

Graphing Rational Functions Using FRATEY

Factor

F

- Use Factored Form to find R-A-T
- Use Standard Form to find E-Y

Roots – Solutions to the TOP of the expression

R

- These are the *x-intercepts*.
- To find the roots:
 - Set the numerator = 0 and solve.
 - Write the roots as ordered pairs: (#, 0)
- The graph **MUST** pass through all roots on the graph and **MUST NOT** cross the x-axis anywhere else.

TOP = 0

Asymptotes (Vertical) – Solutions to the BOTTOM of the expression.

A

- These are the *domain restrictions*.
- To find the vertical asymptotes:
 - Set the denominator = 0 and solve.
- A vertical asymptote is a boundary that the graph can never cross!



BOTTOM $\neq 0$

Twins – Factors with multiplicity of 2.

YOU SHALL NOT PASS!

T

TANGENT

TOGETHER

- Twins in the **NUMERATOR** mean the graph *touches the x-axis and turns around*.
- Twins in the **DENOMINATOR** mean the graph *comes together at the asymptote*.

- Multiplicity of 2 means *squared factors*.

Do these expressions have multiplicity of 2?			
YES	x^2 ,	$-2x^2$,	$(x - 5)^2$, $(x + 3)(x + 3)$
NO	$x^2 + 2x$,	$-x^2 + 3$,	$2x^2 + x - 5$

End Behavior – What the graph does on the *ends* (left and right). (Horizontal Asymptote)

E

- 3 possibilities – Compare degrees in the numerator and denominator.
 - High over Low → No horizontal asymptote
 - Low over High → $y = 0$
 - Same → $y = a/b$, where “a” is the leading coefficient in the numerator and “b” is the leading coefficient in the denominator.

Y-Intercept

Y

- To find the y-intercept:
 - Plug in 0 for x.
 - Solve.
 - Write as an ordered pair: (0, #)