Chapter 1 : Forces â€" The Physics Hypertextbook

The rope isn't horizontal, so the normal force will be less than mg. I thought to get the force of friction its always µk*N. what is the normal force then? mg minus the y component of the force of the rope?

These tools will significantly simplify the manner in which certain problems can be solved. A force F acting on a body. The resulting displacement is indicated by the vector d. Both the force F and the displacement d are vectors who are not necessarily pointing in the same direction see Figure 7. The work done by the force F on the object as it undergoes a displacement d is defined as The work done by the force F is zero if: Positive or Negative Work. The work done by the force F can be positive or negative, depending on [phi]. For example, suppose we have an object moving with constant velocity. If F is the only force acting on the body, the object will either increase or decrease its speed depending on whether or not the velocity v and the force F are pointing in the same direction see Figure 7. Per definition, work is a scalar. The unit of work is the Joule J. From the definition of the work it is clear that: Forces acting on the safe. Sample Problem A safe with mass m is pushed across a tiled floor with constant velocity for a distance d. The coefficient of friction between the bottom of the safe and the floor is uk. Identify all the forces acting on the safe and calculate the work done by each of them. What is the total work done? The force that is applied to the safe can now be calculated The work done on the safe by each of the four forces can now be calculated: The total work done on the safe is therefore which could be expected since the net force on the safe is zero. Example Problem 1 A crate with mass m is pulled up a slope angle of inclination is [theta] with constant velocity. Calculate the amount of work done by the force after the crate has moved to a height h see Figure 7. The coordinate system that will be used is shown in Figure 4. Since the crate is moving with a constant velocity, the net force in the x and y direction must be zero. The net force in the x direction is given by and the force F required to move the crate with constant velocity is hereby fixed: This force acts over a distance d. The value of d is fixed by the angle [theta] and the height h: The work done by the force on the crate is given by The work done on the crate by the gravitational force is given by The work done on the crate by the normal force N is zero since N is perpendicular to d. We conclude that the total work done on the crate is given by which was expected sine the net force on the crate is zero. Crate moved in vertical direction. If the same crate had been lifted by a height h in the vertical direction see Figure 7. Although the work done by each force is the same, the strength of the required force is very different in each of the two cases. Example Problem 2 A 3. Compute a the work done by the rope on the block, and b the coefficient of kinetic friction between block and floor. A total of four forces act on the mass m: These four forces are shown schematically in Figure 7. Since the velocity of the mass is constant, its acceleration is equal to zero. The x and y-components of the net force acting on the mass are given by Since the net force acting on the mass must be zero, the last equation can be used to determine the normal force N: The kinetic friction force fk is given by However, since the net component of the force along the x-axis must also be zero, the kinetic friction force fk is also related to the applies force in the following manner Combining these last two expressions we can determine the coefficient of kinetic friction: The work done by the rope on the mass m can be calculated rather easily: The work done by the friction force is given by The work done by the normal force N and the weight W is zero since the force and displacement are perpendicular. The total work done on the mass is therefore given by This is not unexpected since the net force acting on the mass is zero. However, in many cases this is not a correct assumption. By reducing the size of the displacement for example by reducing the time interval we can obtain an interval over which the force is almost constant. The work done over this small interval dW can be calculated The total work done by the force F is the sum of all dW Example: The Spring An example of a varying force is the force exerted by a spring that is stretched or compressed. Suppose we define our coordinate system such that its origin coincides with the end point of a spring in its relaxed state see Figure 7. The force exerted by the spring will attempt to return the spring to its relaxed state: Relaxed, Stretched and Compressed Springs. The larger the spring

constant, the stiffer the spring. The work done by the spring on an object attached to its end can be calculated if we know the initial position xi and final position xf of the object: Pendulum in x-y plane 7. Work in 2D Consider the pendulum shown in Figure 7. The pendulum is moved from position 1 to position 2 by a constant force F, pointing in the horizontal direction see Figure 7. The mass of the pendulum is m. What is the work done by the sum of the applied force and the gravitational force to move the pendulum from position 1 to position 2? Method 1 - Difficult The vector sum of the applied force and the gravitational force is shown in Figure 7. The angle between the applied force F and the vector sum Ft is a. Vector sum Ft of Fg and F. In order to calculate the work done by the total force on the pendulum, we need to know the angle between the total force and the direction of motion. The distance dr is a function of d[theta]: For a very small distance dr, the angle between dr and Ft will not change. The maximum angle can be easily expressed in terms of r and h: Angle between sum force and direction. The total work done is Using one of the trigonometric identities Appendix, page A15 we can rewrite this expression as Using the equations shown above for Ft cos a , Ft sin a , r cos [theta]max and r sin [theta]max we can rewrite this expression and obtain for W: Method 2 - Easy The total work done on the pendulum by the applied force F and the gravitational force Fg could have been obtained much easier if the following relation had been used: The total work W is the sum of the work done by the applied force F and the work done by the gravitational force Fg. These two quantities can be calculated easily: And the total work is which is identical to the result obtained using method 1. Kinetic Energy The observation that an object is moving with a certain velocity indicates that at some time in the past work must have been done on it. Suppose our object has mass m and is moving with velocity v. Its current velocity is the result of a force F. For a given force F we can obtain the acceleration of our object: Therefore the time at which the mass reaches a velocity v can be calculated: If at that time the force is turned off, the mass will keep moving with a constant velocity equal to v. In order to calculate the work done by the force F on the mass, we need to know the total distance over which this force acted. This distance d can be found easily from the equations of motion: The work done by the force F on the mass is given by The work is independent of the strength of the force F and depends only on the mass of the object and its velocity. Since this work is related to the motion of the object, it is called its kinetic energy K: Alternative Derivation Consider a particle with mass m moving along the x-axis and acted on by a net force F x that points along the x-axis. It falls under the influence of gravity through a distance h see Figure 7. What is its velocity at that point? Since the object is initially at rest, its initial kinetic energy is zero: Example Problem 4 A baseball is thrown up in the air with an initial velocity v0 see Figure 7. What is the highest point it reaches? The initial kinetic energy of the baseball is At its highest point the velocity of the baseball is zero, and therefore its kinetic energy is equal to zero. The work done on the baseball by the gravitational force can be obtained: Suppose the baseball reaches a height h. Power In every day life, the amount of work an apparatus can do is not always important. In general it is more important to know the time within which a certain amount of work can be done. The same amount of work could have been done using a small space heater and having it run for a long time but the space heater would cause no explosion. The quantity of interest is power. The power tells us something about the rate of doing work. For example, our usage of electricity is always expressed in units of kilowatt. This is equivalent to 7.

Chapter 2 : 5 Ways to Find Normal Force - wikiHow

-- The force that is or isn't, and coincidences minus answers -- From nowhere to somewhere: spiritual envy -- Respect for the faithful, the faithless, and the wishy-washy -- Accursed time -- Escaping time -- Deliver us from evil -- Doing good -- Cosmic joking -- Separating the agnostics from the herds -- Peace unto thee and me, and an old.

Notes Have you ever had an unusual event occur precisely at a meaningful time and wondered if it was an answer to prayer? Does the Lord sometimes answer prayers by providing a "sign," that is, a highly unlikely event? Or perhaps two more common events which occur at the same time, which seem to provide two witnesses of a meaningful answer? Or are all "chance" coincidences entirely unrelated to the prayer? Does God use synchronicity to answer prayers? Last Sunday morning I prayed to know if I should write a Meridian article on synchronicity as a possible communication method used by the Lord. No immediate response came, and I typed part of my missionary journal of some decades past. My brother soon phoned and expressed concern about the condition of the world. He specifically mentioned that he was seeking reassurance that he was not overly concerned about a threat ignored by most people. I mentioned that I had just transcribed from my journal a special lesson I had presented on that subject on my mission and that it was based on the April conference address of Pres. My brother was astounded because he had just read that very talk an hour before. I have not thought about that talk since my mission and he could not remember ever having read it previously. What are the chances that we both would be focused on the same four-decade-old conference talk at the same time that morning? To us it was meaningful, which qualifies it as an example of synchronicity, as explained below. Was it an answer to my prayer? And did it give my brother the reassurance he sought? But are we just imposing meaning on what was really just a chance coincidence? Let us consider whether or not the Lord might sometimes communicate through such precisely timed events. Degrees of Revelation There are apparently degrees of strength of revelation. Because scientists like to classify phenomena as a first step to understanding them, let us attempt to classify revelations according to degrees of strength. These high-profile revelations seem to be given when the individual will have to look back in some future day of testing and remember that it was more than a "good feeling" that got him there. Indeed, the Lord explained to Miriam, the sister of Moses, that Moses was in a class above that of most prophets and prophetesses such as herself , precisely because of these higher level communications Num Samuel heard the voice of the Lord. For example, on the farm my uncle heard a voice commanding him to jump, which he did just before a huge hay hook fell from a crane right where he had been standing. There are many times when one has a "feeling" or "impression" to do something. Perhaps it is only to take a different road, only to discover that there was an accident on the usual road. Sometimes the feeling is a "whispering" or the "still small voice" of the Holy Ghost, and the impression is so distinct that it is almost like a voice. Other times it is only a feeling. In both cases the intensity and clarity of information is below that of a dream or distinct voice. Thus, these revelations are both less intense but also much more frequent than the more powerful communications. Sometimes the word "sign" includes the meaning of "miracle", such as in a healing as in Mark In this article, however, the word sign does not necessarily refer to a miracle, but only to something very unusual. Often a sign is something that conforms perfectly to the usual flow of nature, but it still is unusual enough to demand attention. Let us consider two scriptural examples. The sign of the dove at the Baptism of Jesus. The Sign of the Dove. A dove flew down from the sky and landed on the shoulder of the Savior, which was highly unusual, but not really miraculous. While it is sometimes thought that the Holy Ghost transformed himself into a dove, the Prophet Joseph Smith explained that such was not the case. Rather, the dove was instituted before the creation of the earth as a sign to symbolize the presence of the Holy Ghost TPJS, p. Thus, the presence of the dove testified of the presence of the Holy Ghost. Lying in a Manger. At the birth of the Savior, the angel needed to tell the shepherds how to recognize the newborn king when they found him in Bethlehem. How did the angel do that? By giving them a sign: Now when was the last time you saw a baby resting in a ox feeder?

That would clearly be an unusual sight, but it would not be classified as a miracle. What made it a "sign" was the fact that it was predicted by the angel as a way to identify the correct infant. Having looked at these four levels of revelation, let us now consider what I propose to be a particular type of sign. It is perhaps the most subtle form of revelation: The synchronicity of the lunar eclipse at the Crucifixion when the moon "turned to blood. Synchronicity Now we come to the subject of this article: What does that word mean? The word "synchronous" refers to events which happen at the same time. The word "synchronicity" adds two restrictions to that meaning. First, neither of the events can cause the other. Scientifically stated, the events are not "causally related. Meaningful in what way? It refers to the coincidence of events occurring at a time which was meaningful to observers of the events. It other words, two events occur at the same time, in which one does not appear to have caused the other, but both events appear to indicate some meaning to the observer. A solar eclipse is breathtaking. Because this definition opens the door to the entire field of superstitions, omens and portents, where, for example, the appearance of a comet might be interpreted to mean the downfall of the emperor, the question arises as to why this word has been introduced into the discipline of science where causality has reigned supreme. The reason is that it was only until about that the world of physics was based almost entirely on the principal of causality. The universe was viewed as a great machine where everything occurred because of forces acting on objects, which in turn were caused by previous forces acting on objects. All of that changed with the advent of quantum mechanics where non-causal events suddenly appeared everywhere, especially on the atomic level. Determinism was replaced by the newly enthroned monarch of "probabilty. Pauli had been a great force in the formulation with Werner Heisenberg of quantum mechanics. Jung had studied Eastern and ancient philosophies where, for example, people would cast lots to determine who should perform a task or who was the guilty party compare 1 Nephi 3: Jung noticed that such practices were often more accurate than chance would predict, and Pauli was able to provide partial physical explanations of how that could be possible. It took them years to have the courage to publish a jointly authored book on such a controversial topic, but they finally did so in Physics Nobel Laureate Wolfgang Pauli This subject is still too controversial for most modern scientists. Most probably do not even know the word "synchronicity," and most would reject the concept as pseudo-scientific if they did. They continue to believe that all synchronicity is just the result of chance occurrences and that no events have "meaning. But that is not what the scriptures teach. That is, whereas we might not think of a comet as being a "sign" of anything, let us remember that the Star of Bethlehem was given as a sign of the birth of the Savior. Moreover, we have yet to see the "grand sign of the Son of Man in heaven," heralding his return. The Prophet Joseph Smith said that it will be dismissed by the world as merely "a planet, a comet, etc. A sign is a very unusual occurrence, and can include really spectacular events, such as the parting of the Red Sea, or miraculous healings, or having the sun darkened for three hours when the Savior died. But as discussed above, a sign can also include more pedestrian events such as the infant Christ child being laid in a manger. Synchronicity can also be a sign by having two somewhat common events occur at the same time, both of which seem to point to the same meaning. Thus, there is still something very unusual, but with synchronicity, it is the simultaneous timing of the two or more events which is unusual, rather than the rarity of the events themselves. Keeping these fine distinctions in mind, let us now return to the above scriptural examples in the light of the concept of synchronicity. It was that it occurred when the Savior had just been baptized and also when a voice was heard from heaven declaring, "This is my beloved Son, in whom I am well pleased" Mat. Thus, the sign of the presence of the Holy Ghost was given precisely when the voice of the Father was also heard as a sign of his presence. This coincidence of timing, combined with the meaningful interpretation relating to the Holy Ghost, qualifies this sign as an excellent example of synchronicity. The shepherds arrived when Jesus was in the manger. What if the shepherds had arrived to see an empty manger, with Mary holding the infant Jesus? No, we are explicitly told that the shepherds found "the babe lying in a manger" Luke 2: Thus, precise timing is often involved, in this case involving the arrival of the shepherds, so this sign also involves synchronicity. The meaningfulness of the sign was provided by the angel. Without those words, finding the babe in a manger

would probably not have been interpreted as a sign, and even might have disqualified the infant in their minds from having been considered as a newborn king. Most of the "signs" which follow the saints, such as healing the sick, casting out devils and speaking in tongues come as direct results of priesthood authority being exercised. Thus, there is a definite "cause and effect" relationship which disqualifies them as being examples of synchronicity. And it is the same with the greater miracles such as Moses parting the Red Sea. Of course, Pharaoh might say that it was just a chance coincidence that the sea happened to part just when Moses stretched out his hand, but then Pharaoh had thought that all of the plagues were the result of chance or magic. But such miracles were clear examples of the power of God being exercised. So where are the examples of synchronicity? They are all at a much more subtle level, which really do appear to be chance coincidences, but which which have great meaning, either to the observer or to the future course of history. Both of these events changed the course of history to such an extent that the hand of the Lord must surely have been involved in an unseen way. When Peter later denied him the third time, "immediately, while he yet spake, the cock crew.

Skeptics note that therapists go "fishing" for these kinds of answers, that studies began with hypnotists, and symptoms are most dramatic after therapy. Schizophrenia A psychotic disorder where person loses contact with reality.

Alternative Alt3 The lead of this article begins with: Edinburgh Castle is a fortress which dominates the skyline of the city of Edinburgh, Scotland, from its position atop the volcanic Castle Rock. However the lead image that is currently there does little to support these statements and has some technical issues. Despite this it is stilll quite a nice capture but shows only a small portion of the castle in isolation. Perhaps better suited to the body of the article. I had suggested a recent image I had taken as it was hi-res, technically sound and highlighted literally and figuratively that the castle dominates the city skyline. It was reverted upon inclusion in the article for not what i would consider good reason. To avoid any hint of an edit war, I am submitting the two images for community consideration. Saffron Blaze talk So we need to assume that most readers will only see the px thumbnail. Looking at the current lead image again, the house on the left hand side is a bit distracting so it might be worth cropping the photo, but even at px the part of the castle shown is still pretty clear. That said, it would be a shame not to use it in the article. The current image does eliminate any desire to expand but I wonder if those stats would change if the lead images were swapped and people would then be encouraged to click through? However this may detract from the purpose of a lead image. I looked in the Commons for something stellar but unfortunately it does not yet exist, which suprises me somewhat. I realise it may not be bright enough for some. Similar perspective to the first but taken when more sunlight was on the city and with a tighter framing on the castle. Also, it would not involve any skyline, only sky behind the Castle. Something similar to this http: Inverleith and Warriston are both places where the Castle can be seen on the skyline;perhaps also the traditional view from the Calton Hill. I personally think the current lead image is fantastic, as it does demonstrate how the Castle dominates the much smaller and lower Grassmarket buildings. Though I can see the point about them being distracting also. The "Suggested Replacement" picture is very good in this respect, and I think it deserves to be in the first part of the article, as it shows how the Castle Rock stands above its surroundings. I would support the previous replacement of the Princes St Gdns image with this one. There are currently two images from the gardens in this section though one has a distracting pink tree in the foreground. The problem is that though the Princes St view is the most commonly seen, I dont think it tells you much about the castle because all you see is a jumbel of walls. Thanks, Jonathan Oldenbuck talk A shot, potrait style, from a similar perspective as that Britanica shot linked above would be lovely mid-morning on a clear day. In fact its a similar angle to your Salisbury Crags shot you can see the museum roof in the lower left of the shot. Here is an example ; here is another not saying either is brilliant. The Britannica shot is definitely from the Apex hotel in the Grassmarket, so not sure how accessible that would be. Jonathan Oldenbuck talk Here we are discussing the best image to lead into the subject, while meantime Nab82ba has posted a pic in the 2nd position, which is very good but almost a duplicate of the picture by Macographer that follows. Its main virtue is that it is a closer view. As an interim measure I have gone through all his images and removed the link and submitted his photos for deletion as I suspect they are copyvio. It seems that commercial considerations are lurking behind the newly posted image. Some people have no shame. I am content to leave whatever is there now as the alternatives are not spectacular. Hopefully Kim gets a fine day and some free time: I hope that people are ok with it. If not please feel free to drop me a wee line as I am open in regards to changing it. Again sorry to jump the gun by putting it up there! I was tempted to add it before but was being stingy with my castle love lol, I know what you mean though about the colours, not only that I felt that there was a lot of green going on too but it was nicely offset by the viewpoint itself I hope. I also appreciate the other images too, I think the standard and the level of choice is fantastic. Thanks for your input, its much appreciated! At a later stage someone appended the above pic labelled Alternative to an article by none other than King Alex. See this link I never knew before that the castle was a

symbol of Scottish independence, given that at various time in its history it has been garrisoned by the English hence demolished by Bruce or, after , by the British Army, and hence a symbol of the Union. I do know that Edward met the Scottish nobles at Norham on the border. That strikes me as inherently more likely unless he had removed the records, e. If anyone has evidence in print that disagrees with the Salter reference and supports the other contention, I would suggest that the reference be changed. That is a probably a dramatic fiction to heighten the achievement, rather than historical fact. William Francis was a soldier who was said to know a way to sneak in and out of the castle to visit his girfriend in the burgh. Common sense suggests that he probably knew a pathway along the side of the rock that circumvented whatever gatehouse arrangement existed at the time. The idea that Randolph and his men would start at ground level tactically a very dangerous position to put themselves in , climb the northern face of the rock and still have enough energy to scale the walls and defeat the garrison, places them in the league of supermen of a kind only encountered in legend and comics. The taking of the castle was certainly a remarkable accomplishment, but I think the page should be careful how it describes this incident. The Kingship in Eclipse - , among those I was able to check. There is such a cleft in the north face, it leads up behind the ruin of the well-house tower you can see it on the extreme right of this aerial image. I think it would be quite wrong to change the story based on the supposition that it is embroidered, particularly given its wide acceptance. I suggest the article should retain the story as related by Barbour, but could be amended to make clear its origin also. I was merely suggesting a cautionary note should be sounded when relating an heroic exploit that seems far-fetched, as does so much Scottish history. I guess history is written by the victors after all. This is a matter of opinion, dependant on your thoughts on what constitutes "dominating", and also what constitutes Edinburgh city. Certainly it is a prominent feature. It must have dominated the city more in the past before the Victorian expansion of the built-up area outwards. I would say it still dominates the city centre, though one could temper that by saying, mainly from the north, less so from the south and west, and hardly at all from the east unless at a distance. But that kind of exactitude makes for a dull read. While both statements are essentially true they are not very enlightening to the reader. If you look at the definitions of "dominate" and "feature" you could surmise that many structures are features of both those skylines but only a very few could be considered to dominate. It seems clear to me that Edinburgh Castle meets the definition of dominates quite well. This is only one of many verifiable references that describe the castle as such and most make reference specifically to the skyline. I am not convinced sourcing is a requirement since the dominance of this feature is self-evident is so many of the images of the Edinburgh skyline. At a minimum "dominates" is a better descriptor than "feature" as it provides useful factual information. It came across to me as an assertion of fact which would generally be uncontested. Google the sentence "What dominates the skyline of Edinburgh? I think you will see my point about uncontested. How about it "dominates the centre of Edinburgh", or is a "principal feature" of the skyline? I am all for compromise but it is unclear why dominates is not factually correct. It certainly looked that way to me when I was there the week prior. If it stated the height, or size, of the castle then that would be indisputable fact. But using "dominates" is adding opinion to the mix. What if someone replaced it with "crowds the skyline" or "looms over Edinburgh"? They are both correct in so far that the castle is tall, prominent and high, but the manner in which it is is opinion. Wikipedia still has an obligation to be neutral, particularly in the lead. I am not using google hits to conduct "original research". Regardless, if we look at other wiki articles where features dominate skylines we see then described as: Atlantic City Casino hotels dominate the skyline It dominated the Calgary skyline. Any modifier that we add to the statement that Edinburgh Castle is on the skyline is subject to being called an opinion. Is it a feature? Some might argue it is not. Others might argue this as well. At what point does it become factual? My argument is that feature, prominent and dominate are all factual statements with respect to this castle and its relation to the skyline. Do you think you can Google something "for fun" and then use it to demonstrate your point as well? In that case, I suggest it was OR, for fun. Obvious all words carry a certain baggage. We can only attempt to be as neutral as possible. And just because other article sometimes fail to do this does not mean this article should to. Being the one and only.

Chapter 4 : WORK AND KINETIC ENERGY

If the Fine Structure Constant is providing the ratio between the repelling force of two unmoving electrons 1 Planck length apart and that of Planck force, then the electromagnetic force is much weaker than what one may expect and that difference is the Fine Structure Constant.

Applied Force free body diagrams Physics is a simple subject taught by simpleminded folk. When physicists look at an object, their first instinct is to simplify that object. This is the beginning of a type of drawing used by physicists and engineers called a free body diagram. Physics is built on the logical process of analysis â€" breaking complex situations down into a set of simpler ones. This is how we generate our initial understanding of a situation. In many cases this first approximation of reality is good enough. We keep repeating the process until we reach a level of understanding that suits our needs. Just drawing a box is not going to tell us anything. They interact with the world around them. A force is one type of interaction. The forces acting on an object are represented by arrows coming out of the box â€" out of the center of the box. This means that in essence, every object is a point â€" a thing with no dimensions whatsoever. The box we initially drew is just a place to put a dot and the dot is just a place to start the arrows. This process is called point approximation and results in the simplest type of free body diagram. Draw a free body diagram ofâ€¦ a book lying on a level table a person floating in still water a wrecking ball hanging vertically from a cable a helicopter hovering in place a child pushing a wagon on level ground a book lying on a level table First example: Reach into the drawer, pull out the textbook, and lay it on top in a manner befitting its importance. A book lying on a level table. Is there anything more grand? Now watch as we reduce it to its essence. Draw a box to represent the book. Then identify the forces acting on it. Something keeps the book down. We need to draw an arrow coming out of the center pointing down to represent that force. Thousands of years ago, there was no name for that force. We now have a more sophisticated understanding of the world. Books lie on tables because gravity pulls them down. Prosaic means non-poetic, by the way. Prosaic is a poetic way to say common. Prosaic is a non-prosaic word. Back to the diagram. Therefore there has to be some force that also pushes the book up. What do we call this force? Place a book in water or in the air and down it goes. So what do we call this force? Think about it this way. The direction of the force always seems to be coming out of the solid surface. A direction which is perpendicular to the plane of a surface is said to be normal. The force that a solid surface exerts on anything in the normal direction is called the normal force. Calling a force "normal" may seem a little odd since we generally think of the word normal as meaning ordinary, usual, or expected. Normal force is closer to the original meaning of the word normal than normal behavior behavior at a right angle? Well in terms of identifying forces, yes we are. This is a pretty simple problem. The earth exerts a force on the book called gravity or weight. The table exerts a force on the book called normal or the normal force. What else is there? Forces come from the interaction between things. When you run out of things, you run out of forces. The last word for this simple problem is about length. How long should we draw the arrow representing each force. There are two ways to answer this question. One is, "Who cares? This is a reasonable reply. Directions are what really matter since they determine the algebraic sign when we start combining forces. The algebra really will take care of it all. The second answer is, "Who cares is not an acceptable answer. So what is going on? In essence, a whole lot of nothing. Label the one pointing down weight or use the symbol W or Fg and label the one pointing up normal or use the symbol N or Fn. There were quite a few concepts that needed to be explained: We could draw a stick figure, but that has too much unnecessary detail. Remember, analysis is about breaking up complex situations into a set of simple things. Draw a box to represent the person. Draw a wavy line to represent water if you feel like being fancy. Identify the forces acting on the person. There must be a second force to counteract the weight. The force experienced by objects immersed in a fluid is called buoyancy. The person is pulled down by gravity and buoyed up by buoyancy. Label the one pointing down weight or W or Fg and the one pointing up buoyancy or B or Fb. Buoyancy is the forced that objects

experience when they are immersed in a fluid. Fluids are substances that can flow. All liquids and gases are fluids. Air is a gas, therefore air is a fluid. I said there were only three objects in that problem: What about the air? The air does indeed exist and it does indeed exert an upward force on the book, but does adding an extra arrow to the previous example really help us understand the situation in any way? People float in water and even when they sink they feel lighter in water. The buoyant force in this example is significant. Books in the air just feel like books. Whatever buoyant force is exerted on them is imperceptible and quite difficult to measure. Analysis is a skill. When you reduce a situation to its essence you have to make a judgment call. An observant person deals with the details that are significant and quietly ignores the rest. An obsessive person pays attention to all details equally. The former are mentally healthy. The latter are mentally ill. Start by drawing a box. Draw a line coming out the top if you feel so inclined. Keep it light, however. The wrecking ball has mass. Therefore it has weight. The wrecking ball is suspended. Therefore something is acting against gravity. That thing is the cable which suspends the ball. The force it exerts is called tension. The cable is vertical. Therefore the force is vertical. This sounds like the previous two questions. Tension and weight cancel. Label the one pointing down weight or W or Fg and the one pointing up tension or T or Ft.

Chapter 5 : 3 Ways to Calculate Acceleration - wikiHow

Normal force is the amount of force required to counteract the other forces in any given scenario. The best way to go about finding it depends on the circumstances of the object and the variables you have data for.

November 26[edit] Current in two circuits[edit] Hello. For that last question, 10, I assumed that the current follows conventional current and that the "electrons" from the positive side of the left battery would flow in a counterclockwise direction through the bottom light bulb, up to the top light bulb, and to the negative side of the battery. The answers , however, state that no current flows through the top light bulb at all! Can someone shed some light on this? When a wire splits, voltage is identical. Since that voltage difference is the same in both pictures, the two currents have to be identical as long as they have identical bulbs. This means the currents are equal. When working through these types of problems, there are forced voltages with the battery. The difference is that in the bottom circuit, both batteries split the load while in the top circuit, only the right battery supplies current assuming ideal sources. The answer is C. If the left battery nears empty, the right will particially backup, but only up to a quarter of energy on each bulb. The lower bulb well emit less light by time, the upper bulb more until euqual. It is a quarter on energy on each bulb. The bulbs are in line. The visualisation is limited to a maximum of the materials yield stress. This starts with the fact that "stress" is not an uniform unit or measurement shear-, bend-, swing-, notch impact-, torrision-, tension-, weight-"stress" etc.. Additionally this all does change with each material, and even with each alloy. So what example would you like more? In the case of rescue duty the woman or man they always work with. From that point of view there is likely no difference between a "rescue team" and a "family". But to be certain we would have to ask the dogs. However, dogs have been bred for thousands of years to appeal to humans, so them acting friendly is the expected behavior, with exceptions for some that are in the pound because they are "defective" in that regard, or perhaps were abused to the point where they now fear all humans. If the dog pound was full of wolves, instead, which are genetically almost identical to dogs, save the thousands of years of breeding for traits humans find desirable, then very few of them would act in a friendly manner and those few would be the mutations. So, some dogs at shelters will indeed perk up and wag their tails, lick hands, or whine in pleasure as people come by. If they are chosen and led out by new people, they look extremely happy. Seriously, go check out a dog adoption center. At first I went for at least a couple of hours every week; then I got more work and a pair of cats at home. Other volunteers take the dogs for daily exercise. They both seem about the same to me. Are these plants only considered 1 single large plant because they are physically connected? Can 2 physically disconnected parts of the plant be reconnected again? That is, for example, a flock of sheep huddled together is not a single organism. A pine grove is not a single organism either, as the pines merely grow next to each-other. By contrast, an aspen grove a clonal colony constitutes a single organism when all individual trees are interconnected at the roots and can exchange water and chemicals with each other via the interconnected root system. Plants can form interconnected clonal colonies by various means. For example, some plants like many grasses send out roots or rhizomes that sprout new plants when they reach the surface. Some plants like strawberry send out runners that root at certain intervals. Some plants like raspberry produce roots when their branches touch the ground. Some plants like banyan send aerial roots down from its branches, and some of these roots with time become secondary trunks. Fungi "mushrooms" , too, form interconnected clonal colonies by sending out their hyphae mycelium and producing new fruiting bodies from them; this often looks like a circle of mushrooms, and can be quite large. Does this answer your question? Please let us know. All the best, -- Dr Dima talk You can do this experiment yourself, it is called grafting. OP and others may like to read up on ramets and genets , perhaps rhizomes and stolons. In the most confusing cases, whether the clone becomes a distinct organism is often a matter of chance, e. I also took the liberty of linking the terms in the header for convenience. Thanks for the help! I have a few related questions: Yes, once disconnected from each-other, the root systems of two trees from two parts of the clonal colony may reconnect naturally when the

roots are allowed to grow in contact with each-other. It is also possible to graft roots artificially; you may, for example, take a look at the techniques used for root grafting in bonsai plants. What else do I need? The von Mises criterion is useful when you have more than one stress acting on a point. For example, if you have tensile stresses acting along both the x and y axes, you might imagine that even with each stress being lower than the yield stress, the 2 acting in combination might be enough to cause yielding. The von Mises criterion gives an estimate of how big the 2 stresses can be before yielding occurs. Before applying the von Mises criterion, you need to find out what stresses are acting on the point in question, and this will require knowledge of the loading and geometry unless, for example, the stresses are given to you in a class problem. So the factor of sqrt 3 relating shear stress to the yield stress tensile is one case of the von Mises criterion. The similarity of these numbers astonished me. What a coincidence that each of the stars in the galaxy corresponds to a galaxy. Still, this is a very interesting coincidence. There are many approximate numbers one can find in relation to the human body, from the number of heads one to the number of electrons which I will leave someone else to figure out That one of these numbers is somewhere near the number of stars in the Milky Way is accordingly entirely unsurprising. So long as the OP is suggesting there might be as many as 17o galaxies in the universe, I think a private chuckle is perhaps the best response. To insinuate that that makes someone unwelcome is doing a disservice to the ref desks. The only policy criterion they seem to flunk is "not here to build an encyclopedia" but this one is a mild example. That probability is a damn high one if you ask me. Another interesting factoid is that, starting from one meter human size , there are about the same number of powers of ten going up to the size of the Universe and down to the size of a neutron. Visitors might appreciate a little courtesy from the reference librarians. I was looking for intelligent answers, which I generally get to questions I put to Wikipedia. BTW, I was just interested in thoughts, not looking for meaning. Thanks for those who have contributed thus far. To read about crackpots who read too much meaning into coincidences, see numerology. The apparently disproportionate quantity of ones as the leading digit when measuring items is a much-studied phenomenon and not at all related to numerology or pseudoscience. Matt Deres talk I saw a car with the license plate ARW 35W. Of all the millions of license plates in the state, what was the chance that I would see that particular one tonight? If the rough approximation of the order of magnitude of the count of stars did not match, would you have noticed or remarked on its likelihood at all? What about all the other irrelevant cases where some value is approximately equal to a few hundred billion, plus or minus a couple orders of magnitude? Are these coincidences as well? Can you meaningfully compute the probability of such coincidental observations? When I look at my "weather app" on my computer, it always says something like this for example: Does it not freeze because the temperature is higher than 32 degrees? Wikipedia has an article for boiling point , but not for freezing point? It feels like 43 degrees to you because you are hot and loose heat quickly when the wind is constantly moving cold air past you. I hope this helps! The reason why you feel colder when the air is moving is that the moving air carries heat away from your body faster than still air would. Thus, if the weather says "38 degrees F, with a wind chill factor of 28 degrees F", what that means is that your body will lose heat as though it were a windless day at 28 F, though the actual air temperature is The difference is not in actual temperature, the difference is in how fast two bodies of different temperatures equilibrate. When the air moves over the warmer body, it will cool off faster. But it can never cool off to a temperature lower than the ambient temperature. Thus, if the air is at 38 F, the water will never freeze. If the water is at, say, 50 F, it will get down to 38 faster if there is wind than if the air is still, but it can never drop to below the ambient temperature, which is why it will never freeze, no matter WHAT the wind chill factor is. If the temperature is going up, we call the temperature the "melting point". If the temperature is going down, we call it the "freezing point". But the two are identical. This can be enough to cause the water to freeze when ambient air temperature is above freezing. Peggy LeMone has a nice little article here. Short Brigade Harvester Boris talk See Wet-bulb temperature for the technicalities.

Impressed forces are of different origins as from percussion, from pressure, from centripetal force. In general, inertia is resistance to change. In mechanics, inertia is the resistance to change in velocity or, if you prefer, the resistance to acceleration.

In order to be synchronous, the events should be unlikely to occur together by random chance This is one of many universal laws or truths that can never be proven for sure. And yet, there are far too many stories about people who have had mysterious forces miraculously enter or guide their lives when they least expected it. If we really look at it closely, coincidences in our lives are far too common. As they begin to accumulate over the years, our minds begin to open to new possibilities. That maybe, just maybe, they are more than random happenings. What is a synchronous event? What sets these mysterious happenings apart is that they are always unplanned and unexpected. A blind date that leads to life partnership, an unexpected phone call that pulls us away from tragedy, a job opportunity that suddenly opens, a gift of money when we need it most, a dream that turns out to be true, an unexpected admissions to a college we never thought would happen, are just a few examples. These happenings can occur on a large, medium or small scale. I like to think of the large ones as events, which have a major impact on our lives. This can be a long-term relationship with someone, a crippling accident that leads to a life-time challenge, an unexpected book from a friend that opens up a life-changing spiritual quest for us, and so on. The medium synchronous events are more for course corrections that lead us to the major ones or help the major ones unfold smoothly and successfully. For example, an unexpected salary bonus medium that allows us to take a vacation medium during which we find a lifetime partner major , or a new business venture, major or decide to change jobs and move to another part of the country major , are a few examples. The small events are more for fine- tuning the whole process and are also very important. Curiously, these unexpected gifts of guidance often drop in out of the universe to influence our thoughts or impact the direction that our lives may take when we least expect them. Whenever this happens, our free will is never violated in the process. While in body, we always have the choice to react to these events, regardless of size, the way we want to. Where do these events come from? How do they happen? Why do they happen? Do they have a purpose? What is the force that makes them happen? Nobody forces it on us. It creates confusion in our lives. These events may have been based upon some form of guidance such as a strong hunch, a powerful or compelling thought that came into your mind, a voice that spoke to you, a dream that you had, a synchronous event, and so on. Draw a line across a piece of paper. This is your life time-line. Go to the beginning to the left of the line. Put a mark through the line and an event underneath the mark that had a major impact on your life or the direction it took. And, most importantly, came about unexpectedly, without your planning it. Do this until you reach current time. Then think about how it all came to be. A hypothetical time-line might be One can take this simple exercise a bit further by isolating one of the major events in your life and then reconstructing the medium and minor events that helped the major one fall into place and unfold smoothly. Whenever we ask Spirit or our angels for guidance in our lives, whether it has to do with a relationship, a job, a failing marriage, sickness, etc. Look for clues, patterns and things that seem to materialize out of nowhere, but are related to your question. Look for messages that are symbolic, or the words of a song that pop up after asking God or your angels a question. Watch out for an unexpected phone call, finding an old letter or picture, actually hearing a voice in your head, a dream that is related to your question, a vision that appears in your head while meditating, are a few examples. Be alert for medium or major synchronous events that unexpectedly unfold. Always keep in mind that, when things go smoothly and fall into place, you have most likely made the right choice and the right event has come into your life. When our decisions or efforts run into resistance or roadblocks, seriously re-examine the choices you have made or the false alarm, guiding event that has come into your life. Correct guidance is always loving and has our best interests in mind. The wrong guidance generally arouses feelings of fear or guilt.

Hopefully, all of this makes you think and wonder about these magnificent ways that not only guide and influence our lives, but also help us understand our life-plan. We are never left alone.

Chapter 7 : Talk:Edinburgh Castle - Wikipedia

The answer is "Oh, Meaningful coincidences were produced by the force of synchronicity, even when the pattern isn't percent consistent. Take learning language as an example.

Chapter 8 : COINCIDENCES, CONNECTIONS, AND SYNCHRONICITIES

"Coincidence was a concept he did not entirely trust. As someone who had spent his life exploring the hidden interconnectivity of disparate emblems and ideologies, Langdon viewed the world as a web of profoundly intertwined histories and events.

Chapter 9 : Problem on my Final. pulling box with rope problem | Physics Forums

Answered Oct 17, Â· Author has answers and k answer views It is by convention when a tension is acting away from the surface of the body it is considered as positive force While the tension acting inwards the surface of the body is considered as compressional tension.