REVIEW TEST 3 – Chapters 7, 8, 9

Optional @ 10 points towards Test 3 – Due Tuesday

Chapter 7 – Section 7.1: #27, 90, 93; Section 7.5 # 113, 144; Section 7.6 # 40, 49, 74; Section 7.7 # 101, 134

Chapter 8 – Section I : all odd; Section II:1a, 2a, 4a; Section III: 1, 2i, 5; Handout 8.3 : Applications 5,6,7;
Section IV: 1, 3.

Chapter 9 – Section 9.1: #27, 49; Section 9.3: all odd listed.
1b, 2b,c, 7, 9, 11.

CHAPTER 7 – Radicals, Radical Functions, and Rational Exponents

Textbook: Section 7.1: # 27 – 31 odd (find the domain and graph each function by plotting points)
90 – 92 (find the domain, range, and graph the function by plotting points)
93 – 96
Section 7.5: # 113 – 116 , 143, 144
Section 7.6: # 39 – 42, 49, 50, 74 – 77
Section 7.7: # 101 – 113 odd, 134, 135

CHAPTER 8 – Quadratic Equations and Functions

I QUADRATIC EQUATIONS.

Solve (in $\mathbb{C}$) by extracting roots:

1) $9x^2 = 25$; 2) $\frac{2x^2}{3} = 4$; 3) $\left(x - \frac{1}{2}\right)^2 = \frac{3}{4}$;

4) $3(x-2)^2 + 38 = 0$ 5) $4(x+2)^2 = 12$ 6) $1 - 3(x-1)^2 = 10$

Solve the following (in $\mathbb{C}$) by completing the square:

7) $x^2 - 6x - 7 = 0$; 8) $2x^2 - 6x - 5 = 0$; 9) $-4x^2 - 36x - 65 = 0$;

Solve the following (in $\mathbb{C}$) by the quadratic formula:

10) $2x^2 + 1 = 4x$; 11) $x^2 - \frac{x}{2} + 1 = 0$; 12) $\frac{1}{2}x^2 + 1 = \frac{3}{2}x$;

II QUADRATIC EQUATIONS

1) Write a quadratic equation with rational coefficients that has: a) $1 - \sqrt{2}$ as a solution; b) -2 and 3 as solutions;
Write (in standard form) a quadratic equation with real coefficients that has 1-2i as a solution.

2) Solve each equation for the indicated variable:
a) $3x^2 + xy + y^2 = 2$, for y; b) $A = 2w^2 + 4lw$, for w; c) $a^2 + b^2 = c^2$, for b.

3) Show in two different ways that 3-2i is a solution of $x^2 - 6x + 13 = 0$.

4) Solve the following equations: a) $x^4 - 3x^2 = -2$; b) $x^{\frac{2}{3}} - 2x^{\frac{1}{3}} - 3 = 0$; c) $x + \sqrt{x} - 6 = 0$;

III QUADRATIC FUNCTIONS (PARABOLAS)

1) Answer all questions; show all work. Let $y=\frac{1}{3}(x+3)^2-2$ be a parabola.

a) What type of curve is this?; b) y-intercept?; c) Vertex ; d) x- intercept(s)? ; e) sketch its graph; f) What is the standard form of the equation? g) Domain? h) Range? i) Is this function one-to-one? Does it have an inverse?

2) Answer all questions for each parabola.

i) $y=-2x^2+x+3$ ii) $y=-10x^2-2x+1$ iii) $y=\frac{1}{7}x^2-8x+66$

a) What type of curve is this?; b) y-intercept?; c) Vertex ; d) x- intercept(s)? ; e) sketch its graph; f)What is the vertex form of the above equation? g) Domain? h) Range? i) Is this function one-to-one? Does it have an inverse?

3) Let $f(x)=2\left(x+\frac{1}{3}\right)^2-\frac{4}{9}$. Find the following and simplify(don't give approximate answers):

a) The domain of f(x); b) f(2); c) Find values of "x" where f(x)=2 d) The range of f(x).

4) The owner of a café sells 80 cups of cappuccino daily if he charges $2.00 per cup. For each $0.10 that he increases the price, he sells 2 fewer cups per day.

a) Write an expression for the total revenue R in terms of the number of $0.10 price increases x.

b) What should he charge per cup if he wants to receive the most amount of revenue? Explain how you know for sure you have found the price that produces the largest revenue.

5) The fish population in a certain lake rises and falls according to the formula:

$F=2000\left(15+\frac{17}{2}t-\frac{1}{2}t^2\right)$. Here "F" is the number of fish at the time "t" where "t" is measured in years since January 1,1997 when the fish population was first estimated.

a) On what date will the fish population again be the same as on January 1,1998?

b) By what date will all the fish in the lake have died? (Approximate your answer in years to one decimal place).

Handout Section 8.3 – Exercises # 4,5; Applications # 1 - 7

IV INEQUALITIES

Solve the following inequalities. **Write the solution set in interval notation:**

1) $x^2-6x-7\le 0$; 2) $6x-x^2\ge 7$; 3) $x(2-3x)(x-3)\ge 0$;

4) $\frac{3}{x+3}>\frac{3}{x-2}$; 5) $-x(x+1)^2(x^2+5x+6)(2x^2+3x+10)>0$

CHAPTER 9 – Exponential and Logarithmic Functions

Textbook Section 9.1: #17, 18, 21, 25 – 31 odd, 49, 50

Section 9.3: # 23 – 44 every third; 47 – 52 (all); 54 – 72 every third; 73 – 80

1) Find the domain of each function:

a) $f(x)=\log_{10}(12-4x)$; b) $g(x)=\ln\left(x^2-25\right)$; c) $h(x)=\log\left(\dfrac{3-4x}{x+2}\right)$

2) Simplify:

a) $\log_2\left(\log_4 16\right)$ b) $\log_{10}\left(\log_3\left(\log_5 125\right)\right)$ c) $2^{\log_2 5}-3\log_5\sqrt[3]{5}$

3) If the size of a bacteria colony doubles in 5 hours, how long will it take for the number of bacteria to triple?

4) Suppose a certain radioactive substance has a half-life of 5 years. An object starts with 20 kg of the radioactive material.

a) How much of the radioactive material is left after 10 years?
b) The object can be moved safely when the quantity of the radioactive material is 0.1 kg or less. How much time must pass before the object can be moved?

5) The number of bacteria present in a culture after t hours is given by the formula $N=1000e^{0.69t}$.

a) How many bacteria will be there after ½ hour?
b) How long will it be before there are 1,000,000 bacteria?
c) What is the doubling time?

Solve for x in Problems 6 – 12.

6) $10^{x+3}=5e^{7-x}$ 7) $2e^{3x}=4e^{5x}$ 8) $2x-1=e^{\ln x^2}$

9) $5^x=3^{2x-1}$ 10) $3^{x^2-4}=27$ 11) $\log_8\left(x+5\right)-\log_8 2=1$

12) $\log_2\left(\log_3 x\right)=-1$

Answers for Chapter 9

3) 7.925 hours; 4) a) 5 kg; b) 38.2 years; 5) a) 1412 bacteria; b) 10 hours; c) 1 hour;

6) 0.515; 7) -0.347; 8) x=1; 9) $\dfrac{\log_5 3}{2\log_5 3-1}$; 10) $\pm\sqrt{7}$; 11) 11; 12) $\sqrt{3}$