Alg 4 Summer Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_

 WS Assessment

 Target 4:

Polynomial equation

**I can:**

* Solve for the roots of polynomial by
	+ Graphing Calculator
	+ Remainder theorem
	+ Factoring

 **Unit 6: Polynomials and Their graph**

* [**HSA.APR.A.1**](http://www.corestandards.org/Math/Content/HSA/APR/A/1/): Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
* [**HSA.APR.B.3**](http://www.corestandards.org/Math/Content/HSA/APR/B/3/): Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
* [**HSF.IF.C.7.C**](http://www.corestandards.org/Math/Content/HSF/IF/C/7/c/): Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

Remainder theorem: Evaluate the polynomial at given value (synthetic)

f(x) = x3 – 2x2 – 29x + 24 f(x) = -3x4 +9x3 – 6x2 + 16x + 10

 at x = 6 at x = 3

Use remainder theorem to show the given value is the root of polynomial

i.e. show remainder = 0. Then write the polynomial in factor form

f(x) = x4 – 13x2 + 40 $f(\sqrt{5}$) ; $f(2\sqrt{2}$)

f(x) = x3 – 2x2 – 16x + 32 f(x) = x3 – 9x2 + 26x – 24

 f(2); f(4); f(-4) f(2); f(3); f(4)

Graphing Calculator: Find the roots of the following; Sketch the graph

 f(x) = 5x3 + x2 – 5x – 1 f(x) = 3x3 – x2 – 3x + 1

Rational root theorem: If f(x) is a polynomial with integer coefficients and if (p/q) is a zero f(p/q)=0, then p is a factor of the constant term and q is a factor of the leading coefficient

Write all possible rational root of the function then find ONE root

 f(x) = 2x3 + 2x2 – 15x – 9 f(x) = 3x3 – x2 – 3x + 1

f(x) = 4x3 – 3x – 1 f(x) = x3 – 5x2 + 11x – 10

Factor completely then solve the following high degree polynomial

 f(x) = 2x3 + 7x2 + 7x + 2 f(x) = 2x3 – 3x2 + 1

Factor completely then solve the following high degree polynomial

 f(x) = 3x3 + 4x2 + 15x + 20 f(x) = 2x3 + 3x2 + 6x + 9

Factor completely then solve the following high degree polynomial

 f(x) = 3x4 – 8x2 + 5 f(x) = 3x4 – 7x2 – 20

 f(x) = 3x4 – 14x2 + 8 f(x) = 5x4 – 12x2 + 7

Solve the following by graphing and factoring

 f(x) = 6x4 – 6x3 + 12x2 – 24x – 48

For the following function

 Sketch the graph; Find all the real zero to nearest tenth; Find all relative maxima and minima; and state the end behavior

f(x) = x5 – 4x3 + x + 2 f(x) = -x4 + x3 + 2x2 – 4

f(x) = -x5 + 3x3 – x f(x) = x4 – 2x3 – x2 + 3

Fundamental theorem of Algebra: Any polynomial of degree n has n roots may include complex roots.

Sketch all possible fifth degree polynomial have at least one root at 2

**Assessment Target 4**

**I can…** solve high degree polynomial equation

Given function f(x) = 2x4 + 2x3 – 4x2 + 8x – 48

1. List all possible rational roots

2. Use remainder theorem to prove that x = 2 is a root of f(x)

3. Factor completely, show all work and state the roots

5. Sketch the graph; Find all the real zero to nearest tenth; Find all relative maxima and minima; and state the end behavior