19. A beam cantilevered at O is subjected to a concentrated force $P \sim N(2000,\ 200^2)$ lbf and an uniform load of $w \sim N(200,\ 20^2)$ lbf/in. The beam has a cicular cross-section with a diamater of $d = 1$ in. What is the distirbution of maximum bending stress? Note that P and w are independent.

Answer: $S \sim N\left(3.423(10^6),\ \left(2.974(10^5)\right)^2\right)$ psi