

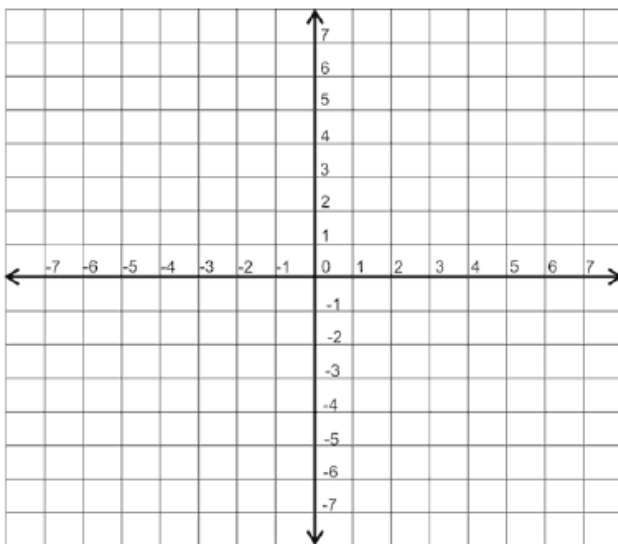
**EXTENDED CONSTRUCTED RESPONSE****Standard A.APR.B.2.****ALGEBRA 2**    **Remainder Theorem****NAME** \_\_\_\_\_**Period** \_\_\_\_\_

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	<p>Student response includes the following elements</p> <ul style="list-style-type: none"><li>❖ Reasoning component = 1 point Algebraic or written explanation for solving the equation</li><li>❖ Computation component = 1 point Calculating the correct answer</li></ul> <p>Sample Student Response:</p> <ol style="list-style-type: none"><li>1. If <math>(x+3)</math> is a factor, then <math>p(-3) = 0</math>. Substituting <math>-3</math> in place of <math>x</math>, <math>0 = 3(-27) + 10(9) - 3a - 6</math> <math>0 = -3a + 3</math> <b><math>a = 1</math></b></li></ol>
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	<p>Student response includes the following elements</p> <ul style="list-style-type: none"><li>❖ Yes <math>(x-1)</math> is a factor with correct steps and justification.</li></ul> <p>Sample Student Response:</p> <p>If <math>p(1) = 0</math>, then <math>(x - 1)</math> is a factor of <math>p(x)</math>. Calculate <math>p(1) = 2 + 5 - 1 - 6</math>. <math>P(1) = 0</math>. Therefore <math>(x - 1)</math> is a factor of <math>p(x)</math>.</p> <p><b>Or</b> If <math>p(x)</math> is divided by <math>(x - 1)</math> and the remainder is zero, then <math>(x - 1)</math> is a factor of <math>p(x)</math>.</p> <p>Students can use either synthetic or long division to arrive at a solution with zero remainder.</p>

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**

<b>Score</b>	<b>Description</b>
1	<p>Student response shows the complete factors and graph in correct direction with 3 zeros correctly plotted.</p> <p>Sample Student Response:            When students divide <math>p(x)</math> by <math>(x-1)</math>, they should arrive at <math>2x^2 + 7x + 6</math>.</p> <p>Therefore, <math>p(x)</math> in complete factored form is <math>p(x) = (x-1)(2x+3)(x+2)</math>.            The zeros are <math>1, -\frac{3}{2}</math> and <math>-2</math>.</p>
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