

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

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

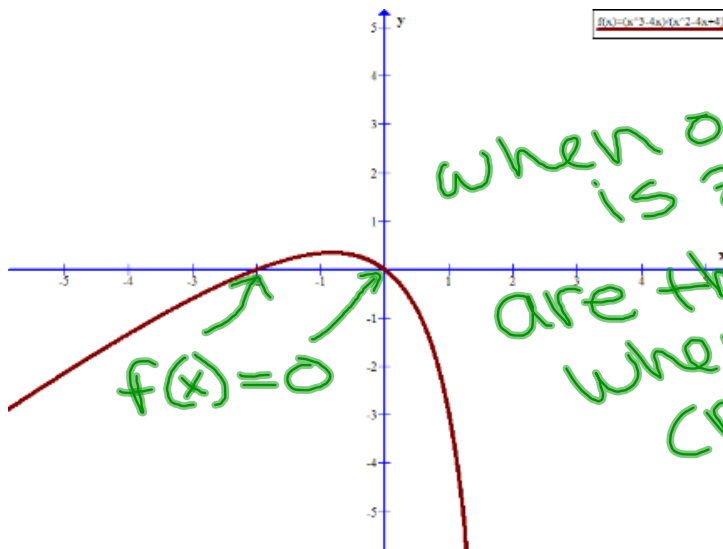
$$z^2 - 2z - 2z + 4$$

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

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

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

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



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

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