Physics 4A
Spring 2025

ave. = 8.1
σ = 2.1

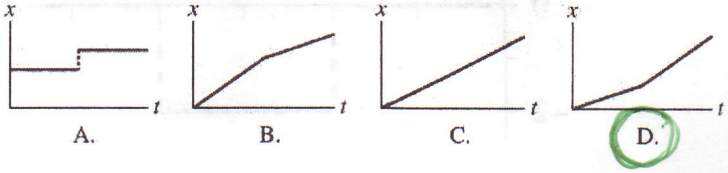
Name Answer Key

Lab: 8:00 am 11:10 am 2:30 pm (circle one)

Quiz #1: Concepts of Motion and Kinematics in One Dimension

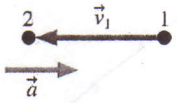
Problem 1 (1 point)
Which position-versus-time graph best describes the motion diagram to the left?

D



Problem 2 (1 point)
A particle undergoes acceleration $\vec{a}$ while moving from point 1 to point 2. Which of the choices shows the most likely velocity vector $\vec{v}_2$ as the particle leaves point 2?

B

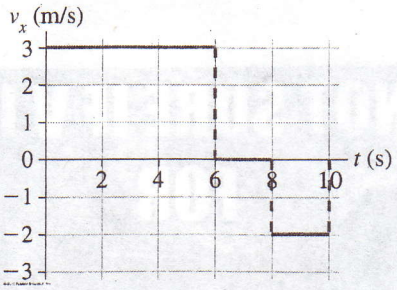


Problem 3 (3 points)
The density of a neutron star is about 1.0×10^{17} kg/m^3. Express this density in pounds/in^3. (Note: 1.0 kg = 2.2 pounds)

$$1.0\times10^{17}\ \text{kg/m}^3 = 1.0\times10^{17}\ \text{kg/m}^3 \left(\frac{2.2\ \text{lbs}}{1\ \text{kg}}\right)\left(\frac{1\ \text{m}}{39.37\ \text{in}}\right)^3$$

$$= 3.6\times10^{12}\ \text{lbs/in}^3$$

Problem 4 (2 points)
The graph below shows the velocity of a moving object as a function of time. If the object starts with initial position of x_0 = -5.0 m, what is the object's position at t = 10 s?



$$X_f = X_i + \Delta X \qquad X_i = -5.0\text{m}$$

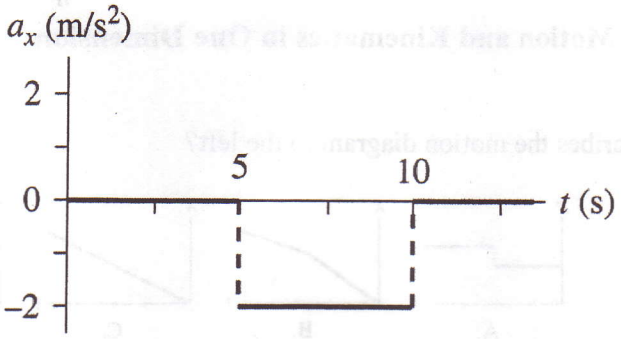
ΔX = area under curve

$= (3\text{m/s})(6\text{s}) + (-2\text{m/s})(2\text{s})$

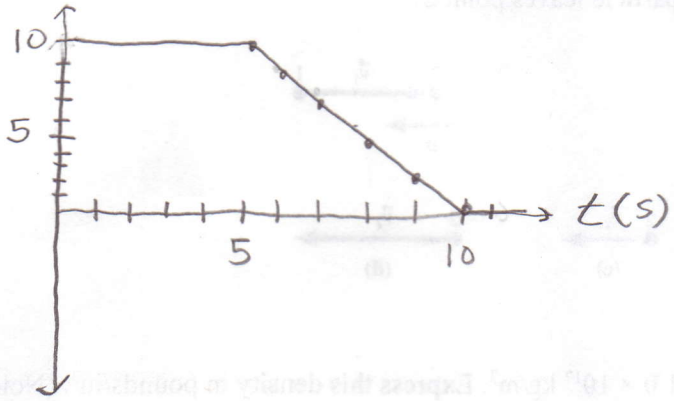
$= 14\text{m}$

$X_f = -5.0\text{m} + 14\text{m} = \boxed{9.0\text{m}}$

Problem 5 (3 points)
An object moving horizontally has the acceleration-versus-time graph shown below. At $t = 0$ s, the object has initial position $x_0 = -10$ m. and initial velocity $v_{0x} = 10$ m/s.



a) Draw a velocity-versus-time graph for the object. Include a numerical scale on the horizontal and vertical axes.



b) Draw a motion diagram of the object's motion.