

Name: _____

key

Kinetic Energy Problemset

$$KE = \frac{1}{2}mv^2$$

$$m = \frac{2 \times KE}{v^2}$$

$$v = \sqrt{\frac{2 \times KE}{m}}$$

SHOW ALL WORK!

1. What is the kinetic energy of a jogger with a mass of 65.0 kg traveling at a speed of 2.5 m/s?

Write down what you know, for example:

m =

v =

$$KE = \frac{1}{2} 65 \times 2.5^2$$

$$KE = 203J$$

KE =



2. What is the mass of a baseball that has a kinetic energy of 100 J and is traveling at 5 m/s?

Write down what you know:

$$\frac{100 \times 2}{25} = 8kg$$

Answer:



3. What is the kinetic energy of a 0.5 kg soccer ball that is traveling at a speed of 3 m/s?

Write down what you know:

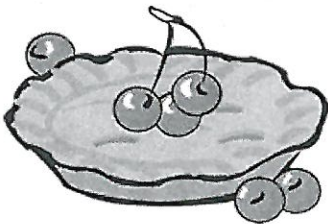
$$KE = 2.25J$$

Answer:



4. What is the kinetic energy of a 1 kg pie travelling at a speed of 4 m/s ?

Write down what you know:



$$KE = 8J$$

Answer:

5. What is the kinetic energy of the pie if it is thrown at 10 m/s?

Write down what you know:

$$KE = 50J$$

Answer:

6. A student is hit with a 1 kg pumpkin pie. The kinetic energy of the pie 32 J. What was the speed of the pie?

Write down what you know:

$$\sqrt{\frac{2 \times 32}{1}} = 8 m/s$$

Answer:

$$\text{GPE} = mgh \quad | \quad g = 9.8 \text{ m/s}^2$$

1. Find the gravitational potential energy of a light that has a mass of 13.0 kg and is 4.8 m above the ground.

m =

g =

h =

GPE =

611 J

Answer:



2. An apple in a tree has a gravitational potential energy of 175 J and a mass of 0.36 g. How high from the ground is the apple?

m =

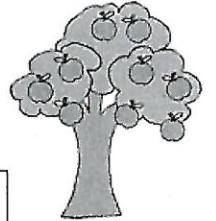
g =

h =

GPE =

~~175 J~~ 0.049 m

Answer:



3. A marble is on a table 2.4 m above the ground. What is the mass of the marble if it has a GPE of 568 J.

m =

g =

h =

GPE =

24 kg

Answer:

4. A box with a mass of 12.5 kg sits on the floor. How high would you need to lift it for it to have a GPE of 355 J ?

m =

g =

h =

GPE =

~3 m

Answer:

5. A cart at the top of a 300 m hill has a mass of 40 kg. What is the cart's gravitational potential energy?

m =

g =

h =

GPE =

GPE = $1.18 \times 10^4 \text{ J}$

Answer:

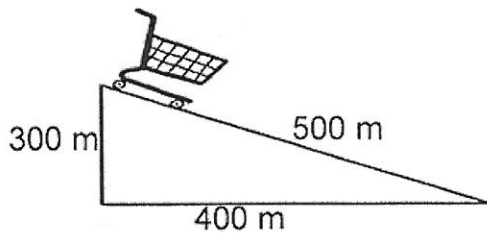
6. Examine the graphic below.

What is the gravitational potential energy of the 6 kg cart as it sits the the top of the incline?

$1.8 \times 10^4 \text{ J}$

What is the KINETIC ENERGY of the cart if it is moving at a speed of 2 m/s at the bottom of the ramp?

12 J



Show work!

Kinetic and Potential Energy Practice Problems

Solve the following problems and show your work!



1. A car has a mass of 2,000 kg and is traveling at 28 meters per second. What is the car's kinetic energy?

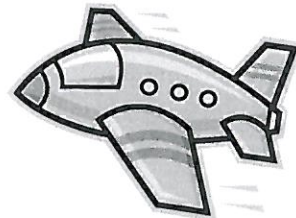
$$KE = 7.8 \times 10^5 \text{ J}$$

2. When a golf ball is hit, it travels at 41 meters per second. The mass of a golf ball is 0.045 kg. What is the kinetic energy of the golf ball?



$$KE = 38 \text{ J}$$

3. The newly developed F-22 Raptor Jet Fighter (something that Mr. DelliGatti worked on in a previous life) weighs approximately 100,000 kg and can travel up to 600 meters per second. What is the kinetic energy of the F-22 jet fighter at this speed?



$$KE = 1.8 \times 10^{10} \text{ J}$$

4. If the jet fighter in #3 is traveling at a height of 10,000 meters, what would the potential energy be?

$$PE = 9.8 \times 10^9 \text{ J}$$

5. A bullet from a policeman's handgun travels at 200 meters per second and has a mass of 0.02 kg. What is the bullet's kinetic energy?

$$KE = 400 \text{ J}$$

6. If the bullet in problem #6 is traveling 2 meters of the ground, what would the potential energy of the bullet be?

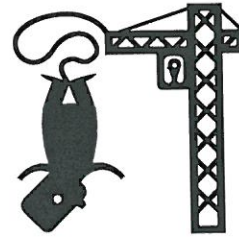
$$GPE = .392 J$$

7. Former Minnesota Vikings Quarterback Brett Favre throws a football at a speed of 35 meters per second. If the weight of the football is 0.4 kg, what would the kinetic energy of Brett Favre's pass be?



$$KE = 245 J$$

8. Mr. DelliGatti decides to break the Guinness Book of World Records for bungee jumping. He goes to the Macau Tower in China where the current record is held. After several heart-pounding seconds, he leaps from a height of 233 meters. If my weight is 86 kilograms, what would my potential energy be just prior to jumping?



$$GPE = 2.0 \times 10^5 J$$

9. I almost hit the ground but luckily I snap back up towards the top of the building. What was my potential energy just before hitting the ground?

$$0 J$$

10. Just before snapping back up in the air, my speed is 50 m/s. What is my kinetic energy just before snapping back up?

$$2.2 \text{ lbs} \sim 1 \text{ kg}$$
$$\frac{1}{2} \times 100 \text{ kg} \times 50^2$$
$$KE = 1.25 \times 10^5 J$$