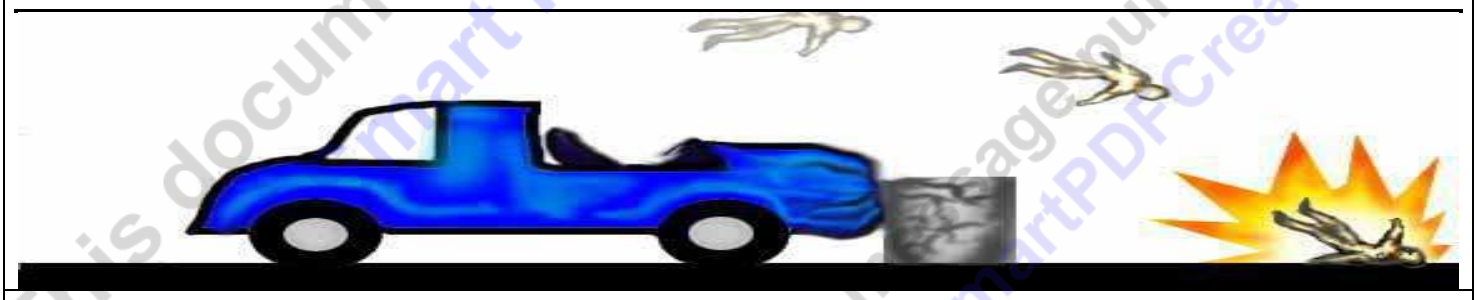
Motion and Machines Unit

Name:
Due:

Please check the diamond and then initial the line after reading the sentence below.

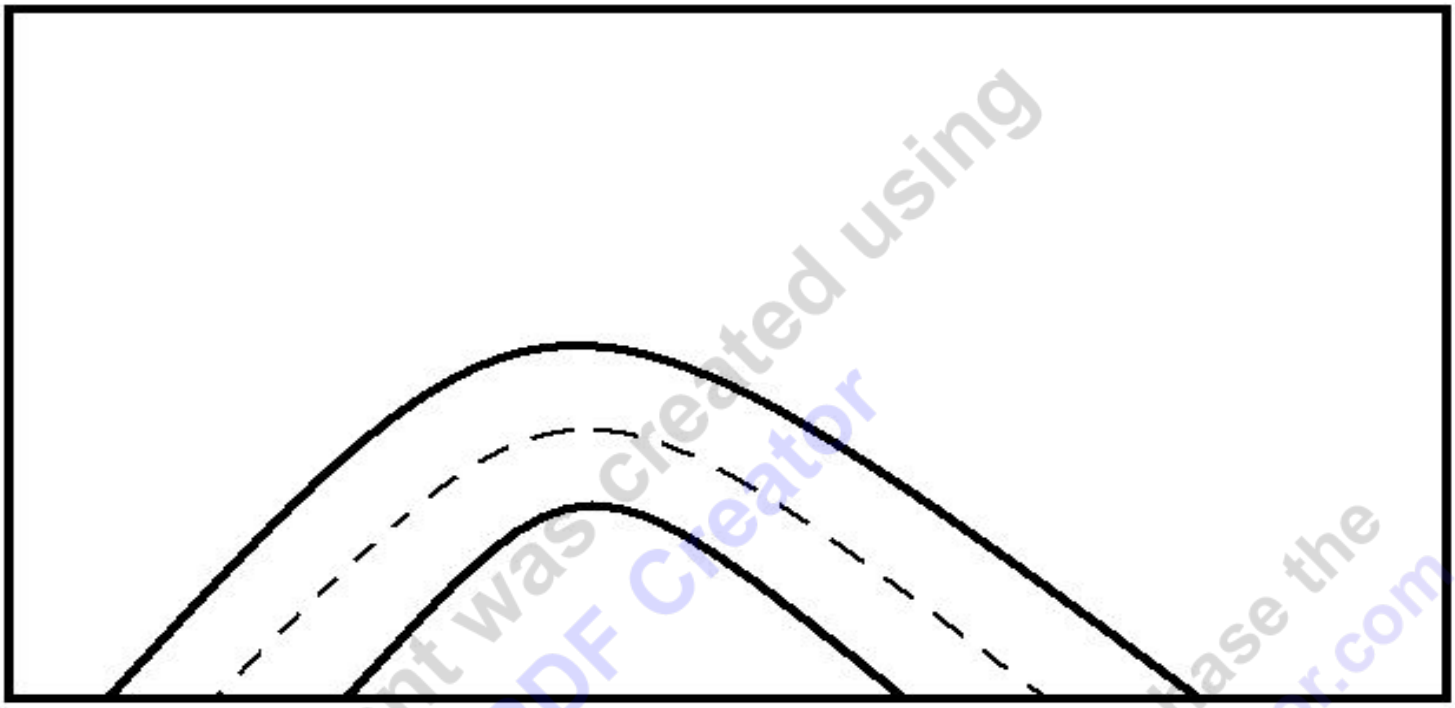
I am aware that I need to show all mathematical work in an organized manner to receive any credit for a question that involves calculations of any kind. Omitting / leaving out the units in the problem or at the end will also result in zero credit ◊ _____

Please explain how the picture below represents Newton's First Law of Motion. Why should you always wear a seatbelt?



Describe how the images below relate to Newton's First Law

Please draw what will happen to a car driving too fast on the sharp curve below. **Explain with some important vocabulary.**



Can you explain how this bird demonstration works?

Please label the picture with correct type of friction below.

Describe the Positives and Negatives of Friction Below

\+ -

Please make an aerodynamic vehicle in the box below. Provide some information about aerodynamics.

Please describe Newton's 3rd Law using the visual below in a short paragraph of at least 25 words.

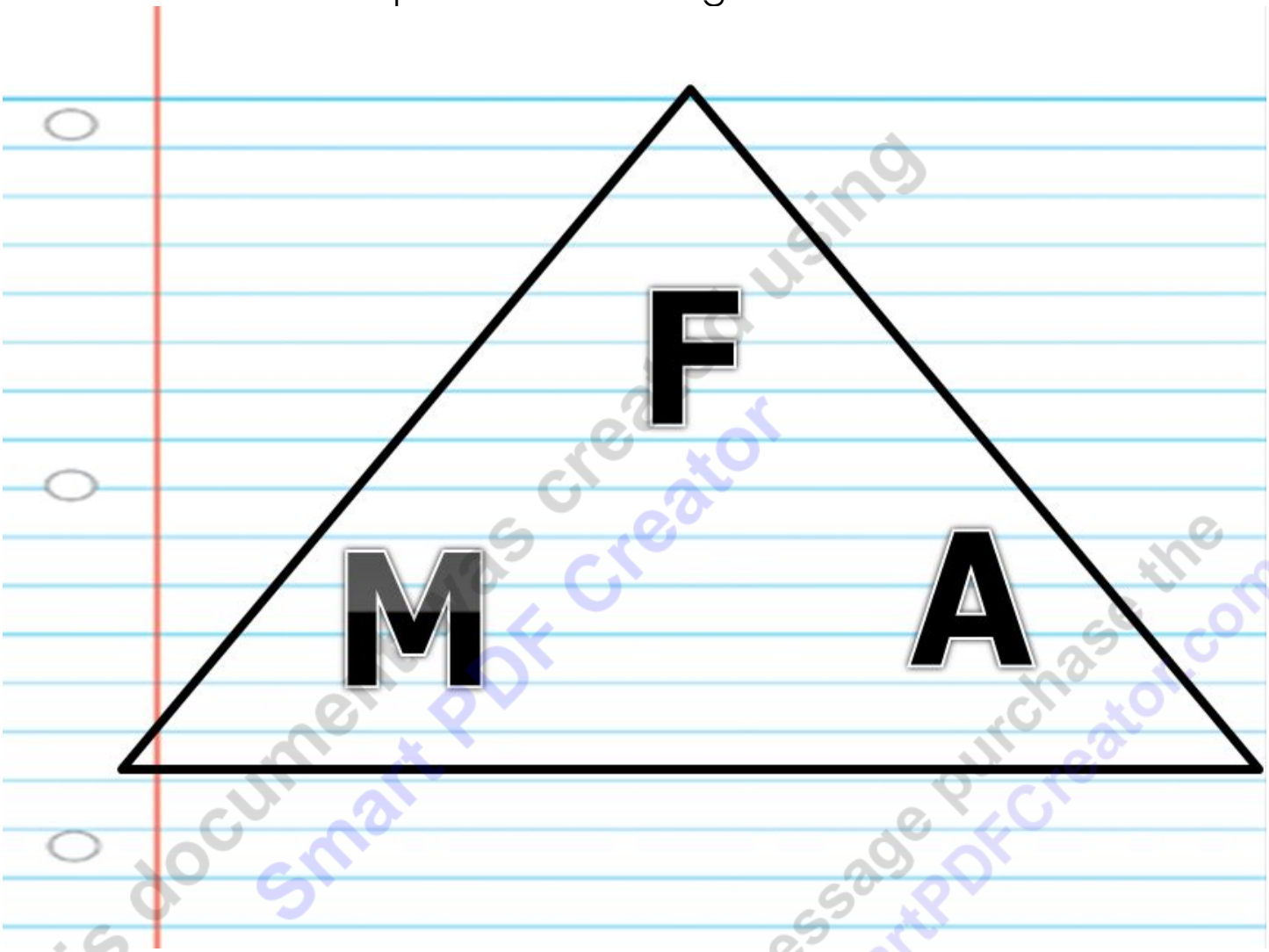
Which of Newton's Law's applies here? Explain using the space on the right.

Please discuss how Newton's 2nd Law (F=ma) applies to the picture below. Both vehicles were traveling at the same speed.

Please provide a visual that demonstrates each of Newton's three Laws

1st	2nd	3rd
See if a neighbor understands it….	See if a neighbor understands it….	See if a neighbor understands it….

Please fill some descriptions in the triangle below for F=ma

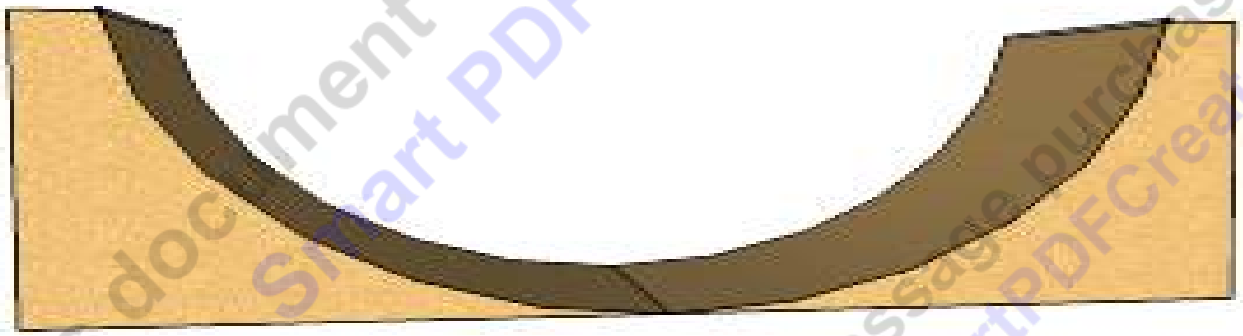


◊ **SHOW YOUR WORK IN AN ORGANIZED MANNER WITH UNITS!**

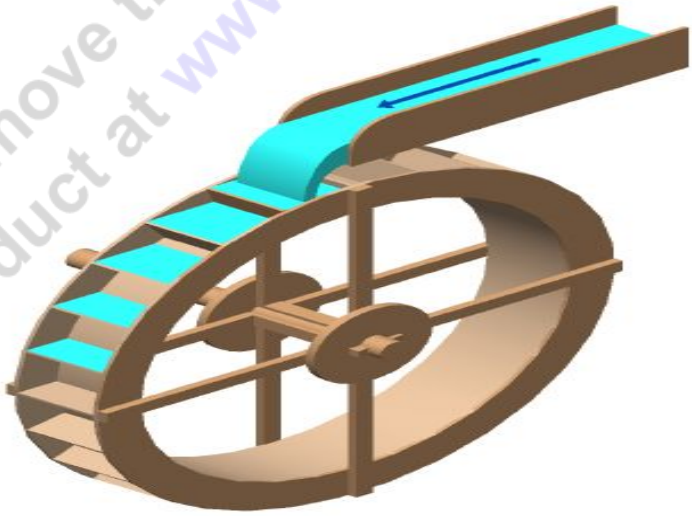
A go-cart with a mass of 200 kg including passengers accelerates from to a speed of 10 meters per second before crashing into a brick wall. F=ma -What was the force of this crash in newtons?	A leaf weighing **6 grams** falls from a tree at a rate of 2 meters every second (m/s^2). What is the force of the leaf hitting the ground in newtons? **Don't forget to convert?**

A car strikes a guardrail and the impact was 20,000 newtons. -The car weighed 1700 kilograms, how fast was it moving in **meters per second (m/s²)?**	A car strikes brick wall and the impact was 15,000 newtons. The car was traveling at 5 m/s². -How much did it weigh in **Kilograms**?

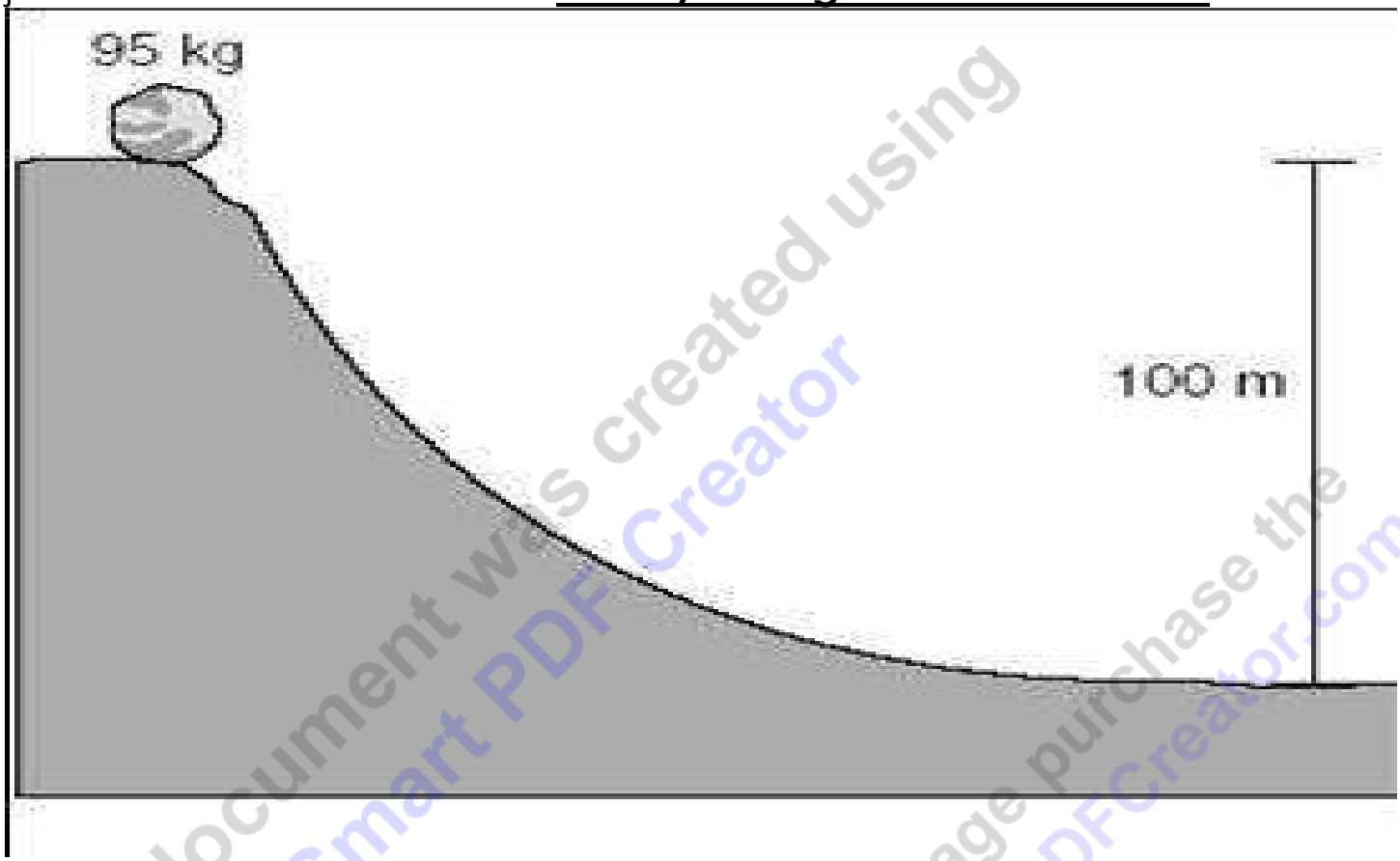
Please describe potential and kinetic energy using the half pipe below.



Please describe how potential energy can be turned into kinetic energy using the picture below as a visual aid.



What's the potential energy of the rock? Use the equation in your journal. Answer is in Joules. **Show your organized work! PE= ?**

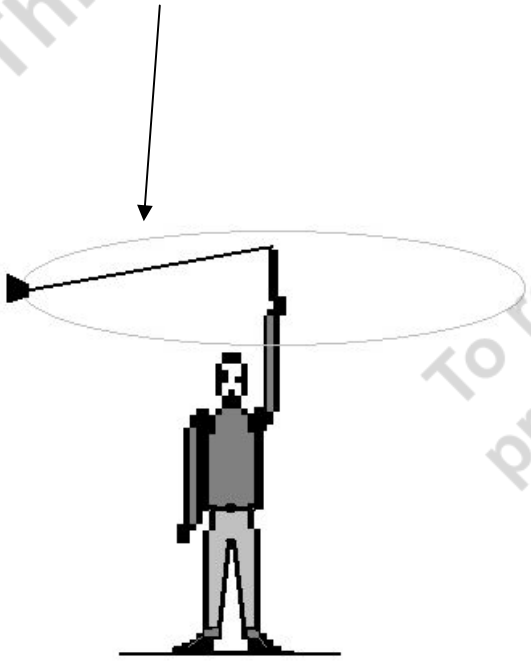


Calculate the potential energy for a 3 kg basketball dropping from a height of 3 meters with a velocity of 9.8 m / s². -Find the PE in Joules? PE=mgh and **please show your work**!	Calculate the potential energy for a 15 kg rock dropping from a height of 100 meters with a velocity of 9.8 m / s². -Find the PE in Joules? **Please show your work**!

A ski jumper moving down the hill had a Potential Energy of 1300 Joules, and a Kinetic Energy of 3,900 Joules. What is her Mechanical Energy?
Please show your work!

What is the kinetic energy of a 20 kilogram cannon ball traveling at 40 meters per second?
-Please show your work!

What force can be seen below?



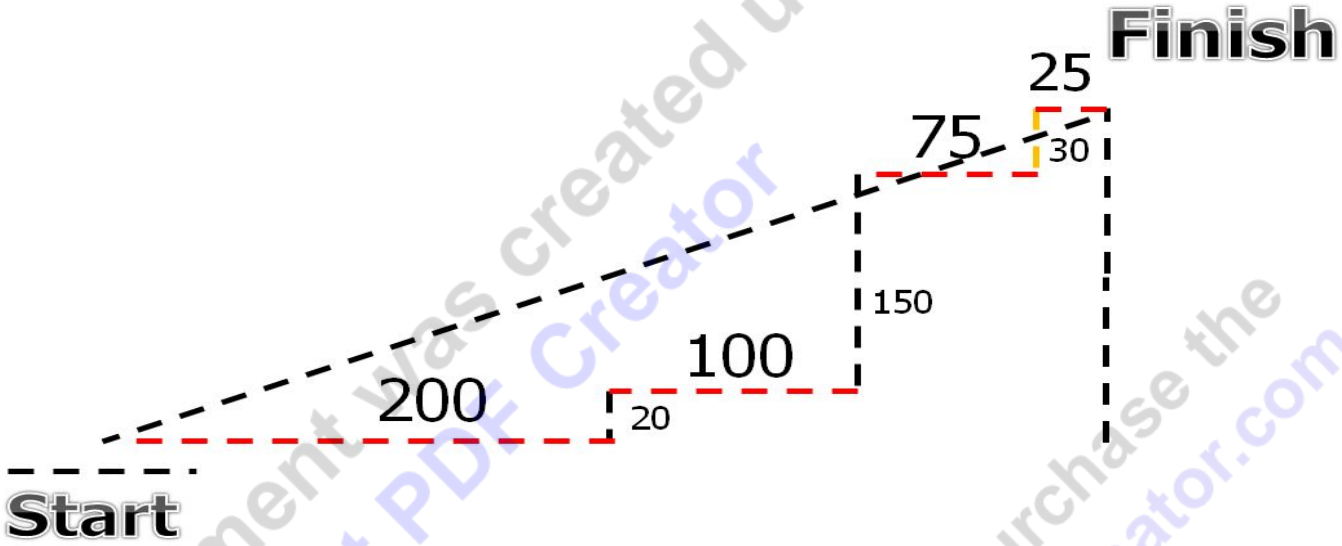
What is the speed of a car that takes two hours to drive 80 miles?

How far did I drive if I traveled 82 km/hr for 4 hours?

PLEASE SHOW YOUR WORK!

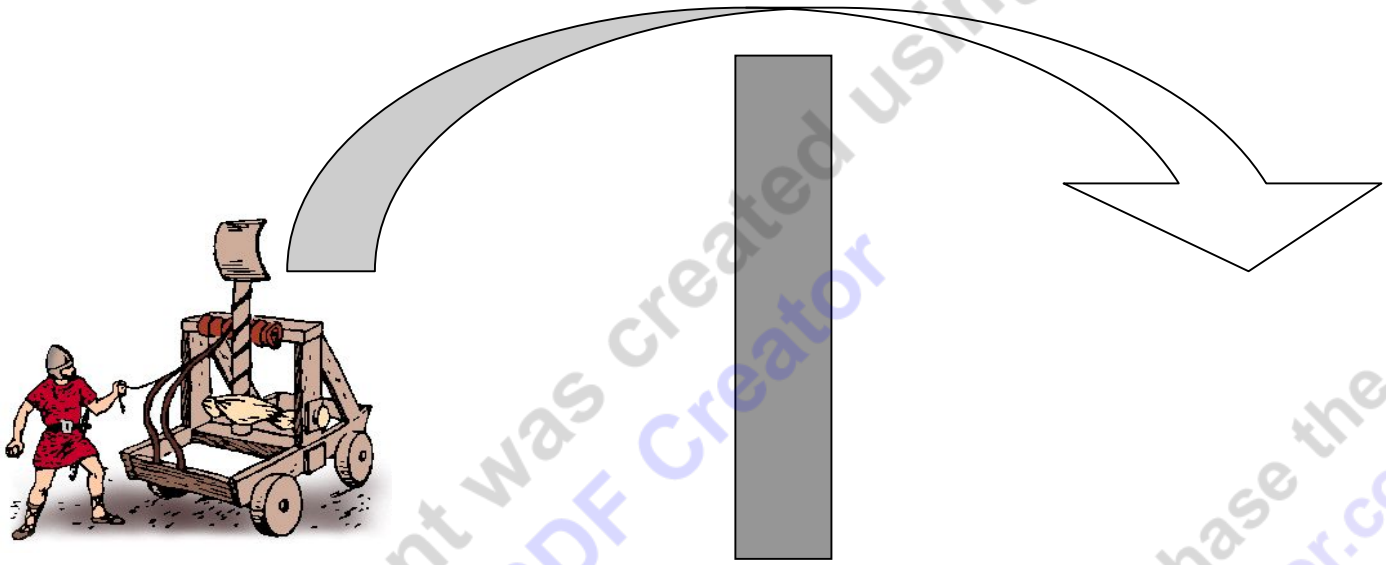
Find the displacement.

Use Pythagorean Theorem $A^2+B^2=C^2$



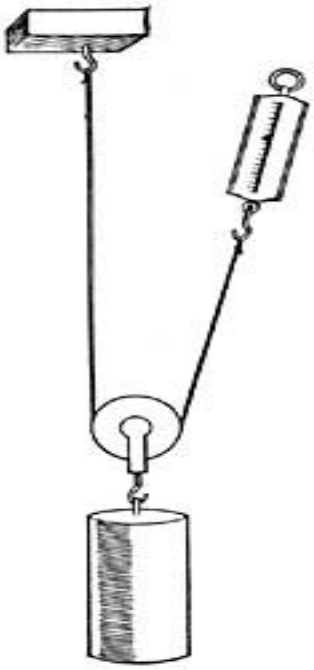
If a car traveling at a velocity of 80 m/s/South accelerated to a velocity of 100 m/s/South in 5 seconds, what is the cars acceleration? **Please show your work!** Remember, The SI base unit m/s^2	The same car traveling 100 m/s/ South decelerates to a velocity of 40 m/s/South in 3 seconds. What is the cars deceleration? **Please show your work!** Remember, The SI base unit m/s^2

What can you tell me about the picture below? Include Newton's Laws of Motion + Potential and Kinetic Energy and Trajectory. (Apex?)

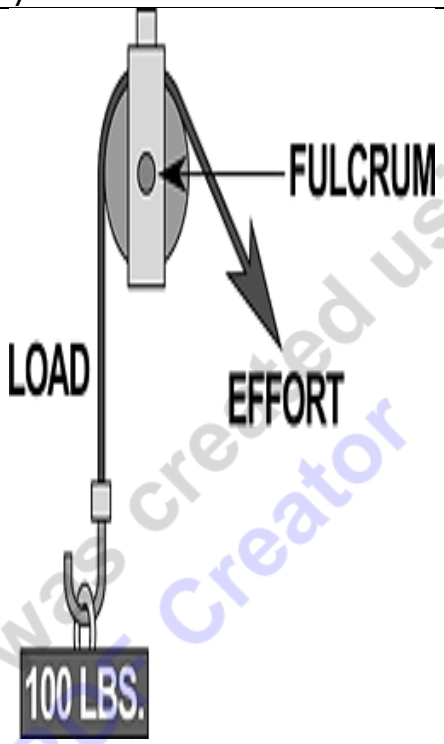


What do all machines do? If you don't know, then please list all of the possibilities. Hint, It's in the notes….

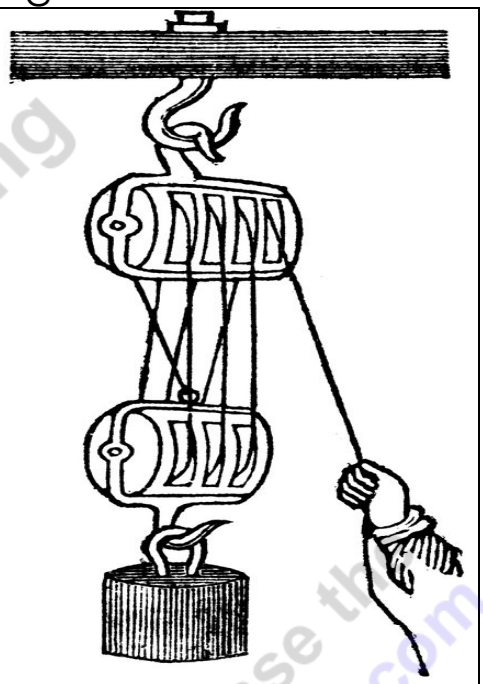
Please provide the name of the correct pulley in the boxes below. Also provide each pulley's Mechanical Advantage.



MA=



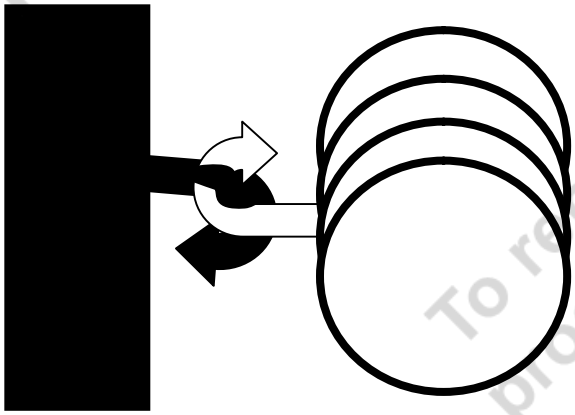
MA=



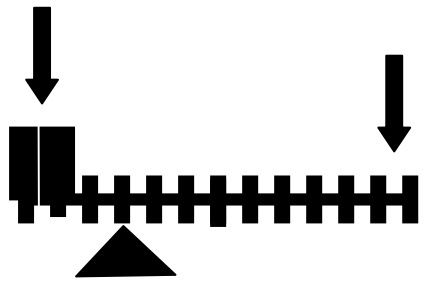
MA=

Turn this page sideways and construct a four pulley system or more.

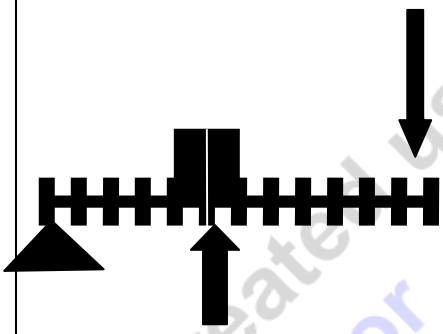
What is your pulley's Mechanical Advantage?

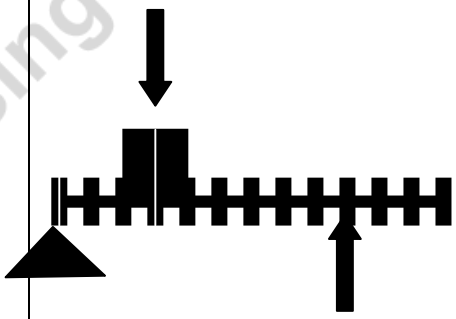


Please provide the name of the correct class of lever in the boxes below (Label each arrow as the effort force, load, or fulcrum).

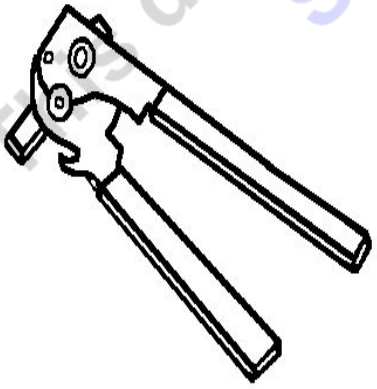


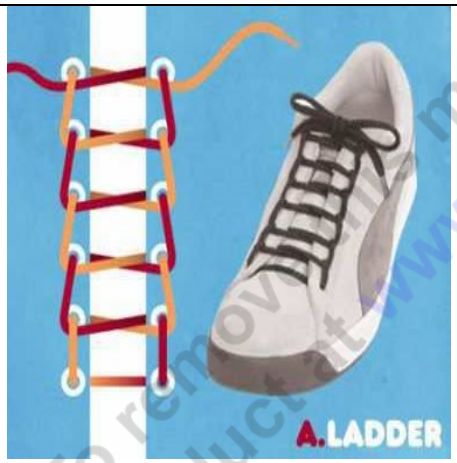
MA=



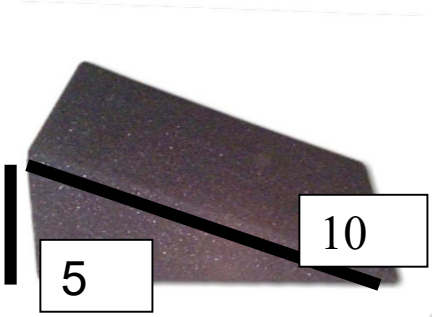


Please label the machines below. There can be more than one answer per square. **Also find the MA where information is given on next page.**

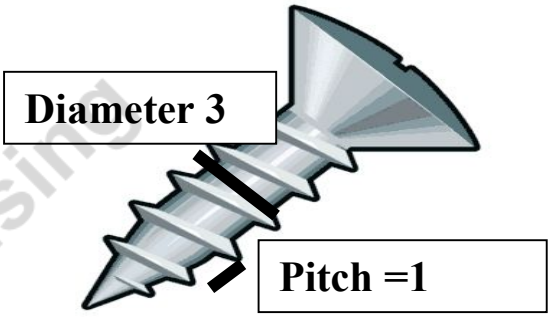




Please show your work
FO
FI

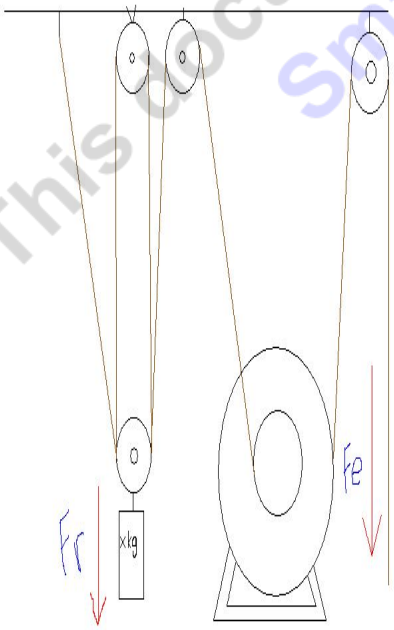


Please show your work
FO
FI



Please show your work
π= 3.14

FO
FI



MA=

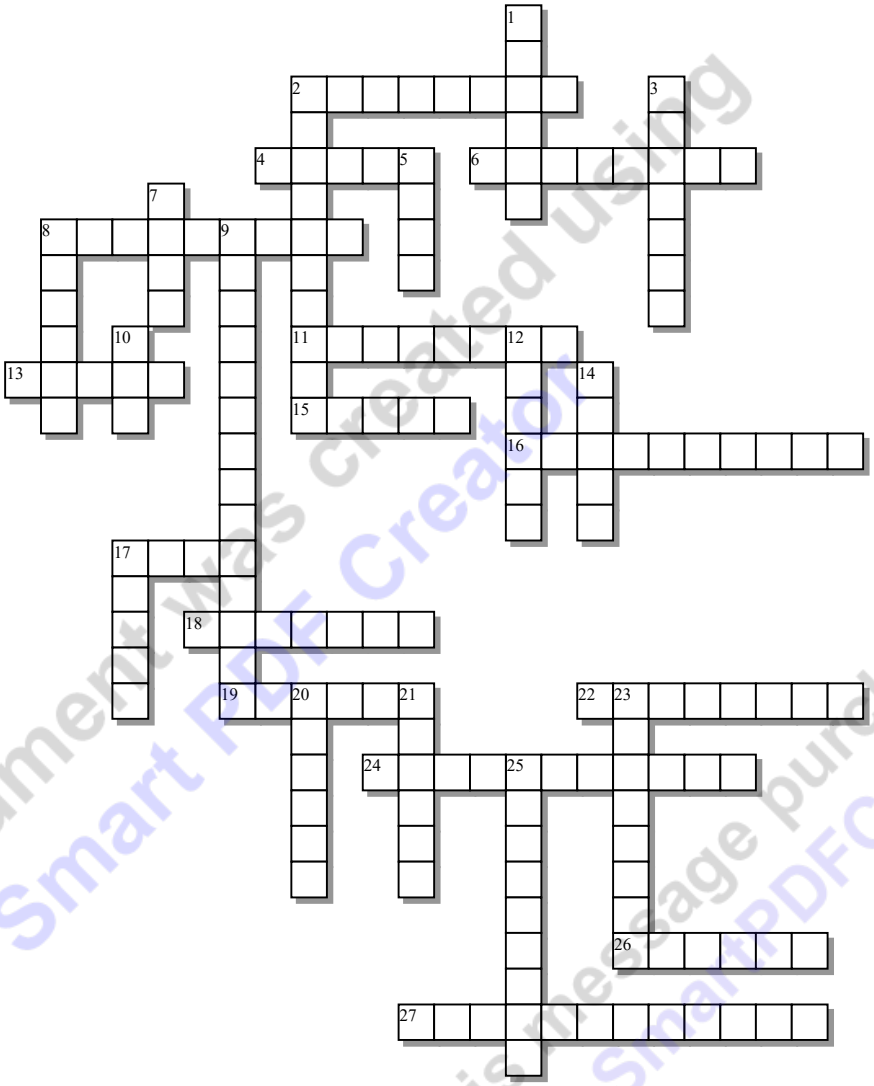
MA =

Please label all of the simple machines in the pictures below. You must draw arrows to them as you describe them. A strong answer will show more than 10.

Sketch out a Rube Goldberg machine that makes a simple task very complex. Your machine must include all of the simple machines we have learned. Please label the machines and your details count.

◊Wheel and Axle ◊Wedge ◊Inclined Plane ◊Pulley
◊Screw ◊Lever

Laws of Motion and Machines Unit Crossword



Across:

2 - This is a measure of the motion of a body equal to the product of its mass and velocity

4 - This machines is an inclined plane wrapped around a pole which holds things together or lifts materials.

6 - This is the name for speed (distance / time) and direction.

8 - The type of energy stored by an object as a result of its position.

11 - This type of machine i two or more simple machines working together.

13 - An object with at least one slanting side ending in a sharp edge,

Down:

1 - KE is measured in _____.

2 - This energy is the sum of PE and KE.

3 - Type of friction that opposes the motion of two surfaces sliding past each other

5 - This depends on the amount of Force (F) exerted and the Distance (d) over which the Force is applied.

7 - An object at rest tends to stay at _____.

8 - Machine that uses grooved wheels and a rope to raise, lower or move a load

9 - The first law of _____ states

which cuts material apart
15 - Type of machine that uses a stiff bar that rests on a support called a fulcrum which lifts or moves loads
16 - The path of flying object: the path that a projectile makes through space under many based on many variables.
17 - The relationship between an object's mass m, its acceleration a, and the applied force F is _____.
18 - This is the name for the energy of motion
19 - Types of machine that does work with one movement.
22 - The resistance encountered when one body is moved in contact with another.
24 - Designed or arranged to offer the least resistant to fluid flow
26 - One _____ is the amount of force required to give a 1-kg mass an acceleration of 1 m/s/s
27 - This is the rate of change in velocity

that all energy is either kinetic or potential
10 - PE = _ _ _
12 - One of the foremost mathematicians and physicists of all time -Sir Issac _____.
14 - Type of machine with a slanting surface connecting a lower level to a higher level. Inclined _____.
17 - This is a PUSH or a PULL, that causes a change in the motion or shape of an object
20 - An object in motion tends to stay in _____.
21 - This is the ability to do work,cause something to move, and gets lost in quality.
23 - For every action there is an equal and opposite _____.
25 - Energy cannot be created or _____.

Possible Answers:
Acceleration, Aerodynamic, Compound, Destroyed, Energy, F=MA, Force, Friction, Joules, Kinetic, Lever, Mechanical, mgh, Momentum, Motion, Newton, newton, Plane, Potential, Pulley, Reaction, Rest, Screw, Simple, Sliding, Thermodynamics, Trajectory, Velocity, Wedge, Work