Review Sheet for Non-Graphing Portion of Final

Section 1.1:	*(8 pts.)*	Convert a repeating decimal to a fraction
Section 1.5:	*(13 pts.)*	Solve a radical equation
Section 1.7:	*(8 pts.)*	Solve an absolute value inequality
Section 2.1:	*(13 pts.)*	Know how to use the difference quotient
Section 2.4:	*(5 pts.)*	Determine if a function is even, odd, or neither
Section 2.7:	*(4 pts.)*	Determine a composite function
Section 2.8:	*(14 pts.)*	Determine the inverse of a function
Section 3.3:	*(18 pts.)*	Determine all real zeroes of a polynomial function
Section 3.4:	*(3 pts.)*	Know how to work with complex numbers
Section 4.2:	*(6 pts.)*	Determine the domain and range of a function
Section 5.2:	*(4 pts.)*	Determine the exact value of trigonometric expressions
	(11 pts.)	Write one basic trigonometric function in terms of another
Section 6.1:	*(4 pts.)*	Convert between degrees and radians
Section 9.2:	*(10 pts.)*	Solve a system of equations

Also, word problems are worth 29 points. These are taken from sections 1.6, 2.6, and 4.5. Formulas will be provided for word problems from section 4.5, but not for those from other sections.

Formulas and Theorems

General form of equation of parabola: An equation for a parabola with vertex $\left(\frac{-b}{2a}, \frac{-(b^2-4ac)}{4a}\right)$ is

$$y = ax^2 + bx + c.$$

Standard form of equation of parabola: An equation for a parabola with vertex (h, k) is

$$y = a(x-h)^2 + k.$$

The intermediate value theorem for polynomials: If $P(x)$ is a polynomial function, $a < b$, and $P(a) \neq P(b)$, then, for any real number k strictly between $P(a)$ and $P(b)$, there exists a real number c with $a < c < b$ such that $P(c) = k$. (Note that $k = 0$ is used most frequently in this class.)

The remainder theorem: If $P(x)$ is a polynomial and c is a real number, then $P(c)$ is equal to the remainder from dividing $P(x)$ by $x - c$.

The rational root theorem: If $P(x)$ is a polynomial function with integer coefficients, the only possibilities for rational roots of $P(x)$ are of the form $\frac{p}{q}$, where p is a factor of the constant term of $P(x)$ and q is a factor of the leading coefficient of $P(x)$.

Descartes' rule of signs: If $P(x)$ is a polynomial function, then the number of positive real roots of $P(x)$ is equal to the number of variations in sign of $P(x)$ or is less than that by some multiple of 2. (For the number of negative real roots of $P(x)$, a similar procedure is used on $P(-x)$.)

<u>The upper bound theorem:</u> If $P(x)$ is a polynomial function and $c > 0$ such that, when $P(x)$ is synthetically divided by $x - c$, the bottom row consists solely of nonnegative numbers, then none of the real roots of $P(x)$ is larger than c.

<u>The lower bound theorem:</u> If $P(x)$ is a polynomial function and $c < 0$ such that, when $P(x)$ is synthetically divided by $x - c$, the bottom row consists of numbers alternating in sign, then none of the real roots of $P(x)$ is smaller than c.

<u>Complex numbers:</u> Every complex number can be written in the form $a + bi$, where a is the *real part*, b is the *imaginary part*, and $i^2 = -1$.

<u>Converting between degrees and radians:</u> The conversion between degrees and radians is given by

$$180^\circ = \pi \text{ rad}.$$

<u>Exact values of trigonometric functions:</u> Following is a chart of some common trigonometric values.

θ	$\sin\theta$	$\cos\theta$
0	0	1
$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$
$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$
$\frac{\pi}{2}$	1	0

<u>Relationships among trigonometric functions:</u> The following relationships hold for trigonometric functions.

$$\tan\theta = \frac{\sin\theta}{\cos\theta} \qquad \cot\theta = \frac{\cos\theta}{\sin\theta}$$

$$\csc\theta = \frac{1}{\sin\theta} \qquad \sec\theta = \frac{1}{\cos\theta}$$

$$\begin{aligned} \sin^2\theta + \cos^2\theta &= 1 \\ \tan^2\theta + 1 &= \sec^2\theta \\ 1 + \cot^2\theta &= \csc^2\theta \end{aligned}$$