

HW L2.1

NAME _____


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

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

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

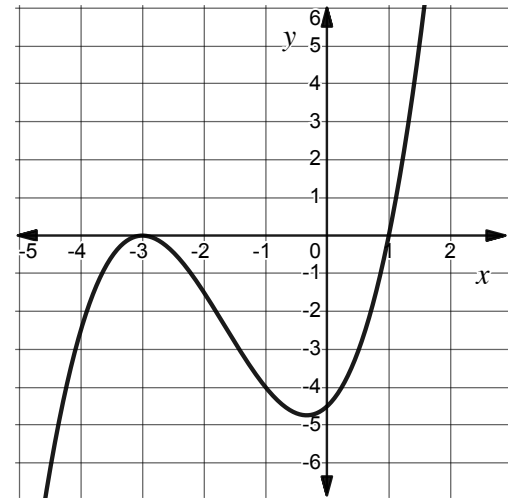
C) $h(x) = \frac{(x^4 - 1)(2x^3 + 2x)}{2}$

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

 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.
- Estimate the interval(s) on which the rate of change of f is negative.
 - 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 equal sized pieces in Figure n . Is f a polynomial function? Explain why or why not.

Figure 1

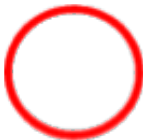


Figure 2



Figure 3



Figure 4



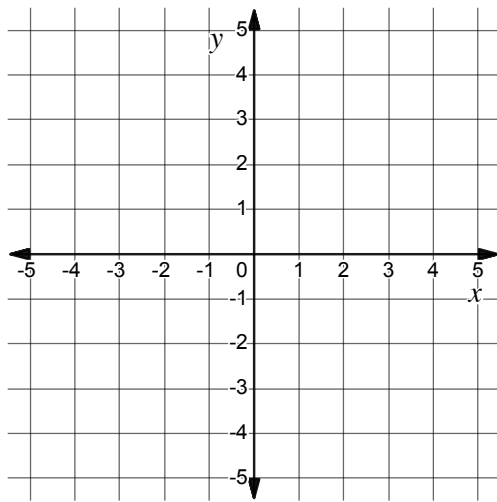
5. Information about a polynomial function f is given in the table.


| x | $x \leq -3$ | $x = -3$ | $-3 \leq x \leq 5$ | $x = 5$ | $x \geq 5$ |
|--------|-------------|----------|--------------------|---------|------------|
| $f(x)$ | Decreasing | 5 | Increasing | 11 | Increasing |

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


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



6. Sketch a function 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?