Review 2

Long Division and Synthetic Division

Remainder Theorem & Factor Theorem

Remainder Theorem: f(k) = remainder

this means - evaluate the function for the value of the suspected zero (plug it in for x)

Factor Theorem: if the remainder is 0 then you have found a root!!! (f(k) = 0)

Rational Root Theorem:

if all coefficients are integers and the constant is not 0, then all possible rational roots are:

$$x = \pm \frac{\text{factors of constant}}{\text{factors of leading coefficient}}$$

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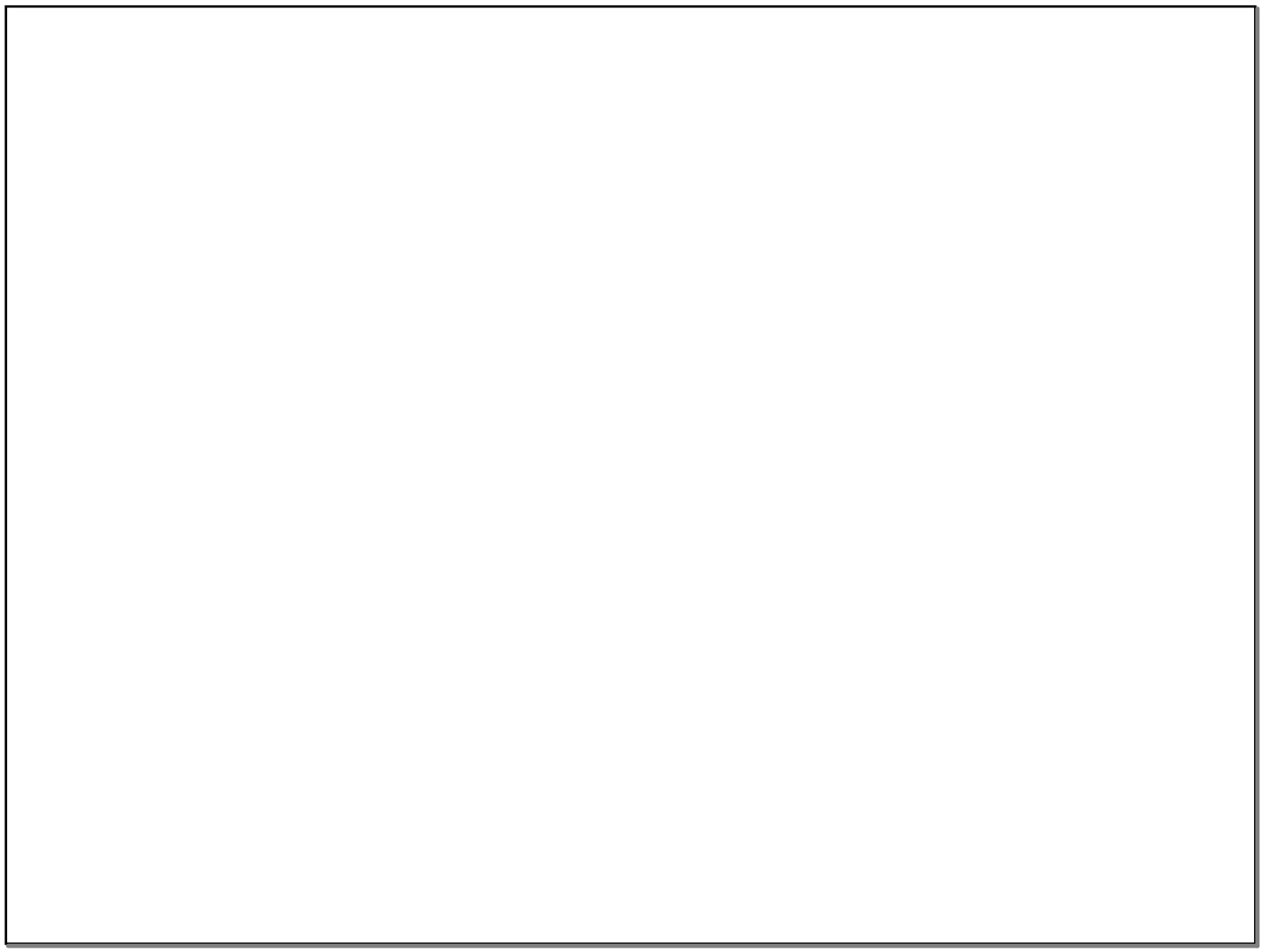


Is $(x+4)$ a factor of (x^3-2x^2+3x-7)

-4

$(-4)^3-2(-4)^2+3(-4)-7$

$-64-32-12-7 \neq 0$ NO

What is the remainder when

$(x^3-2x^2+3x-7)\div(x-1)$

1

$1^3-2(1^2)+3(1)-7$

$1-2+3-7$

-5

Fundamental Thm of Alg: an nth degree polynomial will have n zeros

$3x^7+5x^2-2x+14$ 7

(may be a combination of real and complex & some zeros may be repeated)

Linear Factorization Thm: a polynomial of nth degree has n linear factors 7

(some factors may be complex)

Write a function with degree 3 and zeros -2, 2, and 3

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

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

$x^3-3x^2-4x+12$

2.7 Solving Rational Equations

Rational Equation: an eq. (has an =) made up of 1 or more rational expressions

$x \neq 0$

LCD: x

$\frac{2x}{x} + \frac{3x}{x} = 17x$

$2 + 3 = 17x$

$5 = 17x$

$\frac{5}{17} = x$

steps -

- find restrictions (why do I have restrictions?)
- Find the LCD
- Multiply each term in eq. by LCD to clear fractions
- solve the equation
- check for extraneous solutions

2.8 Solving Inequalities in One Variable

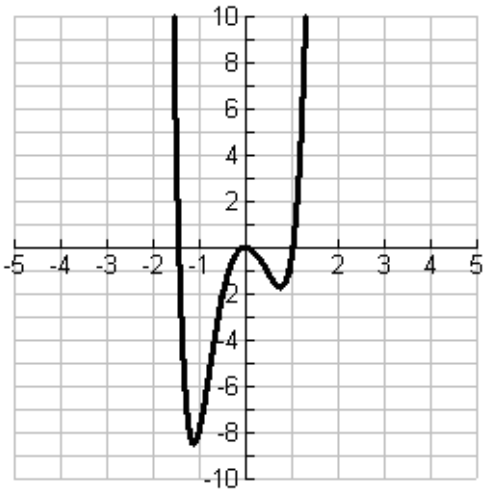
when solving an inequality - your answer is the x values for where the function (y values) meets the given conditions

$f(x) > 0$

report the x values for where the y's are greater than zero

$x < -1.5 \quad x > 1$

$(-\infty, -1.5) \cup (1, \infty)$



Polynomial Inequalities

goal: solving where the polynomial is (+) or (-)

Everything on 1 side and factored

Find all x-intercepts

Plot using open & closed holes according to the inequality sign

Find the signs of the graph in the intervals b/w the intercepts (use a value in the interval)

Answer: the intervals according to the inequality signs (use the union symbol if more than 1 interval)

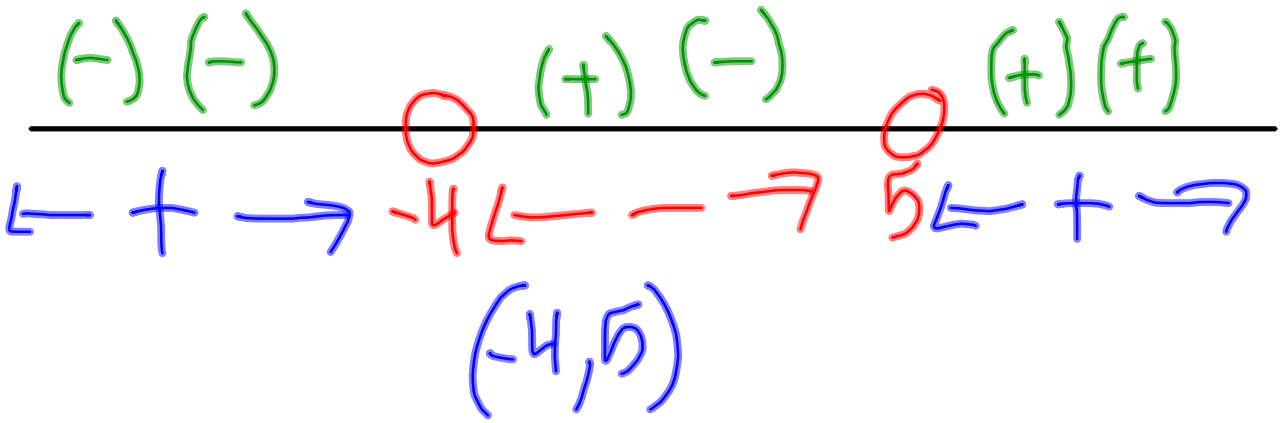
SIGN CHARTS

$(x+4)(x-5) \leq 0$

$<, \leq$: Negative

$>, \geq$: positive

-4 5



$(-4, 5)$

3.1 Exponential Functions

$$y = a \cdot b^x \qquad a \neq 0,\ b \neq 1$$

$$b > 0$$

Used for growth and decay of: bacteria, carbon, populations

$$y = a_0 \cdot b^x$$

a_0 is the inital value

b is the base

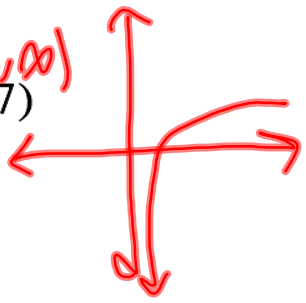
$b > 1$ growth

$0 < b < 1$ decay

Important Concepts

Domain and Range: $f(x)=\sqrt{3-x}$ $(-\infty,3]$ $3-x\geq 0$ $3\geq x$ $x\leq 3$

$f(x)=\log_3(x-7)$ $(7,\infty)$



Linear and Exponential Regression

Compound Inequalities $-3<\frac{4x+2}{4}\leq 9$

$-12<4x+2\leq 36$

$-2\quad -2\quad -2$

$-14<4x\leq 34$

$\frac{-14}{4}<x\leq\frac{34}{4}$

$\frac{-7}{2}<x\leq\frac{17}{2}$

Finding Inverses

Switch x & y

Finding Max and Min with calculator

2ND → CALC → MAX/MIN

Solving Exponential and logarithmic equations

Add and multiply complex numbers

Add like #'s IR w/IR i w/i

Transformations of graphs

Compounding Interest