AP Physics – Thanks for the Homework – 2

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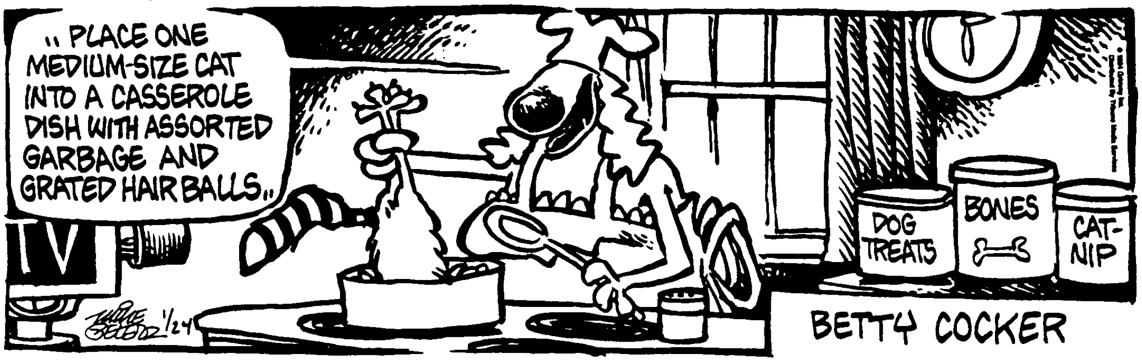
How you are known____Per___



A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die and a new generation grows up that is familiar with it. – Max Planck

1. A racecar accelerates from rest to a speed of 287 km/h in 6.8 seconds. What is its average acceleration?

2. The space shuttle undergoes an acceleration of 53.9 m/s^2. How fast is it traveling at the end of 55.2 s?

3. Can an object under constant acceleration come to rest and stay at rest? Explain your answer.

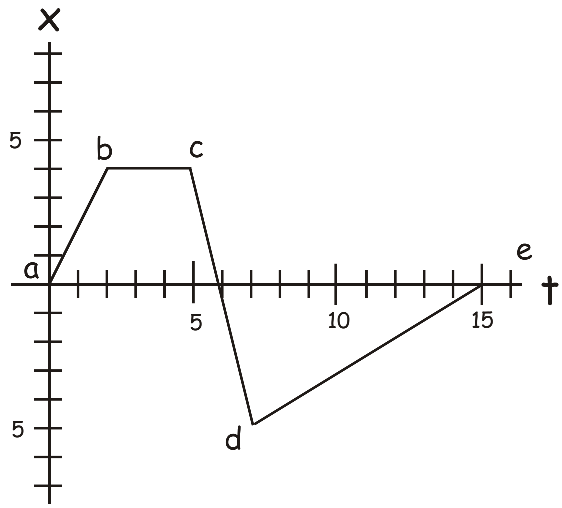
4. You are in an elevator that is accelerating you upward at 4.55 m/s^2. How much time does it take you to reach a speed of 11.0 m/s?

5. Two cars travel in the same direction along a straight highway, one at a constant speed of 55 mi/h and the other at 70.0 mi/h. (a) Assuming that they start at the same point, how much sooner does the faster car arrive at a destination 10.0 miles away? (b) How far must the faster car travel before it has a 15 minute lead on the slower car?

6. A car traveling in a straight line has a velocity of + 5.0 m/s at some instant. After 4.0 s, its velocity is + 8.0 m/s. What is its average acceleration during this time interval?

7. A car is traveling at 108 km/h, stuck behind a slower car. Finally the road is clear and the car pulls over to make a pass. The driver stomps on the gas pedal and accelerates up to a speed of 135 km/h. If it took 3.5 s to reach this speed, what is the average acceleration of the car?

8. A position vs time graph is shown to the right. Please analyze the graph and determine the following. (a) The speed of the object from b → c, (b) the speed from c → d, (c) the speed from d → e, (d) the times ***t*** when the speed of the object is zero, and (e) the points where the direction of the object had to change (if any).



Position Time Graph

9. You walk down the sidewalk to the east for 8.0 min at a speed of 1.2 m/s. You reach a busy street and have to stop. You remain at rest for 2 minutes. The traffic dies down, so you run across the street at constant speed. The street is 12 m wide and it takes you 1.5 s to cross it. You immediately slow down to your regular 1.2 m/s walk speed and proceed for 2 min. You suddenly discover that your plush ducky fell off your backpack. You immediately turn around and run back to the intersection you just crossed. You run at a constant speed of 6.5 m/s. Make a distance vs time graph for your motion.