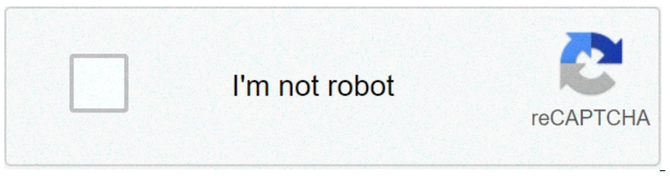

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How to find final velocity with acceleration and initial velocity

The image above represents final velocity. To compute for final velocity, three essential parameters are needed and these parameters are initial velocity (u), acceleration (a) and time (t). The formula for calculating final velocity: v = u + at Where; v = Final Velocity u = Initial Velocity a = Acceleration t = Time Let's solve an example; Find the Final velocity when the initial velocity is 12, acceleration is 9 and the time is 24. This implies that; u = Initial Velocity = 12 a = Acceleration = 9 t = Time = 24 v = u + at v = 12 + (9 x 24) v = 12 + 216 v = 228 Therefore, the final velocity is 228 m/s. Calculating the Initial Velocity when the Final Velocity, the Acceleration and the Time is Given. u = v – at Where; u = Initial Velocity v = Final Velocity a = Acceleration t = Time Let's solve an example; Find the Initial Velocity when the Final Velocity is 32, the acceleration is 12 and the time is 2. This implies that; v = Final Velocity = 32 a = Acceleration = 12 t = Time = 2 u = v – at u = 32 – (12 x 2) u = 32 – 24 u = 8 Therefore, the initial velocity is 8 m/s. Calculating the Acceleration when the Final Velocity, the Initial Velocity and the Time is Given. a = v – u / t Where; a = Acceleration u = Initial Velocity v = Final Velocity t = Time Let's solve an example; Find the acceleration when the final velocity is 50, the initial velocity is 24 and the time is 12. This implies that; u = Initial Velocity = 24 v = Final Velocity = 50 t = Time = 12 a = v – u / t a = 50 – 24 / 12 a = 26 / 12 a = 2.16 Therefore, the acceleration is 2.16. Calculating the Time when the Final Velocity, the Initial Velocity and the Acceleration is Given. t = v – u / a Where; t = Time u = Initial Velocity v = Final Velocity a = Acceleration Let's solve an example; Find the time when the final velocity is 40, the initial velocity is 20 and the acceleration is 10. This implies that; u = Initial Velocity = 20 v = Final Velocity = 40 a = Acceleration = 10 t = v – u / a t = 40 – 20 / 10 t = 20 / 10 t = 2 Therefore, the time is 2 s. Nickzom Calculator – The Calculator Encyclopedia is capable of calculating the final velocity. To get the answer and workings of the final velocity using the Nickzom Calculator – The Calculator Encyclopedia. First, you need to obtain the app. You can get this app via any of these means: Web – To get access to the professional version via web, you need to register and subscribe for NGN 1,500 per annum to have utter access to all functionalities. You can also try the demo version via Android (Paid) – Android (Free) – Apple (Paid) – Once, you have obtained the calculator encyclopedia app, proceed to the Calculator Map, then click on Motion under Physics. Now, Click on Final Velocity under Motion The screenshot below displays the page or activity to enter your values, to get the answer for the final velocity according to the respective parameters which are the initial velocity (u), acceleration (a) and time (t). Now, enter the values appropriately and accordingly for the parameters as required by the initial velocity (u) is 12, acceleration (a) is 9 and time (t) is 24. Finally, Click on Calculate As you can see from the screenshot above, Nickzom Calculator– The Calculator Encyclopedia solves for the final velocity and presents the formula, workings and steps too. An online velocity calculation helps you to find out the acceleration, initial velocity, time and velocity. Velocity is nothing but rate of change of the objects position as a function of time. Mathematical formula, the velocity equation will be velocity = distance / time Initial Velocity v0 = v − at Final Velocity v = v0 + at Acceleration a = v − v0/t Time t = v − v0/a Where, v = Velocity, v0 = Initial Velocity a = Acceleration, t = Time. You are using an out of date browser. It may not display this or other websites correctly.You should upgrade or use an alternative browser. Thread starter Ohoneo Start date Jan 25, 2011 A dynamite blast at a quarry launches a chunk of rock straight upward, and 2.1 s later it is rising at a speed of 19 m/s. Assuming air resistance has no effect on the rock, calculate its speed at (a) at launch and (b) 5.2 s after the launch. Homework Equations v = v0 + at (I'm assuming is the only relevant one, although I'll post two others in case they are needed) x = x0 + v0t + a/2 t^2 v^2 = v0*2 + 2a(x-x0) The Attempt at a Solution I solved part A by plugging into the equation v = v0 + at 19 m/s = v0 + (-9.8 m/s^2)(2.1 s) And I found that the initial velocity equals 40 m/s. So, to solve part b, I should just have to plug the initial in and find the final. I tried that: v = 40 m/s + (-9.8 m/s^2)(5.2 s) v = -11 m/s However, when I entered that solution in for the homework, I was told it was wrong. I'm not really sure how to go about doing the problem if that's incorrect. I thought maybe I could have an error in rounding with significant figures. Thanks for the help! Answers and Replies It could be that since part b asked for the speed, not the velocity, that the sign of the number reported should have been positive. The problem asked for the speed of the rock - you gave its velocity. Remember - speed is a scalar (independent of direction), and velocity is a vector (depends upon direction). edit: gneill and I were posting at the same time, apparently. The problem asked for the speed of the rock - you gave its velocity. Remember - speed is a scalar (independent of direction), and velocity is a vector (depends upon direction). edit: gneill and I were posting at the same time, apparently. I tried that as the answer (11 m/s instead of -11 m/s) and it was still incorrect. No, that is the correct answer. 11.38 m/s to be "precise," but you're only given two significant figures in your initial conditions. I've done it three ways, and it comes to 11.38 m/s each time. And 40 m/s is correct for a. Just now, I did it a 4th way, and I got 10.96 m/s - which still rounds to 11 m/s. No, that is the correct answer. 11.38 m/s to be "precise," but you're only given two significant figures in your initial conditions. I've done it three ways, and it comes to 11.38 m/s each time. And 40 m/s is correct for a. Just now, I did it a 4th way, and I got 10.96 m/s - which still rounds to 11 m/s. Okay, so I did do the math correctly. Thanks for your help :) I'm going to email my professor and see what the issue is with that problem. Here's a way forward. Motion under constant acceleration in one dimension boils down to these equations: $$x(t) = x(0) + v(0)t + at^2/2$$ $$v(t) = v(0) + at$$ Here, $x(t)$ is the displacement as a function of time t, $v(t)$ is the velocity as a function of time, and a is the constant acceleration. Additionally, $x(0)$, $v(0)$ can be interpreted as your initial displacement and initial velocity. (To get these two equations, one would start with $dv/dt = a$ and integrate twice with respect to t.) Solve the second equation for t, and substitute in the first to eliminate t. Can you take it from here? Homework Statement: attached below: Relevant Equations: final velocity=initial velocity + acceleration x time I first calculated initial velocity: √7.09^2+1.07^2=7.17028 acceleration=√7.22^2+2.47^2= 7.63 then i substituted all values into this equation: final velocity=initial velocity + acceleration x time so, final velocity=82.0285 so the magnitude= final velocity-initial velocity= 74.858271 is this correct?? thank you! Answers and Replies Homework Statement:: attached below: Relevant Equations:: final velocity=initial velocity + acceleration x time View attachment 263209 I first calculated initial velocity: √7.09^2+1.07^2=7.17028 acceleration=√7.22^2+2.47^2= 7.63 then i substituted all values into this equation: final velocity=initial velocity + acceleration x time so, final velocity=82.0285 so the magnitude= final velocity-initial velocity= 74.858271 is this correct?? thank you! It's not correct. Velocity and acceleration are vectors. I first calculated initial velocity: √7.09^2+1.07^2=7.17028 Here you have calculated the initial speed. Here you have calculated the initial speed. then how can i calculate the initial velocity with the equation given? thank you! then how can i calculate the initial velocity with the equation given? thank you! You are given the initial velocity. In the link you included it says so explicity. You are given the initial velocity. In the link you included it says so explicity. umm i dont understand.. instead of the form of velocity provided in the question, how can i change it into one value? umm i dont understand.. instead of the form of velocity provided in the question, how can i change it into one value? Velocity is a vector quantity. In general it has three components: in the x, y and z directions (or i, j, k if you prefer). You'll need to learn to work with vectors. You can't reduce a vector to a single value. Velocity is a vector quantity. In general it has three components: in the x, y and z directions (or i, j, k if you prefer). You'll need to learn to work with vectors. You can't reduce a vector to a single value. then how should i calculate the magnitude of the velocity? thank you! then how should i calculate the magnitude of the velocity? thank you! You want the magnitude of the final velocity. First, use the initial velocity vector and the acceleration vector to find the final velocity vector. Only then can you find the magnitude of that vector. do i multiply the components of the initial velocity with acceleration, which i calculated as: -7.7254i,17,5123j do i multiply the components of the initial velocity with acceleration, which i calculated as: -7.7254i,17,5123j Eh? Multiply a velocity by an acceleration? Certainly not. Think: if the velocity is in ms-1 and the acceleration is in ms-2 that would give you something with units m2s-3. Besides, that is no way to multiply vectors. There are only two ways to multiply two vectors (at this level of maths): dot product and cross product. Cross product is only in 3D, so for 2D you only have the dot product. That multiplies two vectors to produce a scalar, not another vector: (a,b).(c,d)=a.c+b.d. Use the relevant equation you quoted in post #1. I don't know about the OP, but I find the notation confusing... could we not write something like: An object has an initial velocity of ##(-1.07 , 7.09)ms^{-1}## and constantly accelerates at ##(7.22 , 2.47)ms^{-2}##. What is the magnitude of the velocity after 9.81s. Or, is that something else. Apologies, for minor hijacking. Last edited: May 22, 2020 I don't know about the OP, but I find the notation confusing... could we not write something like: An object has an initial velocity of ##(-1.07 , 7.09)ms^{-1}## and constantly accelerates at ##(7.22 , 2.47)ms^{-2}##. What is the magnitude of the velocity after 9.81s. Or, is that something else. Apologies, for minor hijacking. Yes, that's just another notation for the same thing. Whether it is confusing depends on what you are used to. The ##\hat i, \hat j,\hat k## notation has benefits in writing out the expansion of a cross product. Likes hmmm27 FactChecker Do the calculations for the ###i## and ##j## components separately, using the ###i## and ##j## components of initial velocity and acceleration. That will give you a final velocity with ###i## and ##j## components. i used this equation: final velocity=initial velocity + acceleration x time then got the final velocity=69.7582i+31.3207j so, the magnitude of velocity= final velocity-initial velocity =76.84i+24.23j got the final velocity=69.7582i+31.3207j Right, but you should not quote more sig figs than in the given data. You only have 3 for acceleration, so 69.8i+31.3j magnitude of velocity=final velocity-initial velocity No, that would be the change in velocity. You are asked for the magnitude of the final velocity. For a vector ##\vec v=x\hat i+y\hat j## the magnitude is ##\sqrt{\vec v.\vec v}=\sqrt{(x\hat i+y\hat j).(x\hat i+y\hat j)}=\sqrt{x^2+y^2}##. Right, but you should not quote more sig figs than in the given data. You only have 3 for acceleration, so 69.8i+31.3j No, that would be the change in velocity. You are asked for the magnitude of the final velocity. For a vector ##\vec v=x\hat i+y\hat j## the magnitude is ##\sqrt{\vec v.\vec v}=\sqrt{(x\hat i+y\hat j).(x\hat i+y\hat j)}=\sqrt{x^2+y^2}##. so, the answer should be 76.5? thanks a lot! how to find final velocity with initial velocity acceleration and distance