Show that
\[ \frac{B_{x}(\rho)}{B_{x}(0)} = i^{2} \left( \frac{7}{6} ; 1 \right) P_{2}^{\frac{\kappa^{2} \rho^{2}}{4}}. \]

14. Starting with Eq. (133), derive Eq. (134) by expressing the complex expressions in polar coordinates, i.e., write
\[ x + iy = r e^{i \theta}, \]
where \( r = \sqrt{x^2 + y^2} \) and \( \theta = \tan^{-1}(y/x) \). Consequently, verify Eqs. (135).

15. By directly evaluating the integrals, verify Eq. (145).

16. Verify that the substitution of (154) into (153) leads to (156).

17. Given a Gaussian-beam wave at the transmitter with beam characteristics \( W_{0} = 0.03 \text{ m}, F_{0} = 500 \text{ m}, \lambda = 0.633 \mu \text{m}, \) determine \( W, F \) and the on-axis intensity \( I(0,L) \) at distance \( L = 1200 \text{ m} \) from the transmitter. Assume unit amplitude at the transmitter.

\[ \text{Ans. } W = 0.043 \text{ m}, F = -710.5 \text{ m}, \]
\[ I(0,L) = 0.492 \text{ W/m}^2 \]

18. If the beam described in Problem 17 passes through a lens/aperture stop of radius 0.01 m and focal length 0.05 m at distance 1200 m from the transmitter, what is the spot radius, phase front radius of curvature, and mean (on-axis) intensity of the beam at distance 0.1 m behind the lens?

\[ \text{Ans. } W = 9.5 \text{ mm}, F = -5 \text{ cm}, \]
\[ I(0,L) = 0.993 \text{ W/m}^2 \]

19. By expressing the radial polynomials (166) of the Zernike set in terms of Pochhammer symbols,