

20080219-1009

Answer

A 120.0 pound woman is standing on a pair of high heels that have a diameter of 0.5000 inch. She is standing balanced on her heels. What is the pressure on the floor in P.S.I.?

Total Force = 120.0 lbs

Each heel supports 60.00 lbs.

Find Area (cross-sectional) of heel

Diam. = 0.5000 in

Radius = Diam./2 = 0.2500 in

Area = $\pi r^2 = \pi \left(\frac{1}{4}\right)^2 = \frac{\pi}{16} \text{ in}^2$

Pressure = $\frac{\text{Force}}{\text{Area}}$

$$= \frac{60.00 \text{ lbs}}{\frac{\pi}{16} \text{ in}^2}$$

$$= \frac{(16)(60.00) \text{ lbs}}{\pi \text{ in}^2}$$

$$= \frac{960.0 \text{ lbs}}{\pi \text{ in}^2}$$

$$\begin{array}{r} 16 \\ 60 \\ \hline 960 \end{array}$$

$$\begin{array}{r} 305.57 \\ 3.1416 \overline{) 960.000000} \\ \underline{94248} \\ 175200 \\ \underline{157080} \\ 181200 \\ \underline{157080} \\ 241200 \end{array}$$

Pressure = 305.6 P.S.I.