AP Precalculus Lesson 2.1 Homework

1. Which of the following functions is NOT a polynomial?

   A) $f(x) = 3x^4 - \sqrt{7}x^6$

   B) $g(x) = 5x^3 + 8x^2 - 9x^0$

   C) $h(x) = \frac{(x^4-1)(2x^3+2x)}{2}$

   D) $k(x) = x^3 - 4x^{1/5}$

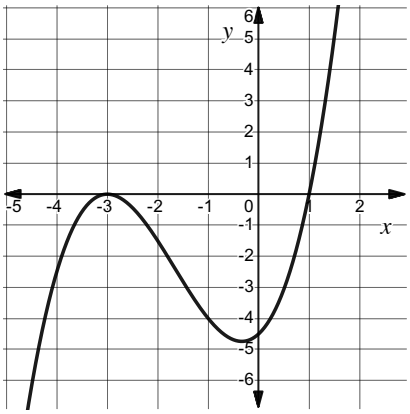
2. Find the degree of the polynomial function that models the data given in the table.

x	0	1	2	3	4	5
$f(x)$	-11	-6	-3	4	21	54

3. The graph of $y = f(x)$ is shown.

   a. Estimate the interval(s) on which the rate of change of f is negative.

   b. Estimate the interval(s) on which the rate of change of f is increasing.



4. A visual sequence is shown. Let $f(n)$ represent the number of leaves in Figure n. Is f a polynomial function? Explain why or why not.

Figure 1 Figure 2 Figure 3 Figure 4

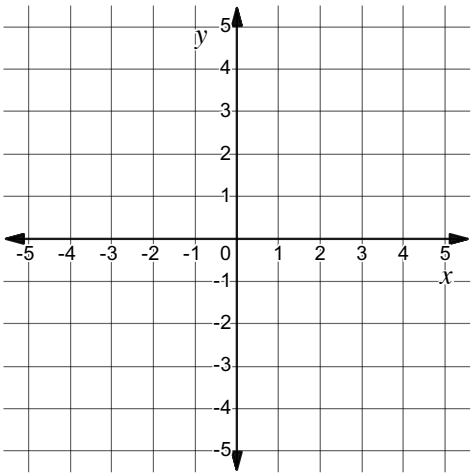
5. Information about a polynomial function f is given in the table.

x	$-\infty < x \leq -3$	$x = -3$	$-3 \leq x \leq 5$	$x = 5$	$5 \leq x < \infty$
$f(x)$	Decreasing	5	Increasing	11	Increasing

a. For which value(s) of x, if any, does f have a relative minimum? Justify.

b. For which value(s) of x, if any, does f have a relative maximum? Justify.

6. Sketch a function for $-5 \leq x \leq 5$ with an absolute maximum occurring at $x = -2$, a relative minimum at $x = 3$ and an inflection point at $x = 0$.



7. Consider the graph of $g(x) = -2x^4 + 5x^3 - 2x + 1$.

a. How many relative maxima does g have?

b. How many relative minima does g have?

c. Find the absolute maximum of g or explain why it does not exist.

d. Find the absolute minimum of g or explain why it does not exist.

8. Let $f(x) = (x - 7)^6$. Find an interval of x on which the average rate of change of f is 0.

9. Let $h(x) = x^4 + x^3 - 12x^2 + 10x + 30$. The graph of h has exactly two inflection points at $x = -1.686$ and $x = 1.186$.
   a. For $(-\infty, -1.686)$ is the rate of change of h increasing or decreasing? How do you know?

   b. For $(-1.686, 1.186)$ is the rate of change of h increasing or decreasing? How do you know?

   c. For $(1.186, \infty)$ is the rate of change of h increasing or decreasing? How do you know?

10. A polynomial function has exactly 3 inflection points. What is the minimum degree of this function?