

October 11, 2017

End Behavior of Polynomials

① P is odd Degree

(a)

down - up
when Leading Coefficient is Positive
 $f(x) = 2x^5$
" + "

(b)

up - down
leading Coefficient is negative
 $f(x) = -3x^3$
" - "

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② P is even Degree

(a)

up - up
leading Coefficient is Positive
 $f(x) = 2x^4$
" + "

(b)

down - down
leading Coefficient is negative
 $f(x) = -5x^8$

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$f(x)$

- End Behavior: down - up ↘ ↗
- Degree odd
- Positive leading Coeff.

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$f(x) = x^3 - 2x^2 - 4x + 8$

a) Find the "zeros" of f
b) Graph f

a) $x^3 - 2x^2 - 4x + 8$
* factor by grouping
 $x^2(x-2) - 4(x-2)$

$(x^2)(x-2)(-4)$
 $(x^2-4)(x-2)$
Difference of two Squares
 $(x+2)(x-2)(x-2)$
 $(x+2)(x-2)^2$
multiply "odd" multiply "even"

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Difference of two Squares

$a^2 - b^2 = (a+b)(a-b)$
 $a^2 - ab + ab - b^2$

$(4x^2) - (9) = (2x+3)(2x-3)$
 $a^2 - b^2$
 $a = 2x \quad b = 3$

$x^2 - 1 = (x+1)(x-1)$
 $1 - x^2 = (1+x)(1-x)$

$16x^2 - 5 = (4x + \sqrt{5})(4x - \sqrt{5})$
 $a = 4x \quad b = \sqrt{5}$
 $\sqrt{5} \cdot \sqrt{5} = \sqrt{5 \cdot 5}$
 $= \sqrt{25}$
 $= 5$

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