Physics 4A
Fall 2025

Name _____

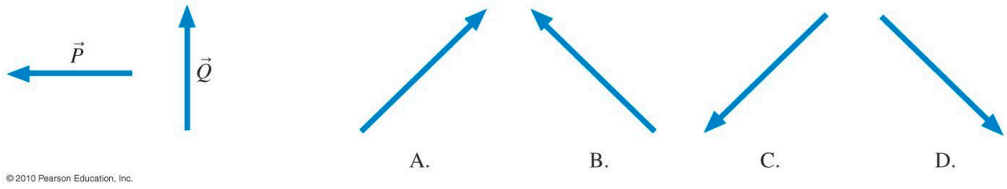
Lab: 8:00 am 11:20 am 2:40 pm (circle one)

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

Problem 1 (2 points)

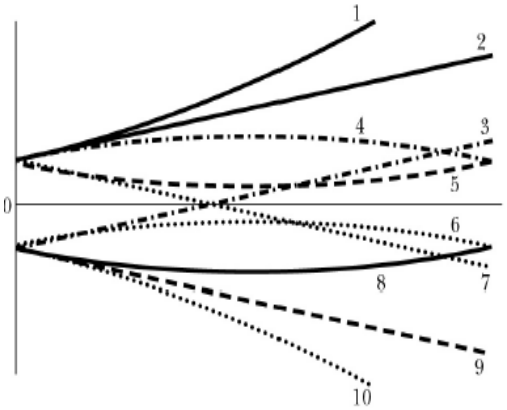
$\vec{P}$ and $\vec{Q}$ are two vectors of equal lengths but different directions as shown in the figure below.

Which vector best describes $-\vec{Q}-\vec{P}$?



Problem 2 (3 points)

In the figure below, assume that the vertical axis plots the *velocity v* of an object moving along an *x*-axis as a function of time.



Situation	*a*	*b*	*c*	*d*
Initial x (m)	+10	–10	+10	–10
Initial v (m/s)	+5	–5	–5	+5
Constant a (m/s^2)	+2	–2	+2	–2

a) Determine which of the 10 plots of *v* versus time *t* best describes the motion for the four situations listed in the table above. (Note: plots 2, 3, 7, and 9 are straight; the others are curved.)

Situation a: *Situation c:*

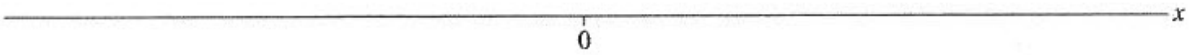
Situation b: *Situation d:*

b) If, instead, the vertical axis plots the *position x* of the object as a function of time, which of the 10 plots best describes the motion for the four situations given in the table.

Situation a: *Situation c:*

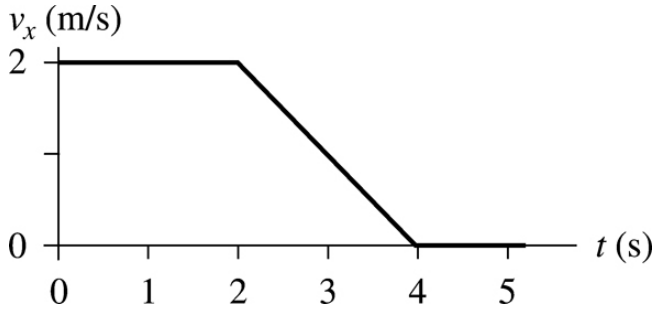
Situation b: *Situation d:*

c) For situation d, draw a motion diagram.



Problem 3

The velocity-versus-time graph for an object moving along an x-axis is shown below. The initial position of the object is $x_0 = -2.0$ m.



a) What is the position, velocity, and acceleration of the object at t = 3 s? You must show all of your work to get full credit.

b) Draw a detailed position-versus-time graph and acceleration-versus-time graph for the object's motion. For each graph, be sure to label your axes and include the appropriate units and values.