Name: _____ Practice Ph12 2-3

1. A 4300 kg truck travelling at 21 m s in the direction of 31º north of east collides with a stationary 1500 kg car. After the collision, the car has a speed of 15 m/s due east. What is the resulting speed of the truck (in m/s)?

2. Two objects with momenta $\mathbf{p}_1$ and $\mathbf{p}_2$. collide and stick together. The magnitude of their total momentum immediately after collision is always equal to
   A. $p_1^2 - p_2^2$.
   B. $p_1^2 + p_2^2$.
   C. the magnitude of $\mathbf{p}_1 - \mathbf{p}_2$.
   D. the magnitude of $\mathbf{p}_1 + \mathbf{p}_2$.

3. A ball at rest is struck obliquely by another ball. Which of the following statements is always correct?
   A. The balls travel in directions at right angles to each other after the collision
   B. The balls have equal momenta after the collision
   C. The sum of the momenta of the two balls does not change as a result of the collision.
   D. The changes in the velocities of the two balls as a result of the collision are equal in magnitude and opposite in direction

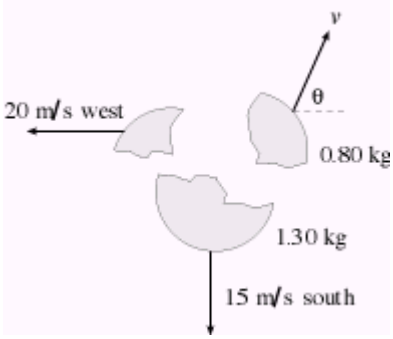
4. A 1200 kg automobile travelling East at 2.0 m/s collides with a 250 kg motorcycle travelling North at 8.0 m/s and the two vehicles lock together. What is the resulting speed of the two locked vehicles?
   A. 8.2 m/s
   B. 2.2 m/s
   C. 3.0 m/s
   D. 5.0 m/s

5. A stationary object in space explodes into three parts of unequal mass. Which of the following statements is true about the three parts immediately after the explosion?
   A. The vector sum of their momenta is zero but the sum of their kinetic energies is not zero
   B. The sum of their kinetic energies is zero and the vector sum of their momenta is zero
   C. Neither the sum of their kinetic energies nor the vector sum of their momenta is zero
   D. The sum of their kinetic energies is zero but the vector sum of their momenta is not zero

6. A 1.2 kg helmet is sliding over very smooth ice at 5.0 m/s east when it collides with the post of a hockey net. The helmet experiences a change of momentum of 4.0 kgm/s north due to the collision. What is the size of the helmet's final momentum?
   A. 10 kgm/s
   B. 2.0 kgm/s
   C. 4.5 kgm/s
   D. 7.2 kgm/s

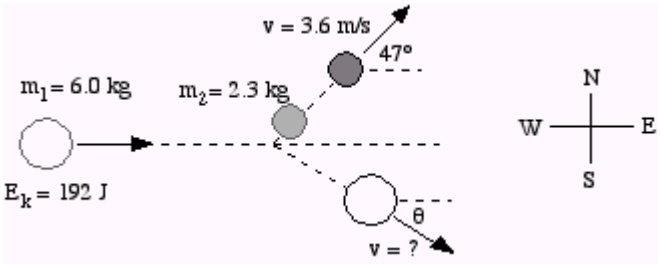
7. A faulty 1.0 kg grenade at rest explodes into three pieces. A 0.40 kg piece goes 70 m/s west and a 0.20 kg piece goes 100 m/s south. What is the magnitude of the momentum of the third piece?
   A. 20 kgm/s
   B. 8.0 kgm/s
   C. 48 kgm/s
   D. 34 kgm/s

8. A 3.00 kg object initially at rest explodes into three fragments as shown in the diagram below.



What are the speed and direction of the 0.80 kg fragment?

9. A 6.0 kg ball having a kinetic energy of 192 J was travelling due east when it underwent an oblique collision with a stationary 2.3 kg ball. The 2.3 kg ball travelled at 3.6 m/s at an angle of 47° north of east after the collision.



What was the velocity (magnitude and direction) of the 6.0 kg ball after the collision?