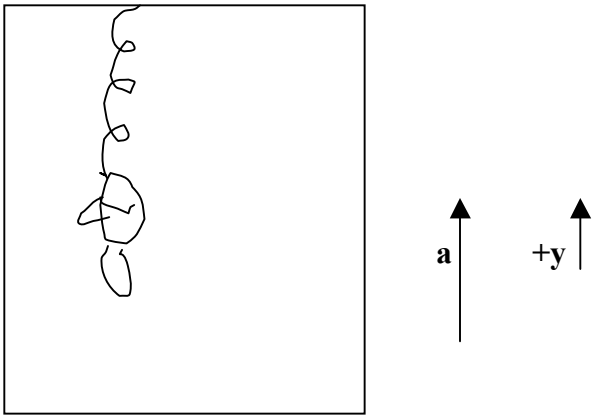
Introductory Physics, Phy1A, Fall 2003 Dr. Deniz Cizmeciyan
Quiz 2

Name _____**KEY**_____

1) A fish is being weighed in an elevator that is going up with an acceleration of $2.45 m/s^2$. The balance reads 50N.



a) (20 points)What is the true weight of the fish?

F_{net}=ma
F_{net}=N-mg
ma = N-mg
m = N/(a+g) = 50N/(2.45m/s^2+9.8m/s^2) = 40N

b) (20 points)What should the acceleration be for the balance to read 30N?

a = N-mg/m = (30-40)N/4.08kg = -2.45m/s^2
You need to accelerate downwards

c) (10 points) What would the balance read if fish is weighed if the cable breaks?
ON

2) A box of bananas weighing 40N rests on a horizontal surface. The coefficient of static friction μ_s= 0.40 and the coefficient of kinetic friction μ_k= 0.20.

a) (10 points) What is the friction if there is no force applied to the box of bananas

f= 0 because no applied force

b) (15 points)What is the magnitude of the friction force if a monkey applies a horizontal force of 6.0N to the box and the box is initially at rest.

$f_{max}=\mu_s N = \mu_s mg$= (0.40)(40N) = 16.0N
f needs to be 6N

c) (15 points)What minimum horizontal force must the monkey apply to start the box in motion?

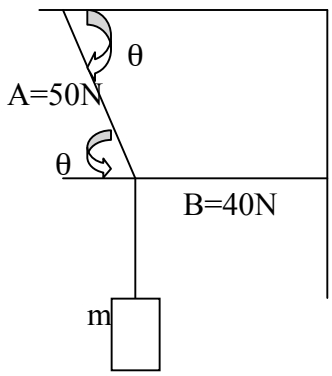
16N to start box (see above)

d) (10 points)What minimum horizontal force must the monkey apply to keep the box moving at constant velocity once it has been started.

$F_{net} = F-f_k = 0$
$F= f_k$
$F= f_k=\mu_k N = \mu_k mg$= (0.20)(40N) = 8.0N

<u>Bonus (10 points)</u>

For the system to be in static equilibrium what should the angle θ be?



$T_{ax}=T_{bx}$

$T\cos\theta = 40N$

$50N\cos\theta = 40N$

$\cos\theta = 0.8$

$\theta = \arccos 0.8 = 37°$