

Assignment

Write

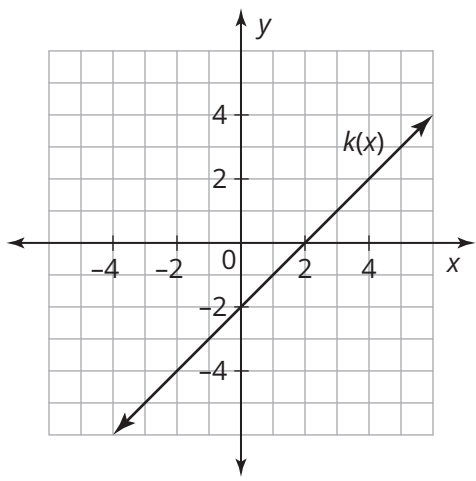
List the key characteristics of a polynomial function.

Remember

The key characteristics of polynomial functions can be compared even when the representations are different.

Practice

1. Analyze the given representations of the polynomial functions $f(x)$, $g(x)$, $h(x)$ and $k(x)$. Then, answer each question and justify your reasoning.

The cubic function $f(x)$ with x -intercepts $(-4, 0)$, $(-1, 0)$, and $(2, 0)$ and y -intercept $(0, 8)$.	$g(x) = (x - 3)^2(x + 2)^2$												
<table border="1" data-bbox="399 903 667 1354"><thead><tr><th>x</th><th>$h(x)$</th></tr></thead><tbody><tr><td>-2</td><td>-7</td></tr><tr><td>-1</td><td>-4</td></tr><tr><td>0</td><td>-3</td></tr><tr><td>1</td><td>-4</td></tr><tr><td>2</td><td>-7</td></tr></tbody></table>	x	$h(x)$	-2	-7	-1	-4	0	-3	1	-4	2	-7	
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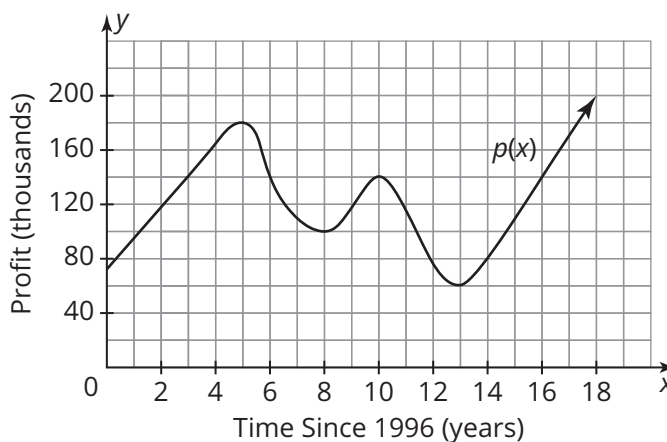
- Consider $f(x)$ and $g(x)$. Which function has the smaller output as x approaches infinity?
 - Consider $f(x)$ and $h(x)$. Which function has the greatest number of imaginary zeros?
 - Consider $f(x)$ and $h(x)$. Which function has a greater degree?
 - Consider $g(x)$ and $k(x)$. Which function has the greater y -intercept?
 - Consider $f(x)$ and $g(x)$. Which function has the lowest relative minimum?
 - Consider $h(x)$ and $k(x)$. Which function has the greatest average rate of change over the interval $(-2, 0)$?
2. Consider the polynomial functions $m(x) = -x^2$ and $n(x) = m(x + 4) - 3$. Which function has the greatest maximum? Explain your reasoning.
3. Consider the polynomial functions $p(x) = x^4$ and $t(x) = p(x - 1) + 7$. Which function's axis of symmetry has a greater x -value? Explain your reasoning.

Stretch

Given $f(x) = x^4 - 625$, determine all the possible polynomial functions for $g(x)$ such that $h(x) = \frac{f(x)}{g(x)}$ is a polynomial function.

Review

- A manager conducted an 18-year study of the profits of his company. The polynomial function $p(x)$ models the company's profits from the year 1996 (when $x = 0$) to the year 2014 (when $x = 18$).
 - Estimate when the profit was \$140,000. Explain your reasoning.
 - At what point during the 18-year study was the profit the lowest? What was the profit at that time?
 - Estimate the average rate of change of the profit over the entire 18-year study. Explain the meaning of your answer in terms of the problem situation.



- Determine the average rate of change for the function $f(x) = -2x^4 + x^3 - 7x^2 - 2x + 3$ over the interval $(4, 8)$.
- Add or subtract the expressions given.
 - $(4x^2 - 2x + 7) + (-8x^2 + 5x - 25)$
 - $(-9x^2 + 16x - 17) - (-12x^2 - 7x + 3)$