

4-2. A vertical random force  $P \sim N(500, 35^2)$  lb acts on a shaft as shown in the figure. The sleeve bearings at  $A$  and  $B$  support only vertical forces. The allowable bending stress of the shaft is  $S_a \sim N(27, 2^2)$  ksi. Determine the diameter of the shaft so that the probability of failure is less than  $10^{-4}$ . (**Ans.**  $d > 1.086$  in.)

