And the next American Idol is ___________________________!

1. Why are polynomials used to approximate other, more complicated functions?

2. What is the degree of the polynomial \( f(x) = 3x + 5 - 7x^3 + 3x^2 \)? ____________

3. Every polynomial is ____________, meaning the graph has no sharp corners or cusps, and is continuous, meaning the graph has no gaps or holes.

4. Fill in the properties of the power function \( f(x) = ax^n \).

\[
\begin{array}{c|c}
 n \text{ even} & n \text{ odd} \\
\hline
\text{Symmetric with respect to the } & \text{Symmetric with respect to the } \\
\text{Domain } & \text{Domain } \\
\text{Graph always contains the points } & \text{Graph always contains the points } \\
& \\
& \\
& , and \\
& , and \\
\end{array}
\]

5. True or False: If \( r \) is a root of \( f \), then \((r,0)\) is an \( x \)-intercept of \( f \).

6. If \((x - r)^m\) is a factor of a polynomial \( f \) and \((x - r)^{m+1}\) is not a factor of \( f \), then \( r \) is called a zero of ____________ of \( f \).

7. True or False: If \( m \) is even, \((x - r)^m\) is a factor of \( f \) and \((x - r)^{m+1}\) is not a factor of \( f \), then the graph of \( f \) crosses the \( x \)-axis at \( x = r \).

8. At most how many turning points does the polynomial \( f(x) = 5x^7 + 6x^4 - 9x^2 + 3x - 1 \) have? ____________

9. For large \( |x| \), what power function does \( f(x) = 5x^7 + 6x^4 - 9x^2 + 3x - 1 \) resemble? ____________