

1. A circular rod carries an axial force of $P = 1200$ lbf. The yield stress of the rod is $S_y = 12$ kpsi. The factor of safety is $n_s = 3.0$. a) What is the minimum diameter of the rod? Then select a preferred fractional diameter. b) If $P \sim N(1200, 200^2)$ lbf, $S_y \sim N(12, 2^2)$ kpsi, and P and S are independent, determine the probability of failure using Monte Carlo Simulation.

Answer: a) $d_{min} = 0.618$ in, $d_{preferred} = \frac{5}{8}$ in; b) $p_f = 6.480(10^{-5})$

