

Optional Problems • MATH 322 • Early Work on Series

A) Use the geometric series to derive a Taylor series for  $f(z) = (z^2 - a^2)^{-1}$  around  $z = i$ .

B) Give the Taylor series for

$$f(z) = \frac{1}{(z - a)^2}$$

around  $z = 0$ . (There are two cases to consider.)

C) Give the Taylor series for

$$f(z) = \frac{1}{(z - a)^2(z - b)}$$

around  $z = 0$ . (Assume  $0 < |a| < |b|$ .) Give the Laurent series around  $z = a$ .