Name: ______________________________

F1 (N)

Θ1 (degrees)

F2 (N)

Θ2 (degrees)

F3 (N)

Θ3 (degrees)

F4 (N)

Θ4 (degrees)

PURPOSE:
To experimentally test the vector nature of force. To show that in static equilibrium the vector sum of forces is zero. To practice resolving vectors into components. To practice drawing accurate scale diagrams

EQUIPMENT:
Force table with 4 pulleys; 4 weight hangers; a central ring with 4 attached strings; assorted weights.

a) Calculate the force magnitude applied to each string.
b) Draw an accurate sketch (free body diagram) of the force vectors superimposed on the appropriate coordinate system. Include force magnitudes and orientation angles. Clearly label the x-y axes.
c) Below the sketch, construct a table listing the magnitude, Mg, and the x and y components for each of the 4 forces (F_x and F_y for each force). Show sample calculations of the net x and y force components: $\sum F_x$ and $\sum F_y$, respectively.
d) Draw an accurate vector diagram proving that your force vectors add to zero (use the graph paper supplied at the end of the packet!)

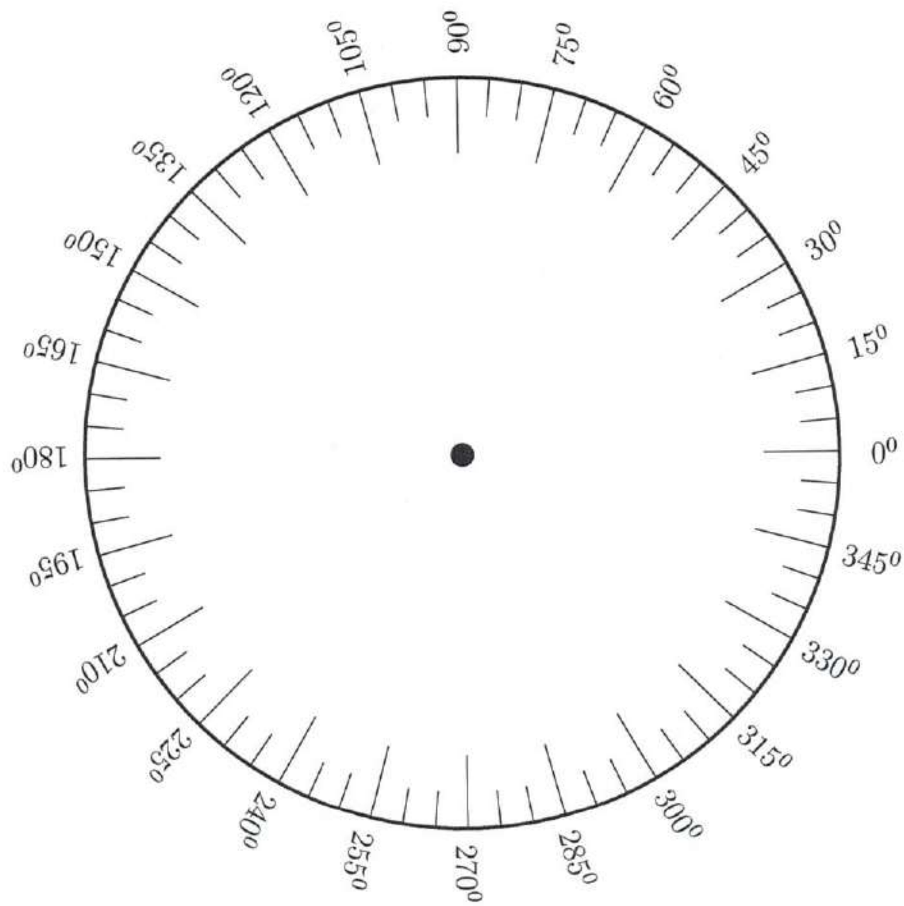
Schedule a 10-minute time block to test your Force Table lab. Your calculations must be finished by that time. You will set up the force table to your own experimental values to be inspected by the teacher.

Your lab writeup should include all of the calculations mentioned above, the practice packet of force calculations from class and a well-written paragraph discussing how the force table demonstrates Newton's Second Law.

GRADING:

Practice Packet	(20 points) __________
Sample Calculations	(15 points) __________
Free-Body Diagram	(10 Points) __________
Table of all force components	(5 points) __________
Scale drawing of force vector addition	(15 points) __________
Paragraph: Newton's Second Law and the Force Table	(15 points) __________
Experimental outcome (did your setup work?)	(10 points) __________
All values calculated and ready on time	(10 points) __________

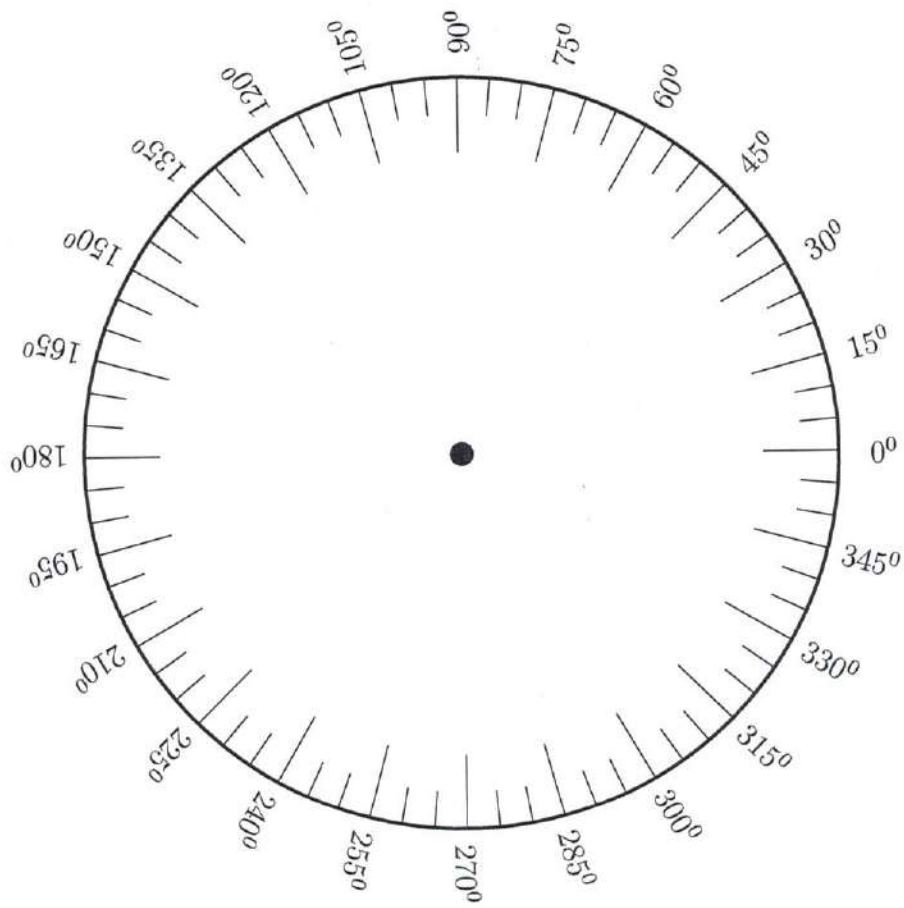
Grade ______________



Case II. $\vec{A} + \vec{B} + \vec{C} = \vec{0}$

vector	mass, kg	magnitude, N	direction	x-component	y-component
$\vec{A}$	0.200		20^0		
$\vec{B}$	0.150		80^0		
$\vec{C}$					

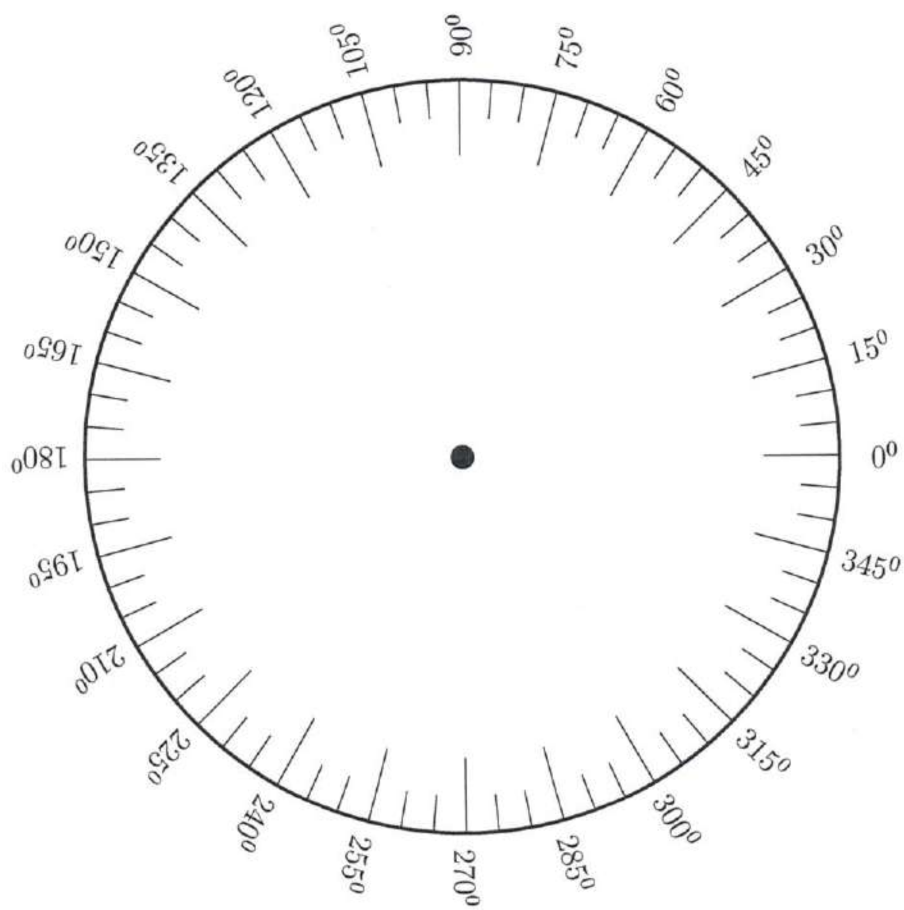
verified: ________________________



Case III. $\vec{A} + \vec{B} + \vec{C} = \vec{0}$

vector	mass, kg	magnitude, N	direction	x-component	y-component
$\vec{A}$	0.200		0^0		
$\vec{B}$	0.150		90^0		
$\vec{C}$					

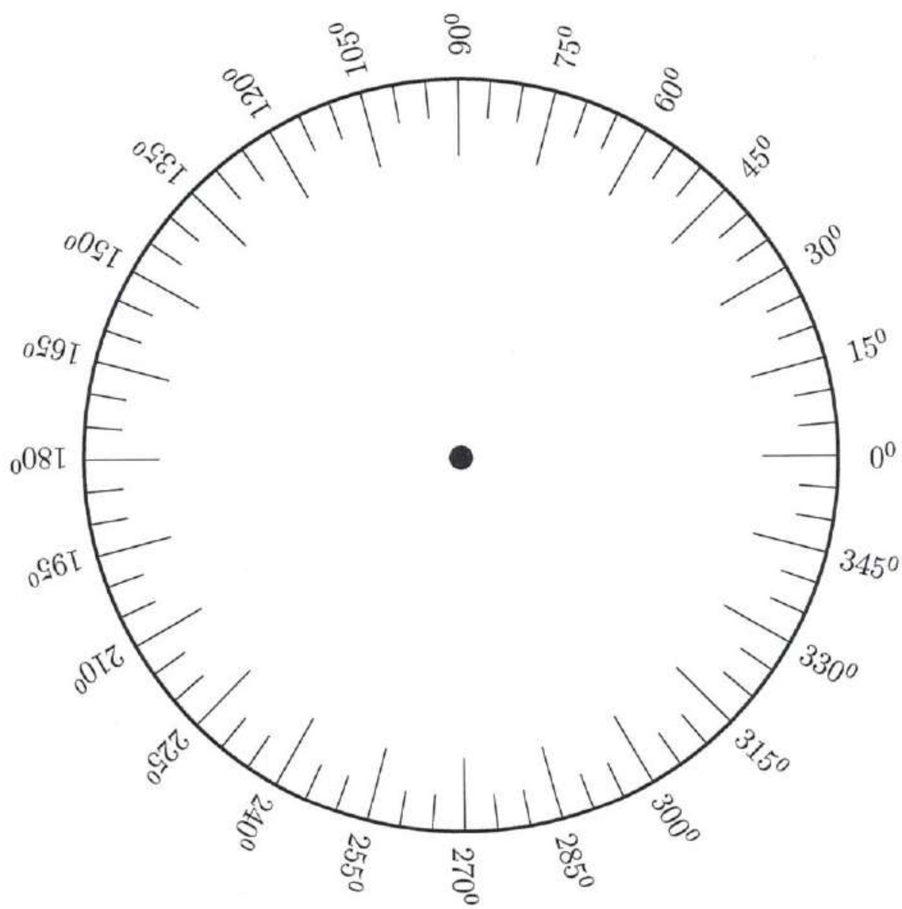
verified: ______________________



Case IV. $\vec{A} + \vec{B} + \vec{C} = \vec{0}$

vector	mass, kg	magnitude, N	direction	x-component	y-component
$\vec{A}$			0^0		
$\vec{B}$			90^0		
$\vec{C}$	0.300		240^0		

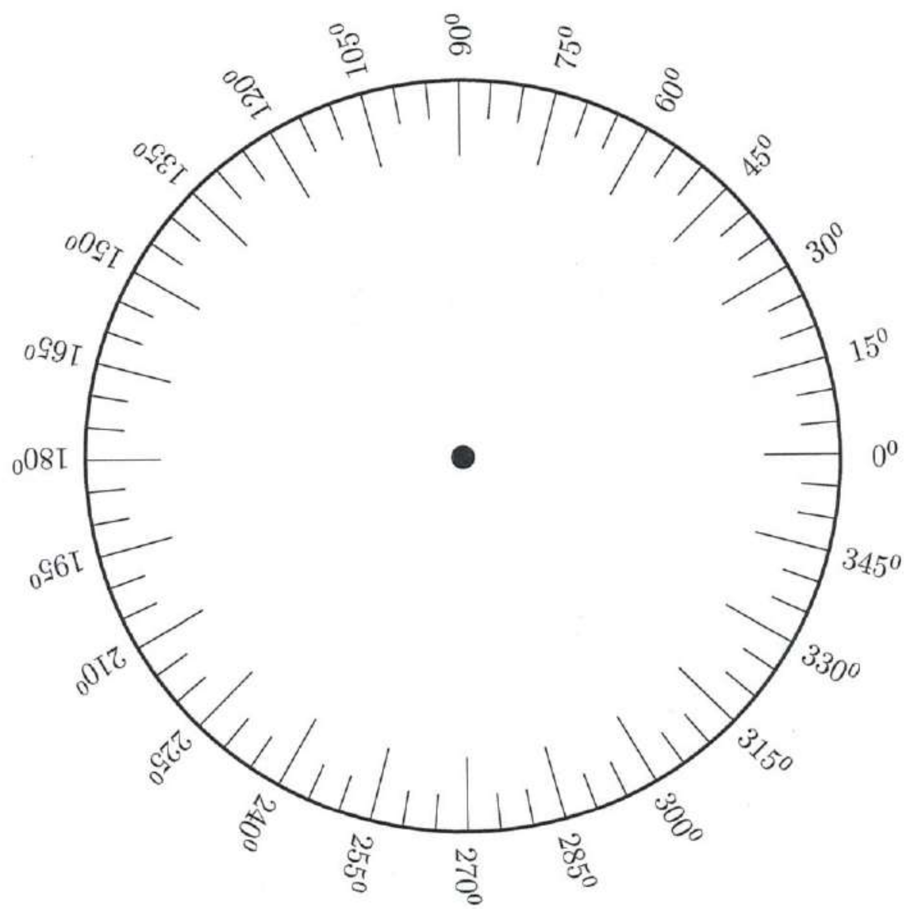
verified: ______________________



Case V. $\vec{A}+\vec{B}+\vec{C}+\vec{D}=\vec{0}$

vector	mass, kg	magnitude, N	direction	x-component	y-component
$\vec{A}$	0.100		30^0		
$\vec{B}$	0.200		90^0		
$\vec{C}$	0.300		225^0		
$\vec{D}$					

verified: ____________________



Case VI. $\vec{A} + \vec{B} + \vec{C} + \vec{D} = \vec{0}$

vector	mass, kg	magnitude, N	direction	x-component	y-component
$\vec{A}$					
$\vec{B}$					
$\vec{C}$					
$\vec{D}$					

verified: ______________________