PHY 181: Summer 2023
Worksheet 4

Name: _____ Date: _____

1 Friction

1.1 Static Friction Introduction

Fill in the missing entries in the table below.

$\vec{F}_N$ (N upward)	μ_s	$\vec{F}_f$ (N leftward)
10	0.50	
80	0.33	
22	1.00	
200		50
25		25
81		27
	0.75	33
	0.50	100
	0.25	50

1.2 Static Friction Continued

Consider a box on flat ground with a weight and a coefficient of friction as stated below. Let the forces have units of lbf. Would the force indicated move the box? True or false.

$|\vec{W}|$=100; μ_s = .50; $|\vec{F}|$=20: _____

$|\vec{W}|$=200; μ_s = .75 $|\vec{F}|$=155: _____

$|\vec{W}|$=20; μ_s = .25 $|\vec{F}|$=6: _____

1.3 Kinetic Friction

Fill in the missing entries in the table below.

$\vec{F}_N$ (N upward)	μ_k	$\vec{F}_f$ (N leftward)
16	.50	
20		5
	.40	20

If an object is being pushed on a flat surface under the following conditions, will it keep sliding? Let the units be in Newtons.

$|\vec{W}|$=100; μ_k = .75; $|\vec{F}|$=70: _____

$|\vec{W}|$=150; μ_k = .50; $|\vec{F}|$=80: _____

2 Momentum

Fill in the following table.

$\vec{v}$ (m/s North)	m (kg)	$\vec{p}$ (N·s North)
15	4	
10	5	
1	20	
	10	50
	9	27
	8	32
10		20
100		40
60		240

3 Impulse

Fill in the following table.

$\vec{F}$ (N North)	t (s)	$\vec{J}$ (N·s North)
12	3	
8	5	
2	30	
	15	60
	3	33
	8	48
5		20
32		4
6		36

4 Momentum and Impulse

Fill in the following table. All directions are north.

$\vec{J}$ (N·s)	$\vec{p}_i$ (N·s)	$\vec{p}_f$ (N·s)
15	5	
-2	8	
	20	40
	8	-8
5		20
5		35

5 Conservation of Momentum

Suppose that there is a closed system with two objects. The first one has a mass of 2kg and the second one has a 5kg. Let the direction be right. Fill in the following table.

$\vec{p}_1$ (N·s)	$\vec{p}_2$ (N·s)	$\vec{p}_{total}$ (N·s)
12	-15	
36		
	-20	

Compute the velocities for each row in the above table.

Row	$\vec{v}_1$ (m/s right)	$\vec{v}_2$ (m/s right)
1		
2		
3		