**HOMEWORK:**

**GRAPH POLYNOMIAL FUNCTIONS**

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<td><strong>DAY 2 DUE:</strong> ______</td>
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1. \( f(x) = 3x^5 + x^3 + 10x^2 + 4x + 1 \)
   
   Degree: _________  LC: _________
   
   \( As \ x \to +\infty \) then \( f(x) \to ____ \)
   
   \( As \ x \to -\infty \) then \( f(x) \to ____ \)

2. \( f(x) = 7(x + 1)^3 (x - 5) (x + 3)^2 \)
   
   Degree: _________  LC: _________
   
   \( As \ x \to +\infty \) then \( f(x) \to ____ \)
   
   \( As \ x \to -\infty \) then \( f(x) \to ____ \)

3. \( f(x) = -x^6 + x^4 + 10x^3 + 4x^2 + 1 \)
   
   Degree: _________  LC: _________
   
   \( As \ x \to +\infty \) then \( f(x) \to ____ \)
   
   \( As \ x \to -\infty \) then \( f(x) \to ____ \)

4. \( f(x) = -2(x + 1)^3 (x - 5)^2 (x + 3)^2 \)
   
   Degree: _________  LC: _________
   
   \( As \ x \to +\infty \) then \( f(x) \to ____ \)
   
   \( As \ x \to -\infty \) then \( f(x) \to ____ \)

5. \( y = (x + 1)^2 (x - 5)^3 \)
   
   Degree: _________
   
   Leading Coefficient: _________
   
   End behavior: \( x \to +\infty, f(x) \to ____ \)
   
   \( x \to -\infty, f(x) \to ____ \)
   
   Zeros and multiplicity: _______ _______ _______ _______

6. Degree is 5 and leading coefficient is \(-4\)

   **Zeros and multiplicity**
   
   \(-1\) (multiplicity 1)
   
   \(3\) (multiplicity 2)
   
   \(6\) (multiplicity 2)
   
   What is the end behavior? \( x \to +\infty, f(x) \to ____ \)
   
   \( x \to -\infty, f(x) \to ____ \)
   
   Write the function: __________________________
7. Circle all polynomial functions.
\[ f(x) = \frac{1}{2}x^2 - 3x^4 - 7 \quad f(x) = x^3 + 3x \quad f(x) = 6x^2 + 2x^{-1} + x \quad f(x) = 22 - 19x + 2x^4 \]

8. Sketch the polynomial function described (no table).
Degree = 5
Leading Coefficient = –4
Zeros: 0 (multiplicity of 2) 
–5 (multiplicity of 2) 
3 (multiplicity of 1)

9. Sketch the polynomial function described (no table).
Degree = 5
Leading Coefficient = 4
Zeros: 0 (multiplicity of 2) 
–1 (multiplicity of 2) 
3 (multiplicity of 1)

10. Sketch the function (no table).
\[ f(x) = x (x + 3)^2 (x - 7)^4 \]

11. Sketch the function (no table).
\[ f(x) = -4 (x - 1)^2 (x - 3) (x + 8) \]