

$$f(z) = \frac{z^3 - 4z}{z^2 - 4z + 4}$$

$$f(z) = \frac{z(z^2 - 4)}{(z - 2)(z - 2)}$$

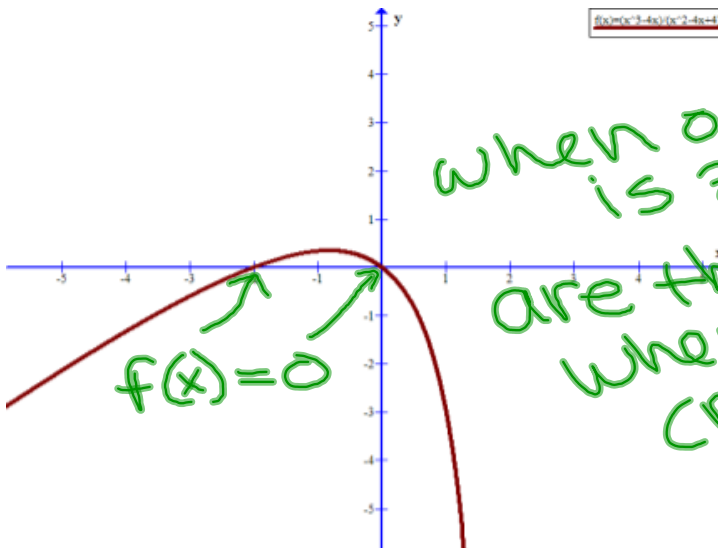
$$z^2 - 2z - 2z + 4$$

$$z^2 - 4z + 4$$

$$f(z) = \frac{z \cancel{(z - 2)}(z + 2)}{\cancel{(z - 2)}(z - 2)}$$

$z = 2$   
 $z = 0 \quad f(z) = 0$   
 $z = -2 \quad f(z) = 0$

$z - 2 = 0 \quad z - 2 = 0$   
 Hole:  $z = 2$  ASY:  $z = 2$



When our numerator  
 is zero  
 are the places  
 where it  
 crosses the  
 x-axis.

$$f(x) = \frac{x^2 - 4x + 4}{x^2 - 5x + 4}$$