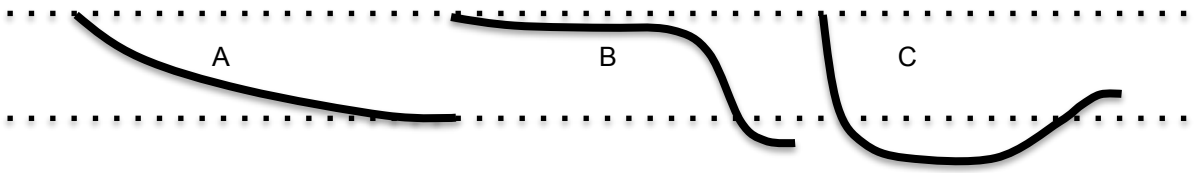
Big Exam #2, 141, Schwartz Name_____

From the syllabus: In order to achieve an "A": Consistently

- correctly identifies underlying physics concepts,
- sets up problem with good drawing and reasons,
- formulates method to solve problem,
- correctly uses units and
- verifies whether answer makes sense.

1. Shown are three frictionless tracks, *each is of equal length*, but bent differently. I drop a marble down each track.



a) We want to know which marbles come off with the highest speed. **Explain which lens you will use and why.**

b) Rank the tracks according to **final speed** when it goes off the track, from fastest to slowest, or state why they all come off with the same speed.

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c) We want to know which marbles took the most time. **Explain which lens you will use and why.**

d) Rank the tracks according to time taken to get to the end of the track, from shortest time to longest time, or state why they all take the same time.

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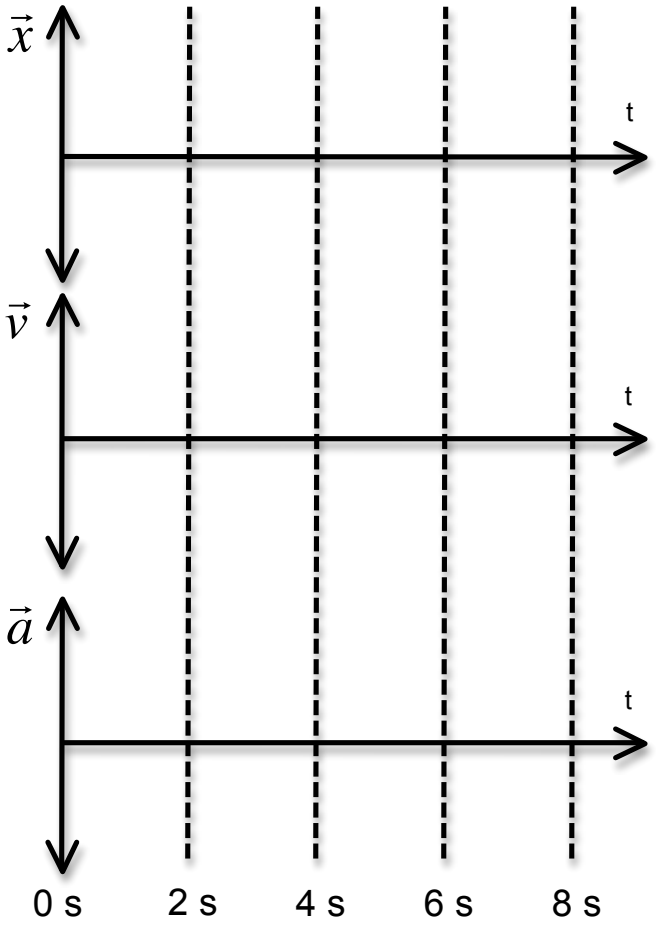
2. An object starts at x = -12 m with constant velocity, v = + 6 m/s for 2 s. Between t=2 s and t = 6 s, the object experiences an acceleration of - 2 m/s^2. That is, the acceleration is in the opposite direction as the initial velocity. After t = 6 s, the acceleration is zero. Please graph the acceleration, velocity, and displacement as a function of time. Please also label the y axes so the graphs make sense.



3. Consider the object at t = 4 s. The object is 100 kg, and has two ropes pulling on it, rope A in the + x direction, and rope B in the – x direction.

a) Which rope is pulling harder? (remember what you have to do to get a "A")

b) If the tension on the rope pulling in the + x direction is 500 N, what is the tension in the rope pulling in the – x direction?