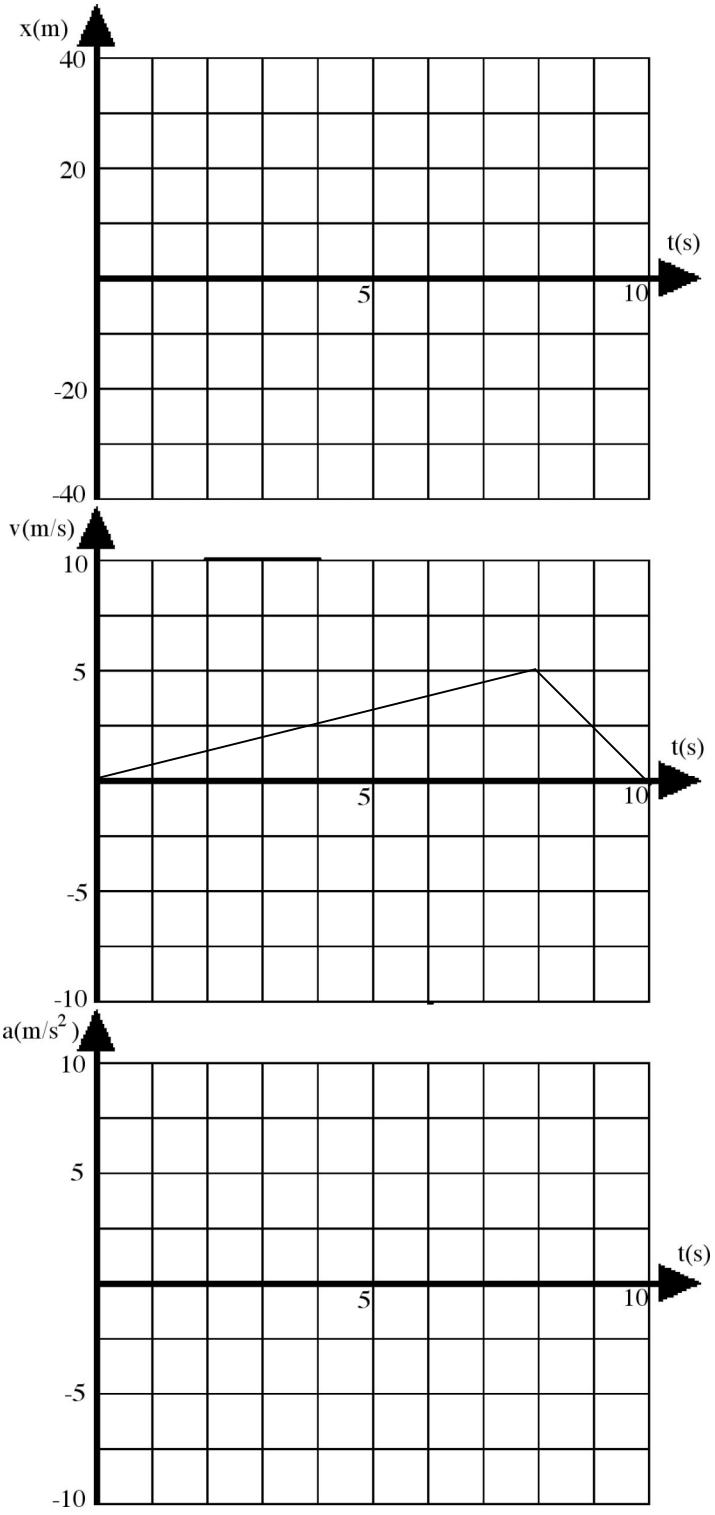
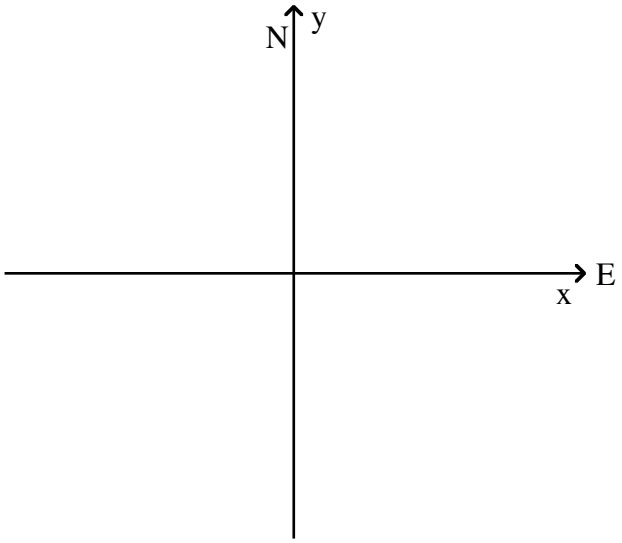
Name:_____

Solve the following problems in the space provided. Use the back of the page if needed. Each problem is worth 20 points. You must show your work in a logical fashion starting with the correctly applied physical principles. The equations you need are on the equation sheet. Your score will be maximized if your work is easy to follow because partial credit will be awarded.

1. The velocity of a car as a function of time is shown in the middle graph at the right. (a)Explain how you would go about sketching the position versus time graph (top) and draw the curve. (b)Explain how you would go about sketching the acceleration versus time graph (bottom) and draw the curve.

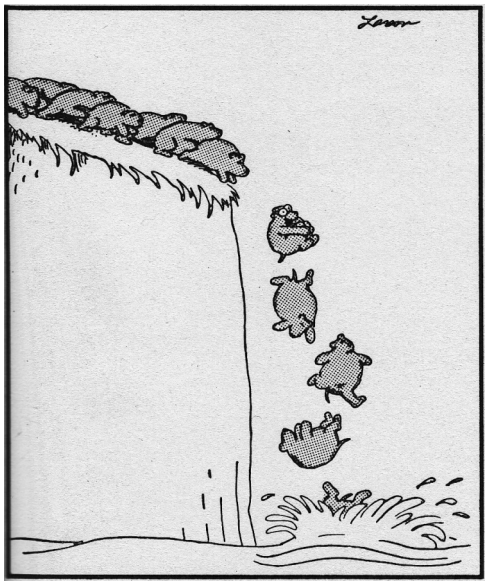


2. A tropical storm was centered 400km away from Honolulu at 30.0° south of east. Six hours later the storm is centered 200km due north. (a)Show the initial position, final position, and displacement at the right. (b)Find the displacement (magnitude and direction) of the storm during this time and (c)find the average velocity of the storm.



3. A sprinter starting from rest reaches their top speed of 7.00m/s in a distance of 25.0m. Find (a)their acceleration and (b)the time to reach this top speed.

4. In the cartoon at the right, the next lemming to leave the cliff has an initial velocity of 2.00m/s at 30.0˚ below the horizontal. He will land 1.00m out from the base of the cliff. Find (a)the time he is in the air and (b)the height of the cliff.



5. The six figures below depict six different satellites in circular orbit around Earth. The satellites differ in their orbital radius, speed, and mass. The specific orbital radius, speed, and mass for each satellite is given in each figure. Rank these satellites, from greatest to least, on the basis of their acceleration. You must carefully explain your reasoning for full credit.

A	B	C	D	E	F
R = 12800km	R = 12800km	R = 12800km	R = 19200km	R = 19200km	R = 16000km
V = 5.7km/s	V = 5.7km/s	V = 5.7km/s	V = 4.6km/s	V = 4.6km/s	V = 5.1km/s
M = 20kg	M = 50kg	M = 100kg	M = 20kg	M = 50kg	M = 100kg