Physics

name _____period ____

Inv-7 Expan. II Intro to FBDs

sheet # ____

Draw "profile view" FBDs (Free Body Diagrams) in the boxes for the following situations showing all forces present. Indicate the relative size of the forces involved by the length of the arrow you draw:

R = air resistance/water drag; n = normal; f_s = static friction; f_k = kinetic friction; F_T = Thrust

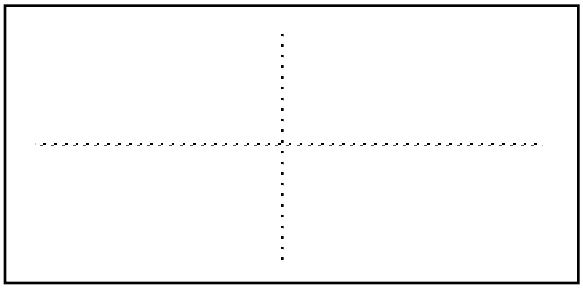
mg= weight; F_p = push or pull; F_L = Force of lift B = Buoyancy of water or air ; F_W = force of wind

REMEMBER: TRUE FBDS CONTAIN *ONLY* FORCE VECTORS

Use another color to show the external source for each force. Write the ΣF = ma equation for each situation

If there is a direction of motion show it with: velocity

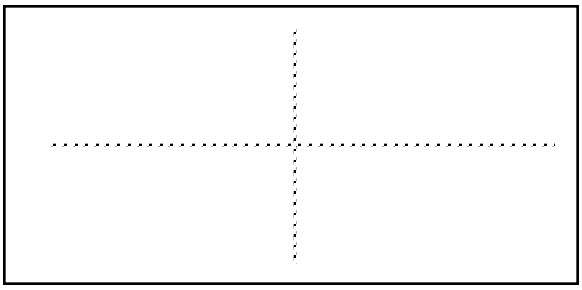
1.) A car slowly accelerating 0 to 60 mph @ 30mph.



Symbol Equation:

ΣF_x

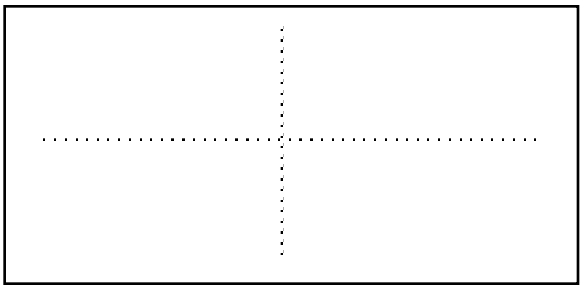
2.) A car quickly accelerating 0 to 60 mph @ 20mph.



Symbol Equation:

ΣF_x

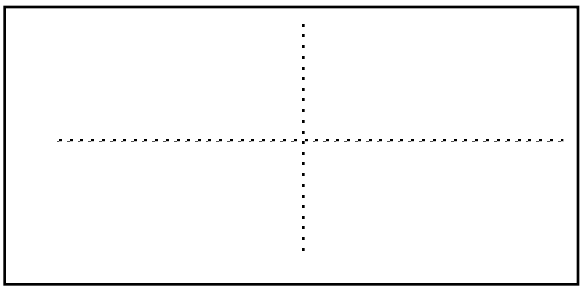
3.) A car traveling down the highway in cruise control at a constant speed of 60 mph.



Symbol Equation:

ΣF_x

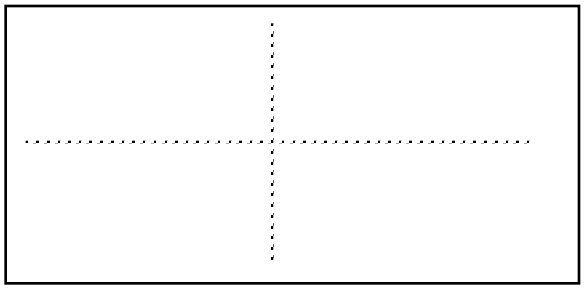
4.) Now speeding up from 60 mph to 120 mph @ 80mph



Symbol Equation:

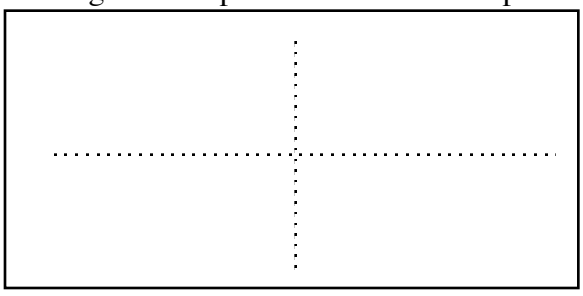
ΣF_x

5.) The car slowing down from 120 mph to 60 mph @ 80mph by the driver putting the car in neutral.



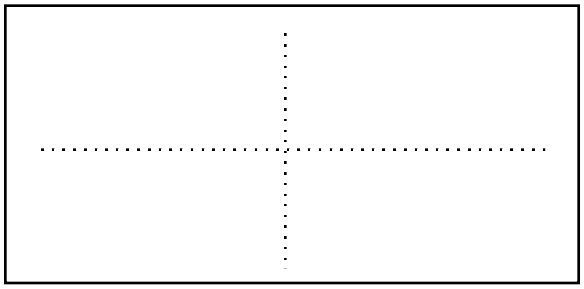
ΣF_x

6.) The car coming to a quick stop from 60 mph by the driver "locking up the brakes" and skidding. The snapshot is taken @ 20 mph.



ΣF_x

7.) A rocket (with rockets firing) accelerating upward through the earth's atmosphere at an angle of approximately 75° with the horizontal.

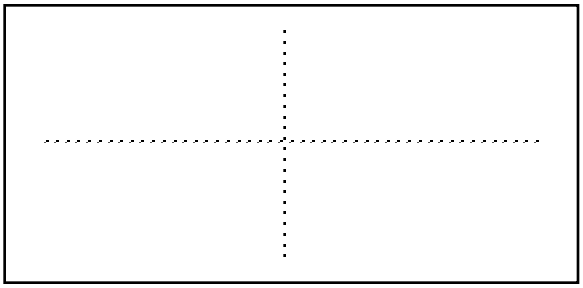


Symbol Equations:

ΣF_x

ΣF_y

8.) That same space capsule from 7 traveling through intergallactic space at 40,000 mph without it rockets firing.

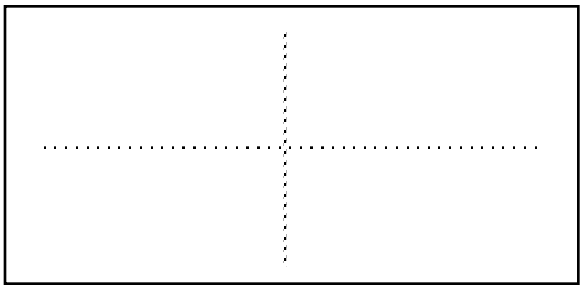


Symbol Equations:

ΣF_x

ΣF_y

9.) A helium balloon rising and accelerating at 80° to the the horizontal with the wind gusting horizontally from the left. Snap shot is @ 10mph.

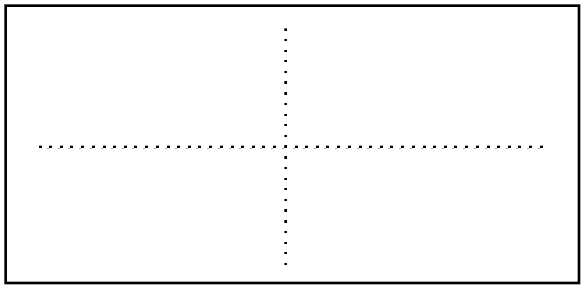


Symbol Equations:

ΣF_x

ΣF_y

10.) The forces on a rowboat being towed by a big ship at a 10 knots. The rope from the big ship to the rowboat makes an angle of 35° with the horizontal.

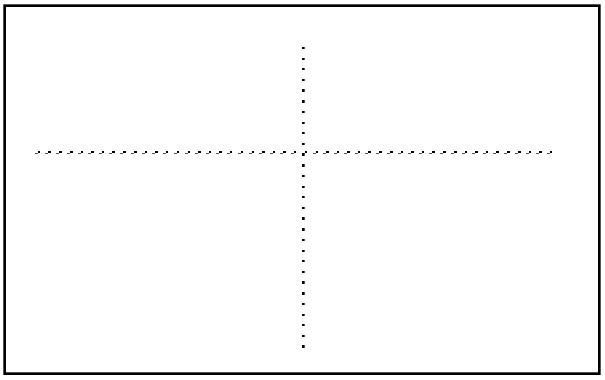


Symbol Equations:

ΣF_x

ΣF_y

11.) A tennis ball in contact with ground as it is at maximum compression and getting ready to reform and bounce straight back up.



Symbol Equation:

ΣF_y

12a.) A bowling ball sinking in water

12b.) A bowling ball rising in water.

a.)	b.)

Symbol Equations:

a.) ΣF_y

b.) ΣF_y