FIRST MIDTERM

Name (print) Condella                        Name (signed) ____________________________

Discussion Instructor (circle): Basko Chakhbazian Condella Hasan McMurray Paul Zhukov

Discussion Section # ________

REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!
Use the conversion constants and data given on the front page.

(a) Convert 145 mi/hr to m/s.

\[
145 \text{ m/hr} \cdot \frac{1 \text{ hr}}{3600 \text{ s}} \cdot \frac{5280 \text{ ft}}{1 \text{ m}} \cdot \frac{1 \text{ m}}{3.281 \text{ ft}} \approx 64.9 \text{ m/s}
\]

(b) Convert 450 m/s to ft/s.

\[
450 \text{ m/s} \cdot \frac{1.28 \text{ ft}}{1 \text{ m}} = 1.476 \times 10^3 \text{ ft/s}
\]

(c) On a very small planet an object falls 150 m from rest in 20.0 s. Calculate the magnitude of "g" on this planet.

\[
g = \frac{2h}{t^2} = 7.50 \times 10^{-1} \text{ m/s}^2
\]

(d) Calculate the angle between the two vectors

\[
\vec{A} = 45.0 \hat{i} + 37.2 \hat{j}
\]

\[
\vec{B} = 27.2 \hat{i} - 48.0 \hat{j}
\]

\[
\cos \alpha = \frac{(45.0)(27.2) - (27.2)(4.5)0}{\sqrt{(45.0)^2 + (27.2)^2}} \frac{1}{\sqrt{27.2^2 + (4.5)^2}} \Rightarrow \alpha = 100^\circ
\]

(e) A hot car will accelerate from 0 to 60.0 mi/hr in a distance of 400 ft. Assume the acceleration is constant (unlikely) and calculate its acceleration in ft/s^2.

\[
a = \frac{v^2}{2(x-x_0)} = 9.66 \text{ ft/s}^2
\]

5 pts each

- 1 no units

- 1 sig fig error