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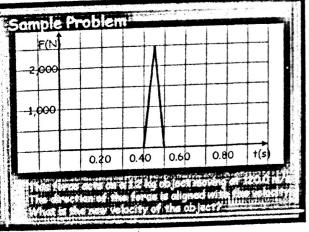
simple Problem

Suppose a 15 kg brick is dropped on a glass table top from a height of 20 cm.

A) What is the magnitude and direction of the impulse necessary to stop the brick?

B) If the table top doesn't shatter, and stops the brick in 0.01 s, what is the average force it exerts on the brick? Fig. J

C) What is the average force that the brick exerts on the table top during this period? 360N



J2125NS 2MAV AV2104 m/s

Definition:

Equation:

Sample problem
A 75-kg man sits in the back of a 120-kg canoe that is at rest in a still pond. If the man begins to move forward in the canoe at 0.50 m/s relative to the shore, what

0=(15)(0,5)+100(v), V= 0.31M/5

External versus internal forces
External forces are

Internal forces are

What can external forces do that internal forces cannot?

Explosions

What type of forces exist in an explosion (external or internal?)

What is conserved in an explosion?

What is not conserved in an explosion?



Which of Newton's three laws is most applicable to recoil? 3rd; equal of opposite =

Describe a perfectly inelastic collision.

What is conserved in both elastic and inelastic collisions?

What is conserved in an elastic collision but not conserved in an inelastic collision?

Sample problem

Suppose a 5.0-kg projectile launcher shoots a 209 gram projectile at 350 m/s. What is the recoil velocity of the projectile launcher?

Sample problem

An exploding object breaks into three fragments. A 2.0 kg fragment travels north at 200 m/s. A 4.0 kg fragment travels east at 100 m/s. The third fragment has mass 3.0 kg. What is the magnitude and direction of its velocity?

Collisions

Definition:

What is conserved in all collisions?

Collision Types

Describe an elastic collision.

Sample Problem

An 80-kg roller skating grandma collides inelastically with a 40-kg kid. What is their velocity after the collision? What is the change in kinetic energy?

Sample Problem

A fish moving at 2 m/s swallows a stationary fish which is 1/3 its mass. What is the velocity of the big fish and after dinner?

$$MV_{1}^{2}(M+J_{3}M)V_{3}MV_{1}^{2}M(1+J_{3})V'$$
 $V'=\frac{MV_{1}}{M+J_{3}M}$
 $V'=\frac{2W_{3}}{1J_{3}}=\frac{1.5MJ_{5}}{1.5MJ_{5}}$

Bertrand

11/28/2012

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Sample Problem

A car with a mass of 950 kg and a speed of 16 m/s to the east approaches an intersection. A 1300-kg minivan traveling north at 21 m/s approaches the same intersection. The vehicles collide and stick together. What is the resulting velocity of the vehicles after the collision? 14M/S @ 61° NOT E

2-Dimensional Collisions

What key concept do you need to remember when you work 2-dimensional collisions problems, either elastic or inelastic?

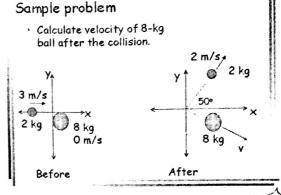
Sample problem

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Sample Problem - elastic collision

A 500-g cart moving at 2.0 m/s on an air track elastically strikes a 1,000-g cart at rest. What are the resulting

velocities of the two carts?

MIVITM2UZZ MIVI TM2UZY

(0.5)(2m/s)=(.5kg)Vi+(10000kg

1kgm/1 = 0,5kg v/ + (1kg)(V/ +2m/s

1=1,5 1/1 + 2

Sample Problem

Suppose three equally strong, equally massive astronauts decide to play a game as follows: The first astronaut throws the second astronaut towards the third astronaut and the game begins. Describe the motion of the astronauts as the game proceeds. Assume each toss results from the same-sized "push." How long will the game last?

X: 2X3 = 2x2 cosso + 8V2

0= 2×25(1150 + 8 Vy2

elow X-axis