EXTENDED CONSTRUCTED RESPONSE **Standard A.APR.B.2.**

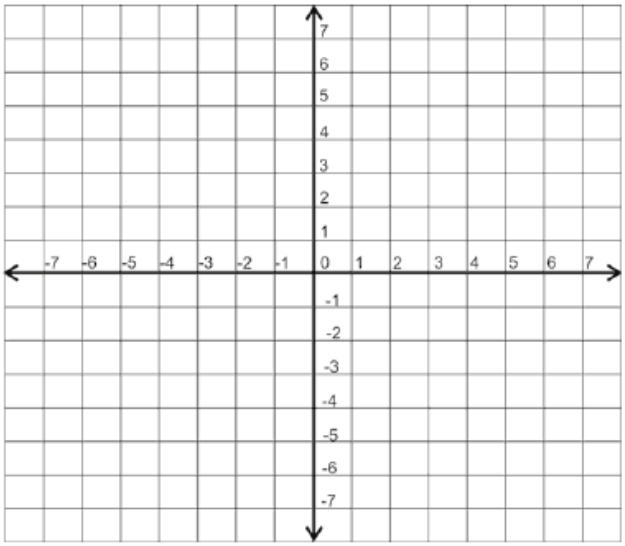
ALGEBRA 2 Remainder Theorem

NAME _____ **Period** _____

1. Consider the polynomial function: $p(x) = 3x^3 + 10x^2 + ax - 6$ where ***a*** is an unknown real number. If $(x + 3)$ is a factor of this polynomial what is the value of ***a***? Show all the steps below.

2. Use the polynomial function $p(x) = 2x^3 + 5x^2 - x - 6$ to answer questions a and b below.
   a. Show that $(x - 1)$ is a factor of $p(x)$ using the Remainder Theorem. Explain your reasoning.

   b. Sketch the graph of $p(x)$ showing all the zeros of the function. Show all work to find zeros.



Task is worth a total of **6 points.**

Rubric Part A	
Score	**Description**
2	Student response includes the following elements ❖ Reasoning component = 1 point Algebraic or written explanation for solving the equation ❖ Computation component = 1 point Calculating the correct answer Sample Student Response: 1. If (x+3) is a factor, then p(-3) = 0. Substituting -3 in place of x , 0 = 3(-27) +10(9) – 3a – 6 0 = -3a -+ 3 **a = 1**
1	Student response shows logical steps and reasons with minor calculation error from arriving at an inaccurate solution
0	Student response is incorrect or irrelevant

Rubric Part 2A	
Score	**Description**
2	Student response includes the following elements ❖ Yes (x-1) is a factor with correct steps and justification. Sample Student Response: If . $p(1) = 0$, then (x – 1) is a factor of *p*(x). Calculate *p*(1) = 2 + 5 – 1 – 6. *P*(1) = 0. Therefore (x – 1) is a factor of *p*(x). **Or** If $p(x)$ is divided by (x - 1) and the remainder is zero, then (x - 1) is a factor of *p(x).* Students can use either synthetic or long division to arrive at a solution with zero remainder.

1	Student response shows logical steps and reasons with minor calculation error from arriving at an inaccurate solution
0	Student response is incorrect or irrelevant

Rubric Part 2B	
Score	**Description**
1	Student response shows the complete factors and graph in correct direction with 3 zeros correctly plotted. Sample Student Response: When students divide p(x) by (x-1), they should arrive at $2x^2$ + 7x + 6. *Therefore, p*(x) in complete factored form is *p*(x) = (x-1)(2x+3)(x+2). The zeros are 1, $-\frac{3}{2}$ and -2 .
0	Student response shows only 1 factor and 1 zero; irrelevant answers

Genesis Convert Table

Task Point	Genesis Score
0	55
1	59
2	69
3	79
4	89
5	100