Pre-Calculus 30 **Chapter 1 Review**

*y = f(x) + k* if k > 0, a vertical translation of “k” units ***up***
 if k < 0, a vertical translation of “k” units ***down***

*y = f(x – h)*  if h > 0, a horizontal translation of “h” units ***to the right.*** if h < 0, a horizontal translation of “h” units ***to the left.***

*y = -f(x)*  a reflection in the x-axis

*y = f(-x)* a reflection in the y-axis

*y = af(x)*  a vertical stretch about the x-axis by a factor of 

*y = f(bx)*  a horizontal stretch about the y-axis by a factor of 

*y = af(b(x – h)) + k*

Mapping Notation (image points): 

Invariant points – points that remain the same after a transformation is applied.

Writing equations: Look at stretches (*a* and *b*) and reflections (-*a* and -*b*) first. Then look at translations/shifts (*h* and *k*).

Inverse of a relation:

* interchange the x-coordinates and y-coordinates
* the graph of the inverse is a reflection of the relation in the line y = x
* domain and range are reversed

if the inverse of a function *f(x)* is a function, it is written *f -1(x)*

**Pre-Calculus 30 Chapter 2 Review**

Base Radical Function:  has the following characteristics:

* left endpoint at (0, 0)
* no right endpoint
* shape of half a parabola

Graph  by transforming  using the parameters *a, b, h*, and *k.*

Key values to consider when graphing  and are *f(x)* = 0 and *f(x)* = 1. (These are invariant points.)

Domain of  : all values in the domain of *f(x)* for which f(x)0 is defined

Range of  : the square roots of all values in the range of *f(x)* for which *f(x)* is defined

Solving Radical Equations algebraically

Solutions/Roots of Radical Equations are the x-intercepts of the graphs of the corresponding radical function.

**Chapter 3 Review**

Definition of polynomial

Synthetic Division

Remainder Theorem

* If *P(x)* is divided by *x – a*, the remainder is *P(a)*
* If *P(x) ÷ (x – a) = 0*, then *x – a* is a factor of the polynomial

Graphing ***Odd*** Degree Polynomials – have 1 to *n* zeros (x-intercepts)

* Positive lead term – start in Quadrant III and end in Quadrant I
* Negative lead term – start in Quadrant II and end in Quadrant IV

Graphing ***Even*** Degree Polynomials – have 0 to *n* zeros (x-intercepts)

* Positive lead term – start in Quadrant II and end in Quadrant I
* Negative lead term – start in Quadrant III and end in Quadrant IV

Factoring – GCF, difference of squares, factoring trinomials, synthetic division

Sketching graphs

* Find x-intercepts (let y = 0). If necessary, factor. Look at factors and their multiplicity to decide on the behaviour of the graph at each zero.
* y-intercept (constant term…or let x = 0)
* Look at leading term (degree and coefficient) and decide on ***end behaviour***
* Be able to state intervals where the function is positive and where it is negative

Sketching graphs using transformations

* . Use mapping notation to sketch the transformed graph.

Word Problems

**Chapter 9 Review**

Rational functions:  . Restriction: *q(x)≠0*

Base Functions:  

Tranformations:  

Vertical asymptotes: *x = h x = h*Horizontalasymptotes: *y= k y = k*Vertical stretch: a a

Mapping Notation:  

Domain – possible values for *x*

Range – possible values for *y*

Graphing Rational Functions/Writing Equations of Rational Functions

* ***x-intercept***: a factor of ***only*** the numerator
* ***vertical asymptote***: a factor of ***only*** the denominator
* ***point of discontinuity***: a factor of ***both*** the numerator and the denominator
* find y-intercept (let *x* = 0)
* sign analysis: tells where the graph is positive and negative
* horizontal asymptote:
a) if numerator degree = denominator degree, *y* = ratio of leading coefficients

b) If numerator degree < denominator degree, y = 0

Solving Rational Equations Algebraically – watch for extraneous roots!

**Chapter 10 Review**

**Sum of Functions**

 This can also be written as .

**Difference of Functions**

 This can also be written as 

**Product of Functions**

 This can also be written as 

**Quotient of Functions**

 This can also be written as , where ****

We can substitute one function, , into another function, . The result would be .

This is read “*g* of *f* of *x*”.

The notation for this function composition is …**not to be confused with multiplication** which is .

Review: Page 158 #1ac, 2,4,6,8,11a,12,13,15,16a

 Page 550 #1-3, 4ac, 6,8,10