Bellwork Alg 2 Wednesday, November 13, 2019

1. State the actual degree (number) and actual leading coefficient (number) for this polynomial:
$y = -7x^4(2x-3)^3(7-3x)^2(5x-9)(8-x)^5$

2. State the end behavior of each polynomial.
a) $y = 8x^5 + 3x^2 - x^9 + 7x^6 + 135$
b) $f(x) = x^3(7x-9)^2(12-5x)^3(8+3x)^2$

3. Given a 7th degree polynomial with a positive leading coefficient.
a) What is the maximum number of x-intercepts possible?
b) What is the maximum number of extremes possible?

4. If the polynomial in Problem #3 has the max number of x-intercepts and extremes
a) How many of them will be maximums
b) How many points of inflection will there be

5. Use this description of a polynomial:
>Decreasing and concave up on the interval $(-\infty,-4)$
>Increasing and concave up on the interval $(-4,-1)$
>Increasing and concave down on the interval $(-1,1)$
>Decreasing and concave down on the interval $(1,3)$
>Decreasing and concave up on the interval $(3,5)$
>Increasing and concave up on the interval $(5,\infty)$
a) Make a sketch of this graph with maximums, minimums, and points of inflection identified with dots.
b) State the x-coordinates of all maximums
c) State the x-coordinates of all minimums
d) State the x-coordinates of a points of inflection
e) State the likely degree and whether the leading coefficient of this polynomial is positive or negative.

ANSWERS

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1. State the actual degree (number) and actual leading coefficient (number) for this polynomial:

$y = -7x^4(2x-3)^3(7-3x)^2(5x-9)(8-x)^5$

$(-7x^4)(2x)^3(-3x)^2(5x)(-x)^5$

$(-7x^4)(8x^3)(9x^2)(5x)(-x^5)$

$= 2520x^{15}$

DEGREE = 15

LEADING COEF = 2520

2. State the end behavior of each polynomial.

a) $y = 8x^5 + 3x^2 - x^9 + 7x^6 + 135$

LEADING TERM = $-x^9$ → NEG ODD

END BEHAVIOR: ↑ ↓

up, down

$y \to \infty$ as $x \to -\infty$

$y \to -\infty$ as $x \to \infty$

b) $f(x) = x^3(7x-9)^2(12-5x)^3(8+3x)^2$

$(+x^3)(+x^2)(-x^3)(+x^2)$

$= -x^{10}$

LEADING TERM = $-x^{10}$ → NEG EVEN

END BEHAVIOR: ↙ ↘

down, down

$y \to -\infty$ as $x \to \pm\infty$

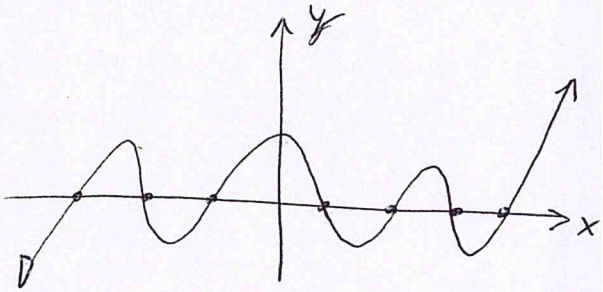
3. Given a 7th degree polynomial with a positive leading coefficient.

a) What is the maximum number of x-intercepts possible?

$n \to$ 7

b) What is the maximum number of extremes possible?

$n-1 \to$ 6



4. If the polynomial in Problem #3 has the max number of x-intercepts and extremes

a) How many of them will be maximums 3

b) How many points of inflection will there be 5

5. Use this description of a polynomial:

>Decreasing and concave up on the interval $(-\infty, -4)$

>Increasing and concave up on the interval $(-4, -1)$

>Increasing and concave down on the interval $(-1, 1)$

>Decreasing and concave down on the interval $(1, 3)$

>Decreasing and concave up on the interval $(3, 5)$

>Increasing and concave up on the interval $(5, \infty)$

a) Make a sketch of this graph with maximums, minimums, and points of inflection identified with dots.

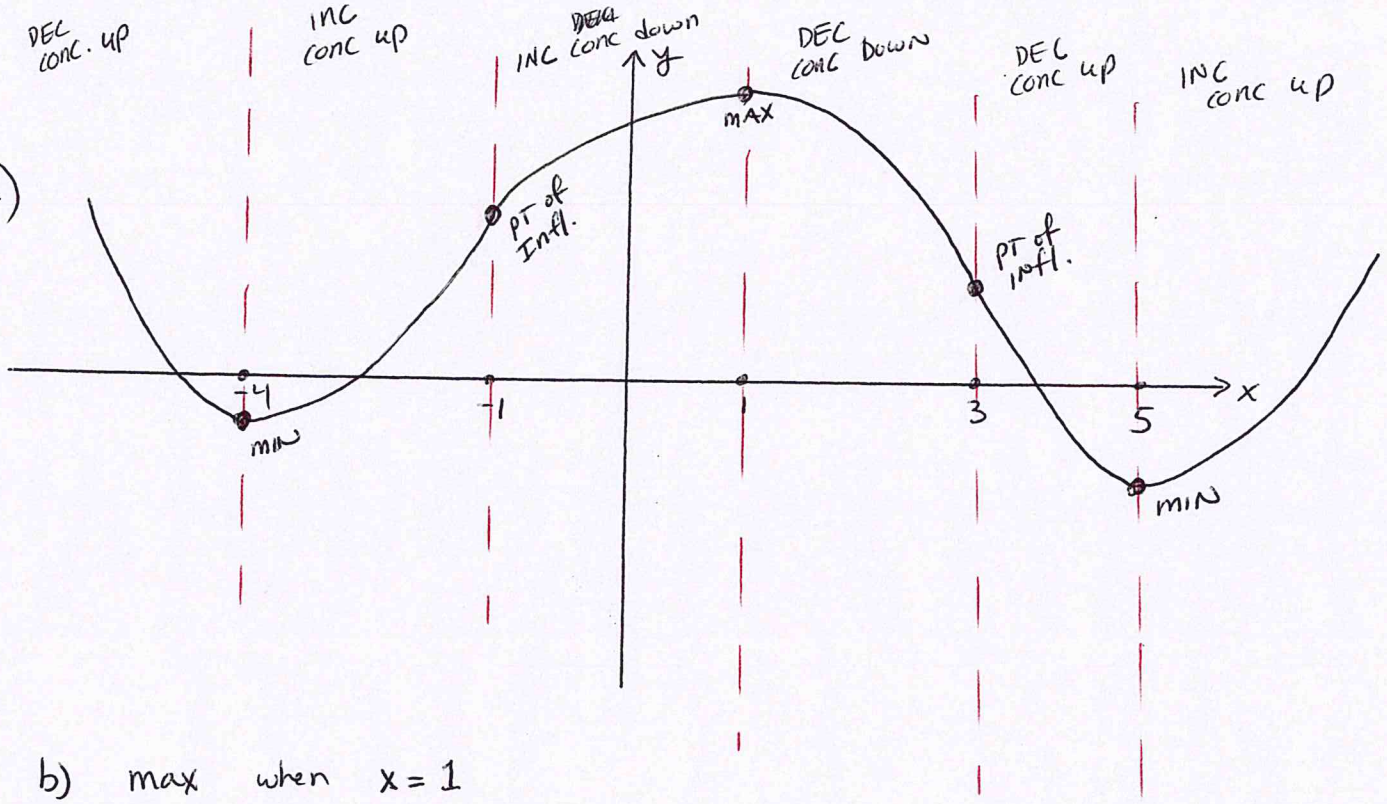
b) State the x-coordinates of all maximums

c) State the x-coordinates of all minimums

d) State the x-coordinates of a points of inflection

e) State the likely degree and whether the leading coefficient of this polynomial is positive or negative.

a)



b) max when $x = 1$

c) min when $x = -4, 5$

d) pts of inflection when $x = -1, 3$

e) pos 4th deg polynomial