

$$y = x^4$$

If  $f(x) = x^4$  then

$$f(u+iv) = (u+iv)^4 = u^4 + i(4u^3v) - 6u^2v^2 - i(4uv^3) + v^4 = u^4 - 6u^2v^2 + v^4 + i(4u^3v - 4uv^3)$$

Set the imaginary part equal to zero:  $4u^3v - 4uv^3 = 4uv(u^2 - v^2) = 4uv(u-v)(u+v) = 0$ .

So we get  $u = 0$ ,  $u = v$  or  $u = -v$ . Substituting these into the real part (one at a time) we have the following parametric equations of the phantom graphs.

$$x = 0$$

$$y = v^4$$

$$z = v$$

$$-\infty < v < \infty$$

$$x = u$$

$$y = -4u^4$$

$$z = u$$

$$-\infty < u < \infty$$

$$x = u$$

$$y = -4u^4$$

$$z = -u$$

$$-\infty < u < \infty$$