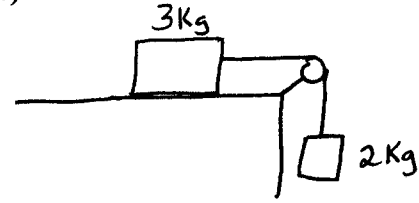


Name _____ Period _____ Date _____

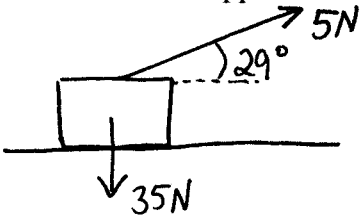
Show all work, circle your answers, show units! (40 points possible)

1. In this machine there is no friction, so...

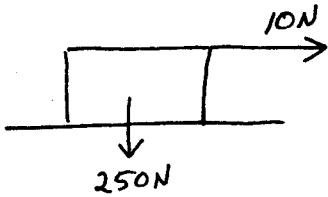


- a. What is the tension in the string? (2 pt) _____
- b. What is the acceleration of the top block? (2 pt) _____

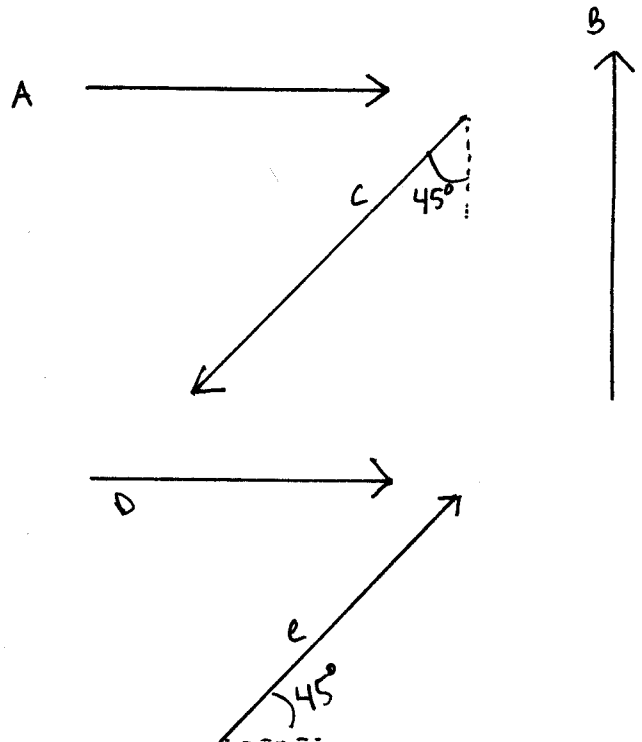
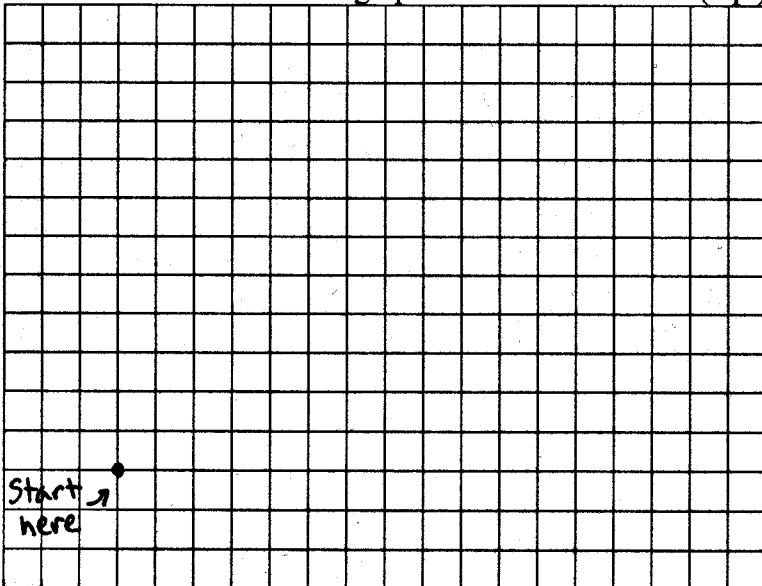
2. A force is applied to a box on a frictionless surface, what is the acceleration? (3 pts) _____



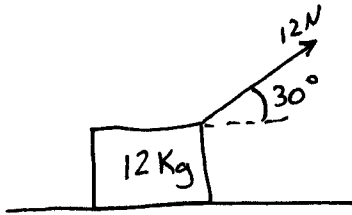
3. Bob's suitcase was damaged by baggage handlers and the wheels are now gone. Being stubborn, Bob decides to **pull** his suitcase rather than carry it (silent protest, you know). A 10 N force is applied horizontally to his suitcase to move it at a constant velocity. If Bob's suitcase has a weight of 250 N, what is the coefficient of sliding friction? (3 pt) _____



4. Add the vectors on the graph to find the resultant. (3 pt)

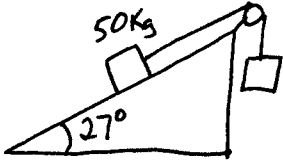


5. What is the motion of the box? (4 pt) _____



$\mu = .15$
sliding

6. What is the mass of the hanging box? (3 pt) _____



No Friction

$A = .31 \frac{m}{s^2}$ up the incline

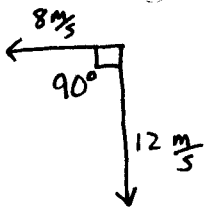
7. Margie is flying her plane above the clouds at 200 km/hr due East (according to her compass). She "knows" that she has to fly 120 Km to reach her destination. However, there is a steady 20 km/hr wind blowing from the south. If she does not figure it out, where will she actually be at the time she thinks that she has arrived? (Draw a diagram that includes the answer) (3 pts)

8. Bad Boy Georgie is standing in his tree house and kicks an empty brown bottle with an initial horizontal velocity of 6 m/s. If his tree house porch is 7 meters high, how long will it take for the bottle to hit the ground (out of his father's sight)? (3 pts) _____

9. Georgie's next door neighbor Beatrice has a tree house as well. Georgie's bottle landed in her yard and she decided to send it back into Georgie's yard from her own tree house porch. She uses a slingshot to launch it sideways at an initial velocity of 20 m/s! It travels 30 m into the neighbor's yard on the other side of Georgie's house. How tall is Beatrice's tree house porch? (3 pt) _____

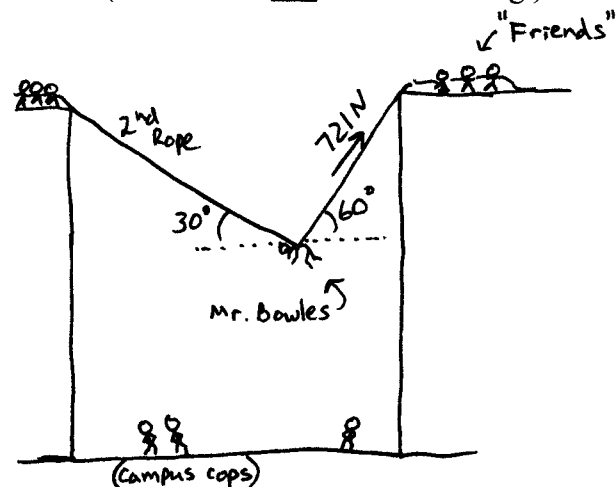
10. Marcus shoots a series of raw potatoes from the top of his school building as a protest for the cafeteria serving Tator Tots rather than French fries. The school is really old and tall, at 18 m. Markus yells "Spud!!!" just as he launches each potato. How much time do students have to react (and move) after each launch if the potatoes are shot at an angle of 39 degrees with an initial velocity of 10 m/s? (4 pt) _____

11. Find the equilibrant for the two vectors shown below. (3 pt)
 _____ at _____ degrees



12. Mr. Bowles was quite an "athlete" in college and decided to go from one dorm to another without touching the ground. Ropes were held at the top of both buildings and Mr. Bowles tied both of them to himself. The idea was to hang straight down from one building while students on top of the other building took more and more of the tension and Mr. Bowles would be transported between the buildings (as students on the first building let more and more rope out).

What would be the tension on the 2nd rope in the picture shown? (4 pt) _____
 (Mr. Bowles had a mass of 85 kg.)



Extra Credit (3 points): (Show all work on back) Santa is on the peak of a roof which has the coefficient of sliding friction of .21 and his weight is 1000N. The roof is 4m long at 22 degrees. If the roof is 10 m high at the bottom edge, how far out does Santa land? _____ m