

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

**Standard A2.A.APR.A.2** 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.

**Tier 1 (up to 70 points) Complete #1-10 (7 points each)**

**Tier 2 (up to 88 points) Complete #1-13 Do not move up to Tier 2 if you have not completed all of Tier 1. (6 points each)**

**Tier 3 (up to 100 points) Complete #1-15 Do not move up to Tier 3 if you have not completed all of Tier 1 & Tier 2. (6 points each)**

Find all zeros. Factor when possible.

1.  $f(x) = (2x - 1)(x - 5)$

2.  $f(x) = x(5x - 2)(x^2 + 1)$

3.  $f(x) = x^3 + 8$

4.  $f(x) = x^4 - x^2 - 30$

5.  $f(x) = 2x^3 + x^2 - 10x - 5$

6. Write a polynomial function of least degree with integral coefficients that has zeros 3, 2 and -2.

7. Divide  $(x^3 - 8x^2 + 17x - 10)$  by  $(x - 5)$  using synthetic division.

8. Find a polynomial function whose graph passes through  $(0, 5)$ ,  $(2, 10)$  and  $(1, 4)$ .

Find all zeros.

9.  $f(x) = x(x + 2)(x - 2)(3x^2 - 4)$

10.  $f(x) = (2x + 5)(x^2 - 2x - 5)$

11. Determine whether  $(x + 2)$  is a factor of  $x^3 + x^2 - 16x - 16$ . **Explain.**

12. Use synthetic division to completely factor  $x^3 + 2x^2 - 5x - 6$  given that  $(x + 1)$  is a factor.

13. Write a polynomial function of least degree with rational coefficients that has roots  $-4i$  and  $6 - i$ .

14. Find a linear, quadratic and cubic model for the data. Round coefficients to the nearest hundredth. Which model best fits the data? **Explain.**

<b>x</b>	3	8	15	21
<b>y</b>	7	11	26	44

15. The expression  $V(x) = x^3 - 13x + 12$  represents the volume of a rectangular safe in cubic feet. The length of the safe is  $x + 4$ . What linear expressions with integer coefficients could represent the other dimensions of the safe? Assume that the height is greater than the width.