#1 Momentum

Equations: F=ma $\quad$ Ft=mΔv $\quad$ SOHCAHTOA $\quad$ ρ = mv $\quad$ $(m_1v_1 + m_2v_2)_{init} = (m_1v_1 + m_2v_2)_{final}$

1) What is the momentum of a 65.0kg object that has a velocity of 3.86m/s?

2) If the momentum of an object is 75.3kg m/s, then what is its velocity if it weights 83.8N?

3) What was the impulse on a 7.88kg object if its velocity changed from 7.72m/s to 3.36m/s?

4) What was the force of impact on a 25.5kg object that was initially at rest and in 0.22s was accelerated to a velocity of 8.33m/s?

5) What is the force of impact on a 0.23kg object that has an initial velocity of 4.5m/s and bounces off a wall and returns with the same velocity as before if the time of impact lasts 0.11s?

6) How long was a 28Nforce applied to a 35.3kg object if its velocity went from 2.21m/s to 9.36m/s?

7) If the force of impact was 42.8N and it lasted for 0.18s, then what will the final velocity be of a 6.36kg object that initially was traveling at 3.60m/s in the same direction of the impact. What would it be if the object was traveling in the opposite direction?

8) A 5.2kg object is traveling with an initial velocity of 3.2m/s, and it strikes a stationary 4.4kg object. What would the final velocity be if they stick together after impact? What would the final velocity be for the second object if the first object comes to a stop after impact?

9) A 3.8kg object is traveling with an initial velocity of 8.3m/s and strikes a 6.2kg object that is traveling toward it in the opposite direction with an initial velocity of 6.1m/s. If the first object is moving backward after the impact with a velocity of 0.80m/s, what is the final velocity of the second object?

10) What are the x and y components of the momentum of a 0.56kg object that is moving at 3.3m/s at an angle of 33° to the x axis?

11) A 3.5kg object is traveling along the y axis with a velocity of 2.82m/s and it strikes a stationary 4.2kg object. After the impact the 3.5kg object travels at a 38° angle with the y axis in the negative x direction with a velocity of 1.15m/s while the 4.2kg object goes off at a 48° in the positive x direction. What is the final velocity of the 4.2kg object?

Answers

1) 251kg m/s
2) 8.99m/s
3) -34.4kg m/s
4) 966N
5) 19N
6) 9.01s
7) 4.81m/s, -2.39m/s
8) 1.7m/s, 3.8m/s
9) -0.52m/s
10) x = 1.55kg m/s, y = 1.01kg m/s
11) 2.80m/s