9.1 \(P = 150,000 \text{ Pa (gage)}\)
\(\rho_m = 2000 \text{ kg/m}^3\)
g = 9.8 m/s\(^2\)
From Eq. 9.2 for \(\rho_s << \rho_m\),
\[
R = \frac{\Delta P}{\rho_m g} = \frac{150000}{2000 \times 9.8} = 7.65 \text{ m}
\]
This is an impractical height in most cases - a manometer fluid with greater density is required.

9.4 \(P = 5.1 \text{ psi}\)
Eq. 9.2, \(\Delta P = R\rho g; R = \Delta P/g\rho\)
\[
R_{in\text{Hg}} = \frac{(144 \text{in}^2 / \text{ft}^2)(\text{Plbf/in}^2)(32.17 \text{ ft - lbm/ lbf - sec}^2)}{(\rho_{\text{Hg}} \text{ lbm/ ft}^3)(32.17 \text{ ft/ sec}^2)(12 \text{ in/ ft})} = \frac{144 \times 5.1 \times 32.17}{13.6 \times 62.43 \times 32.17 \times 12} = 10.4 \text{ in Hg}
\]
\[
R_{ft \text{ HO}} = \frac{(144 \text{in}^2 / \text{ft}^2)(\text{Plbf/in}^2)(32.17 \text{ ft - lbm/ lbf - sec}^2)}{(\rho_{\text{w}} \text{ lbm/ ft}^3)(32.17 \text{ ft/ sec}^2)} = \frac{144 \times 5.1 \times 32.17}{62.43 \times 32.17} = 11.8 \text{ ft H}_2\text{O}
\]

9.10 The applied pressure is (Eq. 9.2):
\[
\Delta P = \Delta h pg = 3\text{in}/(12\text{ in/ft}) \times 62.4\text{lbm/ft}^3/(32.17\text{lbm-ft/ lbf - sec}^2) \times 32.17\text{ ft/ sec}^2 = 15.6\text{lbf/ft}^2
\]
This pressure is applied to the inclined manometer. Using Eq.9.3:
\[
\Delta P = R \sin \theta pg
\]
\[
15.6(\text{lbf/ft}^2) = R \sin 7^\circ \times 50.0(\text{lbm/ft}^3)\times 32.17(\text{ft/ sec}^2)/ 32.17(\text{lbm - ft / lbf - sec}^2)
\]
\[
R = 2.56 \text{ ft}
\]