve quadratic inequalities using a number line system (or test-point method).
* Solve maximum and minimum problems.

*Problems to try:*

1. From the book: pg 269: 1, 3, 83, 102, 115

1. Write the function in the form

3. Find the vertex, axis of symmetry, x-intercepts, and y-intercept for the parabola

83. Find the x-intercepts, y-intercept, and asymptotes for the graph of the function and sketch the graph.

102. Solve the inequality. State the solution set using interval notation.

115. If the altitude in feet of a model rocket is given by the equation, where is the time in seconds after ignition, then what is the maximum height attained by the rocket?

**Sec 3.2**: Zeros of Polynomial Functions

* Be able to do long division and synthetic division. Know when you can and cannot use synthetic division.
* Be able to list out the possible rational zeros.
* Find all the real and imaginary zeros of a polynomial.

*Problems to try:*

1. From the book: pg 269: 7-17 odd, 23

Find all the real and imaginary zeros for each polynomial function.

7. 9. 11.

13. 15. 17.

Use the rational zero theorem to list all possible rational zeros for each polynomial function.

23.

**Sec 3.3**: The Theory of Equations

* Given the roots of a polynomial, find the polynomial.
* Remember how to determine how many roots a polynomial will have, and the definition of multiplicity.
* Find all the real and imaginary zeros of a polynomial.

*Problems to try:*

1. From the book: pg 269: 27, 29, 47-55 odd

Find a polynomial equation with integral coefficients (and lowest degree) that has the given roots.

27. 29.

Find all real and imaginary solutions to each equation, stating multiplicity when it is great than one.

47. 49.

51. 53.

55.

**Sec 3.4:** Miscellaneous Equations

* Be able to solve any type of equations. Remember to look for factors, check all solutions when solving square root functions, how to factor the difference and sum of cubes, and that there are always two equations when solving absolute value functions.

*Problems to try:*

1. From the book: pg 269: 57-61 odd, 65-67, 69

Find all real solutions to each equation.

57. 59. 61.

65. 66. 67.

69.

**Sec 3.5**: Graphs of Polynomial Functions

* Review the notes on graphing from Tuesday the 6th
* Remember the three types of symmetry (pg 237), end behavior and graph any functions.
* Be able to solve polynomial inequalities using the test method

*Problems to try:*

1. From the book: pg 270: 85, 87, 105

Find the x-intercepts, y-intercept, and asymptotes for the graph of each function and sketch the graph.

85. 87.

Solve each inequality. State the solution set using interval notation.

105.

1. Graph

**Sec 3.6:** Rational Functions and Inequalities

* Be able to find the x and y intercepts, the vertical and horizontal asymptotes, domain and range, etc. and graph rational functions
* Be able to solve rational inequalities

*Problems to try:*

1. From the book: pg 270: 91-97 odd, 107

Find the x-intercepts, y-intercept, and asymptotes for the graph of each function and sketch the graph.

91. 93. 95. 97.

Solve each inequality. State the solution set using interval notation.

107.

**Sec 4.1:** Exponential Functions and their Applications

* Be able to graph exponential functions using transformations and identify the domain and range.
* Solve compounding interest problems (you need to know both formulas).]
* Be able to solve simple exponential functions without a calculator

*Problems to try:*

1. From the book: pg 334: 63, 64, 71, 72, 105, 106

Sketch the graph of each function. State the domain, the range, and whether the function is increasing or decreasing. Identify any asymptotes.

63. 64. 71. 72.

Solve each problem.

105. If $50,000 is deposited in a bank account paying 5% compounded quarterly, then what will be the value of the account at the end of 18 years?

106. If $30,000 is deposited in First American Savings and Loan in an account paying 6.18% compounded continuously, then what will be the value of the account after 12 years and 3 months.

**Sec 4.2:** Logarithmic Functions and their Applications

* Be able to graph logarithmic functions using transformations and identify the domain and range.
* Write logs as exponential and vice versa.
* Solve simple logarithmic functions without a calculator.

*Problems to try:*

1. From the book: pg 333: 33-43 odd, 67, 69, 70

Find the exact solution to each equation.

33. 35. 37.

39. 41. 43.

Sketch the graph of each function. State the domain, the range, and whether the function is increasing or decreasing. Identify any asymptotes.

67. 69. 70.

**Sec 4.3:** Rules of Logarithms

* Know the rules for simplifying logs
* Be able to expand and condense logs
* Begin to solve log and exponential equations

*Problems to try:*

1. From the book: pg 333: 21, 23, 24, 25, 27, 41-51 odd, 89-97 odd

Rewrite each expression as s single logari99thm.

21. 23.

24.

Rewrite each expression as a sum or difference of multiples of logarithms.

25. 27.

Find the exact solution to each equation.

41. 43. 45.

47. 49.

51.

Use the rules of logarithms to determine whether each equations is true or false. Explain your answer.

89. 91. 93.

95. 97.

**Sec 4.4**: More Equations and Applications

* Be able to solve any equations involving exponentials and logs. Review the strategies discussed in class or on pg 322.

*Problems to try:*

1. From the book: pg 334: 83-88, 109, 111, 112

Use a calculator to find an approximate solution to each equation. Round answers to four places.

83. 84. 85. 86.

87. 88.

109. The number of grams of a certain radioactive substance present at time is given by the formula, where is the number of years from the present. How many grams are present initially? How many grams are present after 1000 years? What is the half-life of this substance?

111. According to an educational psychologist, the number of words learned by a student of a foreign language after hours in the language laboratory is given by. How many hours would it take to learn 10,000 words?

112. Health researchers divided the state of Maryland into regions according to per capita income and found a relationship between per capita income (in thousands) and the percentage of pediatric TB cases. The equation can be used to model the data.

a. What percentage of TB cases would you expect to find in the region with a per capita income of $8000?

b. What per capita income would you expect in the region where only 2% of the TB cases occurred?

1. For some extra help on solving: pg 337: 1-12

Solve each equation.

1. 2. 3.

4. 5. 6.

7. 8. 9.

10. 11. 12.

1. For some extra help on graphing: pg 337: 13-24

Sketch the graph of each function.

13. 14. 15. 16.

17. 18. 19. 20.

21. 22. 23. 24.