1.21

1.25

1.25 A tank of oil has a mass of 25 slugs. **(a)** Determine its weight in pounds and in newtons at the earth's surface. **(b)** What would be its mass (in slugs) and its weight (in pounds) if located on the moon's surface where the gravitational attraction is approximately one-sixth that at the earth's surface?

(a) weight = mass × g

$= (25 \text{ slugs})\left(32.2 \frac{\text{ft}}{\text{s}^2}\right) = \underline{\underline{805 \text{ lb}}}$

$= (25 \text{ slugs})\left(14.59 \frac{\text{kg}}{\text{slug}}\right)\left(9.81 \frac{\text{m}}{\text{s}^2}\right) = \underline{\underline{3580 \text{ N}}}$

(b) mass = $\underline{\underline{25 \text{ slugs}}}$ (mass does not depend on gravitational attraction)

$\text{weight} = (25 \text{ slugs})\left(\frac{32.2 \frac{\text{ft}}{\text{s}^2}}{6}\right) = \underline{\underline{134 \text{ lb}}}$

1.22

1.26

1.26 A certain object weighs 300 N at the earth's surface. Determine the mass of the object (in kilograms) and its weight (in newtons) when located on a planet with an acceleration of gravity equal to 4.0 ft/s^2.

$\text{mass} = \frac{\text{weight}}{g}$

$= \frac{300 \text{ N}}{9.81 \frac{\text{m}}{\text{s}^2}} = \underline{\underline{30.6 \text{ kg}}}$

For $g = 4.0 \text{ ft/s}^2$,

$\text{weight} = (30.6 \text{ kg})\left(4.0 \frac{\text{ft}}{\text{s}^2}\right)\left(0.3048 \frac{\text{m}}{\text{ft}}\right)$

$= \underline{\underline{37.3 \text{ N}}}$