Polynomials with Geogebra 2012-03-06   [23]

http://www.scottfarrar.com/ma2011/

Painting the Quintic	Imaginary Roots
1. Create a quintic polynomial that only intersects the x-axis four times.	1. Place the vertex at $(4, -4)$. What are the roots?
2. Create a quintic polynomial that only intersects the twice.	2. Place the vertex at $(4,4)$. What are the roots?
3. Create a quintic polynomial that is always decreasing.	3. What is the blue dotted line?
4. Create a quintic polynomial with only 2 local extrema.	4. Are roots always x-intercepts?
5. What do the points represent?	5. Explain what the $\pm$ of $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$ means on the graph.
6. What do the dotted lines represent?	

| Rationals with the same degree: Quadratic over Quadratic	Rationals with a higher degree in the numerator: Quartic over Quadratic
1. The sliders a and b affect the leading coefficients of the numerator and denominator, respectively. How do they affect the end behavior?	1. Create the following:
2. What are the green dots?	
3. What are the blue dots?	
4. What happens when a green dot and a blue dot have the exact same value?	
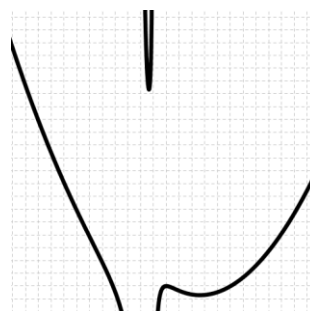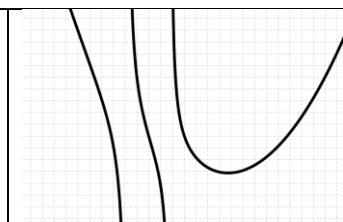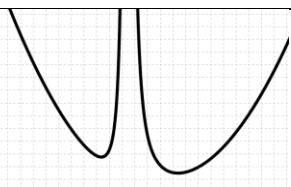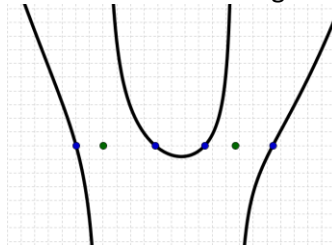
2. Make both end behaviors $\rightarrow -\infty$

3. Make the blue roots $\{-2-, 1, 2, 4\}$ and the green roots $\{0, 3\}$. What is the domain of the middle branch? What is the domain of the left branch? What is the domain of the right branch? Why are we allowed to "cross" the parabolic asymptote?