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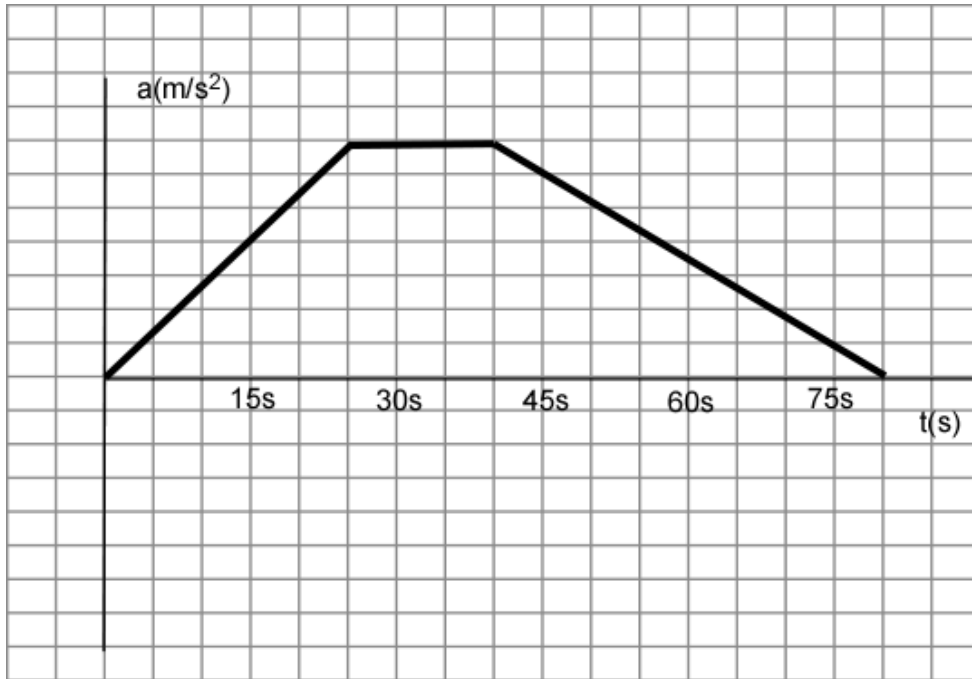
Name: \_\_\_\_\_

Physics 50  
Winter 2011  
Exam 1

**MAKE SURE TO SHOW ALL WORK IN COMPLETE DETAIL. NO CREDIT WILL  
BE GIVEN IF NO WORK IS SHOWN. EXPRESS ALL ANSWERS IN SI UNITS.**

1. An unmarked police car traveling at a constant speed of 95 km/h is passed by a speeder traveling at 140 km/h. Precisely, 1.00 s after the speeder passes, the policeman begins to follow with an acceleration of  $3.0 \text{ m/s}^2$ . (15 pts)
  - a) Calculate the time for police car to catch speeder.
  - b) Calculate the distance traveled and velocity of police car when it catches speeder.

2. A particle moves with an acceleration as given by the graph below. If at  $t = 0$  s, the velocity was  $+10$  m/s, (10 pts)
- a) Calculate the velocity at  $t = 40$  s.
  - b) Calculate the velocity at  $t = 80$  s.
- Use the graph below to solve the problem.



3. You shoot an arrow into the air. Four seconds later (4.0 s) the arrow has gone straight upward to a height of 55.0 m above the launch point. (15 pts)
- a) Calculate the initial speed of the arrow.
  - b) Calculate the maximum height of arrow.
  - c) Calculate the time to reach a point 30.0 m above the launch point.
  - d) Draw the graph of  $y$  vs.  $t$  and  $v$  vs.  $t$  for the motion of the arrow.