Final Exam Review

Chapter 1

Exponents:

$$x^m x^n = x^{m+n} \qquad x^{-m} = \frac{1}{x^m}$$

$$\left(x^m\right)^n = x^{mn} \qquad \frac{x^m}{x^n} = x^{m-n}$$

$$x^0 = 1 \qquad (xy)^m = x^m y^m$$

$$\left(\frac{x}{y}\right)^m = \frac{x^m}{y^m}$$

Radicals:

$$\sqrt[b]{x^a} = x^{\frac{a}{b}}$$

Polynomials:

adding, subtracting, multiplying, dividing
factoring -- look for common factors first
three terms--trial and error
two terms--formula or common factor

Rational expressions (fractions with polynomials):

adding, subtracting, multiplying, dividing

Complex fractions (fraction over a fraction)

Rationalizing

Chapter 2

Solving equations:

linear
rational equations (fractions with variable in denominator)-- either an answer you can use, an answer you can't use (no solution) or all real x except x =??

Applications

Solving quadratic equations-- $ax^2+bx+c=0$

(1) solve by factoring

(2) solve by completing the square (do not have to)

(3) solve by quadratic formula

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

Imaginary numbers

Radical equations, absolute value equations, etc.

Inequalities, absolute value inequalities:

(1) $|x|<b$ **means** $-b<x<b$

(2) $|x|>b$ **means** $x<-b$ **or** $x>b$

Chapter 3

distance formula: $d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

midpoint formula: $\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$

circles: $(x-h)^2+(y-k)^2=r^2$

Lines:

slope = $m=\frac{y_2-y_1}{x_2-x_1}$

equations of lines:

(1) $y-y_1=m(x-x_1)$

(2) $y=mx+b$

general form

Finding function values or expressions
Domain, range, increasing, decreasing...

Stretching, shifting, reflecting of graphs
piece-wise functions

Parabolas:
Standard form: $y = a(x-h)^2 + k$

$$\textbf{Vertex}: \ (h,k)$$

Quadratic form:

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

$$\textbf{Vertex}: \ \ \textbf{x-coord} = -\frac{b}{2a} \quad \textbf{or find average of x-int.}$$

plug in to find y

Add, subtract, multiply, divide two functions
Composition of functions $f \circ g$

Inverse functions

Directly proportional: $y = kx$
Inversely proportional: $y = \frac{k}{x}$

Solving (graphing) inequalities using a sign chart

<u>Chapter 9</u>
Two equation/two unknowns
substitution/elmination

Chapter 5

Exponential equation: $y = a^x$

Logarithmic equation: $x = a^y$ **or** $y = \log_a x$

Properties:

(1) $\log_a(uw) = \log_a u + \log_a w$

(2) $\log_a\left(\frac{u}{w}\right) = \log_a u - \log_a w$

(3) $\log_a u^c = c \log_a u$

Change of base formula:

$$\log_b u = \frac{\log_a u}{\log_a b}$$

Only formulas given:

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$A = Pe^{rt}$$