PHY131 F Fall 2020
Class 5

Today:

- Chapter 2 Kinematics: Motion in One Dimension
- Problem Solving Examples relevant to the Synchronous Midterm Assessment

1

Some people in a hotel are dropping water balloons from their open window onto the ground below. The balloons take 0.15 s to pass your 1.6-m-tall window. Where should security look for the raucous hotel guests?

SKETCH & TRANSLATE.

SIMPLIFY & DIAGRAM

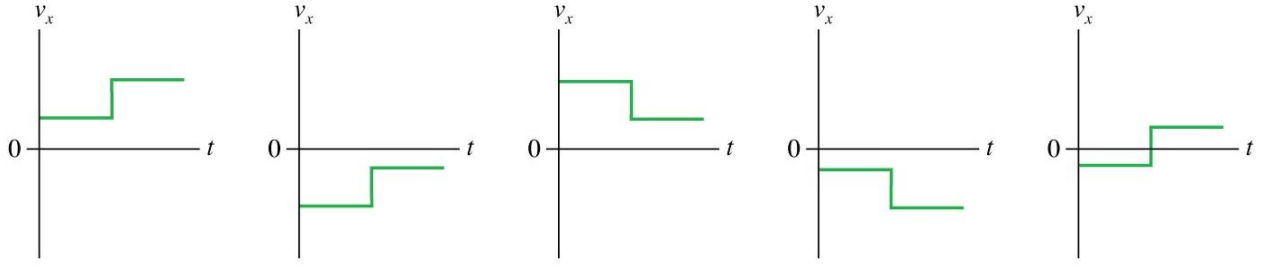
REPRESENT MATHEMATICALLY

SOLVE & EVALUATE

2

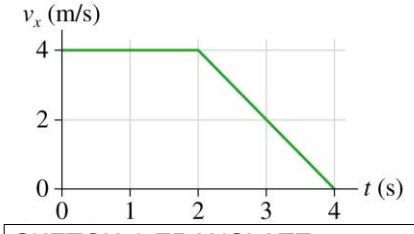
Poll

Here is a motion diagram of a car moving along a straight road. Which velocity-versus-time graph matches this motion diagram?



3

Here is the velocity graph of an object that is at the origin ($x = 0$ m) at $t = 0$ s. At t = 4.0 s, the object's position is



SKETCH & TRANSLATE.

REPRESENT MATHEMATICALLY

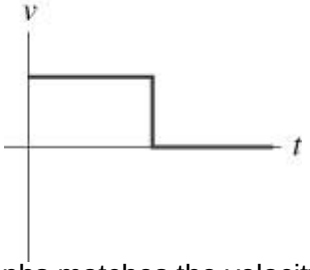
SOLVE & EVALUATE

SIMPLIFY & DIAGRAM

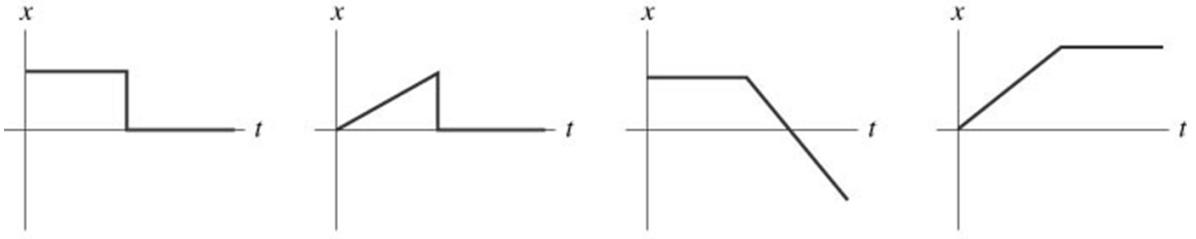
4

Poll

A graph of velocity versus time for a hockey puck shot into a goal appears as follows:



Which of the following position graphs matches the velocity graph?



5

Shannon drives at a constant speed on the highway. She measures the time between passing successive km markers separated by exactly 1.000×10^3 m. If she measures a time of 48 seconds, what is her speed?

SKETCH & TRANSLATE.

REPRESENT MATHEMATICALLY

SIMPLIFY & DIAGRAM

SOLVE & EVALUATE

6

Poll

A Toyota Camry can accelerate from rest to 100 km/h in 6.5 s.

A Porsche 918 Spyder can accelerate from rest to 100 km/h in 2.6 s.

During the test, which car would drive the longer distance?

A The Camry

B The Porsche

C They would both travel the same distance

7

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SKETCH & TRANSLATE.

REPRESENT MATHEMATICALLY

SIMPLIFY & DIAGRAM

SOLVE & EVALUATE

8

In an 8.00 km race, one runner runs at a steady 11.0 km/h, and another runs at 14.0 km/h. How far from the finish line is the slower runner when the faster runner finishes the race?

SKETCH & TRANSLATE.

REPRESENT MATHEMATICALLY

SIMPLIFY & DIAGRAM

SOLVE & EVALUATE

9

A speed skater moving across frictionless ice at 8.0 m/s hits a 5.0-m wide patch of rough ice. She slows steadily, then continues on at 6.0 m/s. What is the magnitude of her acceleration on the rough ice? (Assume acceleration is constant on the rough patch.)

SKETCH & TRANSLATE.

REPRESENT MATHEMATICALLY

SIMPLIFY & DIAGRAM

SOLVE & EVALUATE

10

Poll

Heather and Jerry are standing on a bridge 50 m above a river. Heather throws a rock straight down with a speed of 20 m/s. Jerry, at exactly the same instant of time, throws a rock straight up with the same speed. Which rock has the faster speed as it hits the water? [Neglect air resistance.]

A The rock Heather threw.

B The rock Jerry threw.

C Both rocks will have the same speed as they hit the water.

11

Before Class 6 on Wednesday

- Read the first 3 sections of chapter 3:
- 3.1 Force
- 3.2 Representing Forces with Vectors
- 3.3 How is Force Related to Motion?

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