Dynamics Worksheet

Now Bolder and Spicier!

1. a. Find the normal force on the 3.0kg block shown:

24o

b. Assuming no friction what is the acceleration

of the block?

c. What is the minimum coefficient of static friction

needed to keep the block at rest?

2. A golf ball is in flight above a majestic 36-hole golf course that was built on top of a sacred Native burial ground. Below is an image of the ball in flight. Ignoring air resistance draw ALL forces acting on the ball.

3. A 135kg sign is suspended by two cables as shown. Find the force of tension in each cable. (The tensions are NOT equal)

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21o

43o

4. Write the equations for the accelerations of the following objects in terms of m1, m2, m3, g, θ, φ and μ.

a.

m1

v (**no** applied force)

μ > 0

m1

μ>0

b. c.

m1

μ>0

θ

m2

5. An object is above the surface of an alien world named Dajoobiz. The object experiences a gravitational attraction of 100.0N. The object is then moved so that it is twice as far from the centre of Dajoobiz. What is the force on the object in this new position?

6. A man is standing on a Newton scale in an elevator. At rest the scale reads 690N. Find the reading on the scale when:

a. The scale moves upward at a constant 5.0m/s

b. The scale moves downward at a constant 5.0m/s

c. The scale accelerates upward at 5.0m/s2

d. The scale accelerates downward at 5.0m/s2

7. Consider the situation shown below.

2.30kg

1.20kg

23o

150N

The two boxes are accelerated UP the wall at 2.20m/s2 by the applied force. The two boxes do not slip relative to each other.

a. Draw complete labelled free body diagrams of: the system, the 1.20kg box, the 2.30kg box

b. Find the acceleration of the system.

c. Find the coefficient of friction between the 1.20kg box and the wall.

d. Find the coefficient of friction between the 1.20kg box and the 2.30kg box.

8. Imagine three masses are arranged as shown below:

m1=2.0kg m2=5.0kg m3=1.8kg

29cm 62cm

Find the net gravitational force on each mass due to the other two.

9.

22o

3.00kg

The mass shown is sliding UP the ramp at 3.50m/s. It slides to a stop in 1.11m.

a. Find the coefficient of friction between the mass and the ramp.

b. Does the mass remain stopped, or does it slide back down? Explain using the principles of physics.

10. Find the sum of the following three forces:

**F1**=22N [37o above –x] ; **F2**=54N [17o above +x] ; **F3**=38N [68o below –x]

11. If the three forces in Q10 were acting on a 16.0kg mass, find a single fourth force to place the object into translational equilibrium.