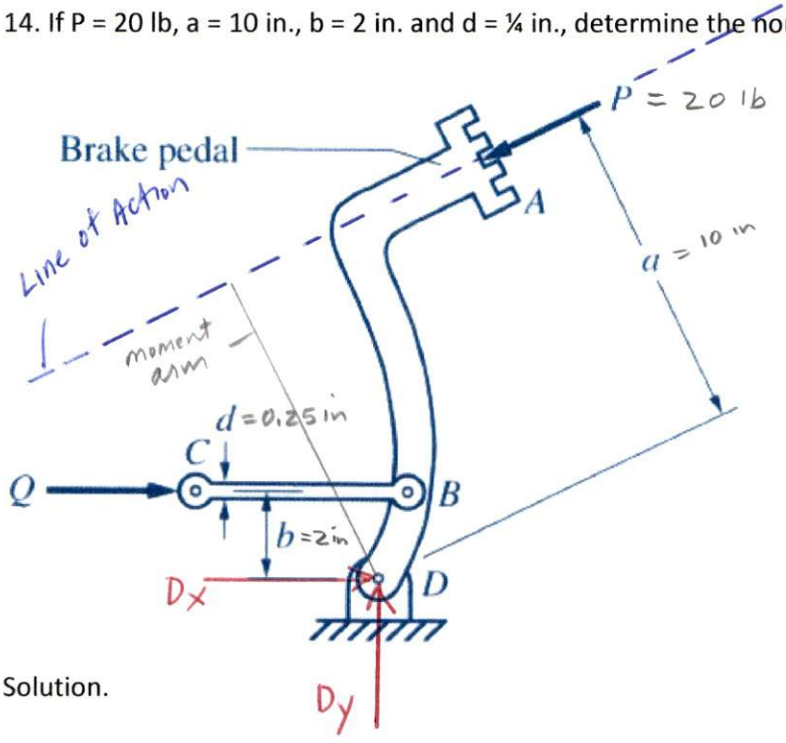
9-14

The force applied to the brake pedal of a car is transmitted by lever AD and connecting rod BC, as shown in Fig. P9-14. If P = 20 lb, a = 10 in., b = 2 in. and d = ¼ in., determine the normal stress in rod BC.



Solution.

FBD

Equilibrium Equations

$$[\Sigma M_D = 0] \quad -Q(2\text{ in}) + P(10\text{ in}) = 0$$

$$Q = \frac{20\text{ lb}(10\text{ in})}{2\text{ in}} = 100\text{ lb}$$

$$\sigma_{BC} = \frac{P}{A} = \frac{100\text{ lb}}{\frac{\pi (0.25\text{ in})^2}{4}} = 2037\text{ psi}$$