

Challenge Number 1

THE MATH JESTER

Winter 2018-19

Name: _____

Grade: _____

Consider the polynomials

$$f(x) = (x - 1)(x + 2)(x - 4).$$

$$g(x) = (x + 4)(x - 1)(x + 7).$$

$$h(x) = (x - 5)(x - 4)(x - 1).$$

1. For each polynomial, what is the sum of its roots (x-intercepts)? [3 points.]
2. For each polynomial, what is the coefficient of the second-highest-degree term (in this case x^2)? [3 points.]
3. What do you notice? Make a conjecture about a polynomial of degree 3, its roots and one or a combination of its coefficients. (Note: you do not need to prove the conjecture! But if you try, I will be impressed.) [3 points.]
4. Spoiler alert: your conjecture *probably* only works if the leading coefficient (coefficient of x^3) is 1. This is okay. [Up to 4 bonus points for verifying this.]
5. Is this interesting? (There are multiple correct answers. Use your judgment.) [7 points.]