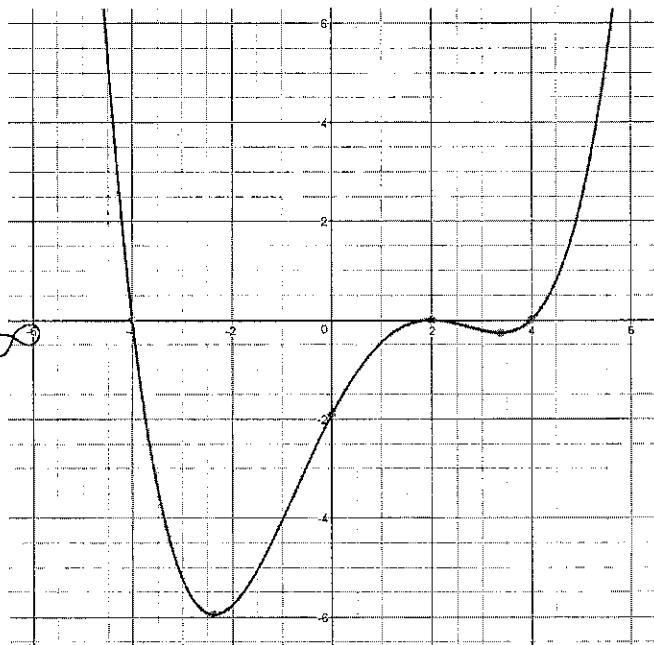


C Level Questions

1. Give 3 reasons why the function shown could NOT be represented by the polynomial $f(x) = -(x+4)^2(3x-2)(x-4)$. Be specific.



- 1) End Behavior is wrong. $f(x)$ has a negative L.C., but the graph $\rightarrow \infty$ as $x \rightarrow \pm \infty$.
- 2) Behavior at $x = -4$ is wrong. -4 is a double root, so the graph should "bounce" off -4 , like a parabola.
- 3) Root of $x = 2$ is wrong. If $3x - 2 = 0$, then $x = 2/3$. $x = 2$ is not a zero of $f(x)$.
2. Use the degree and leading coefficient of the polynomial to describe (without graphing) what happens to $g(x) = 3(x-1)(x-2)(x-3)^3$ when $x \rightarrow -\infty$ and when $x \rightarrow \infty$.

Degree = 5 (1+1+3) odd.

L.C. = 3 positive.

Odd & positive looks like x^3

So as $x \rightarrow \infty, g(x) \rightarrow \infty$,
& as $x \rightarrow -\infty, g(x) \rightarrow -\infty$

A/B Level Questions

3. Jake takes a job as a financial analyst. He has been following a tech company that his firm is considering buying. The profits for the tech company over the last three years can be modeled with the polynomial $p(x) = (x^2 - 64)(x^2 - 10x + 16)$, where x = months since January 2013 and y = monthly profit in \$1000.

- a. What is the constant for the polynomial and what does it tell you about the tech company?

$$p(0) = (0^2 - 64)(0^2 - 10(0) + 16) = (-64)(16)$$

- b. Find all months in which the company earned zero profit.

Set = 0.

$$(x^2 - 64)(x^2 - 10x + 16) = 0$$

$$(x+8)(x-8)(x-8)(x-2) = 0$$

$$x = -8, x = 8, x = 2$$

\nearrow May 2012 \nearrow September 2013 \nwarrow March 2013

$$p(0) = -1024.$$

So when $x=0$,
 $y = -1024$. In Jan 2013, the company lost \$1,024,000.

4. Given that $h(3) = 0$ and $h(4) = 0$, for the polynomial $h(x) = x^4 - 15x^3 + 48x^2 + 44x - 240$, factor $h(x)$ and find all the roots of the polynomial.

$h(3) = 0 \rightarrow (x-3)$ is factor.

$h(4) = 0 \rightarrow (x-4)$ is factor.

Divide to break down $h(x)$.

	x^3	$-12x^2$	$12x$	$+80$
x	x^4	$-12x^3$	$12x^2$	$80x$
-3	$-3x^3$	$36x^2$	$-36x$	-240

Divide again

	x^2	$-8x$	-20
x	x^3	$-8x^2$	$-20x$
-4	$-4x^2$	$32x$	80

Factor $x-10$

	x^2	$+10x$
x	x^2	$+10x$
$+2$	$2x$	-20

So $h(x) = (x-3)(x-4)(x+2)(x-10)$

Roots = 3, 4, -2, 10.