ENERGY CONSERVATION

Unit 10 & 11 Dr. John P. Cise

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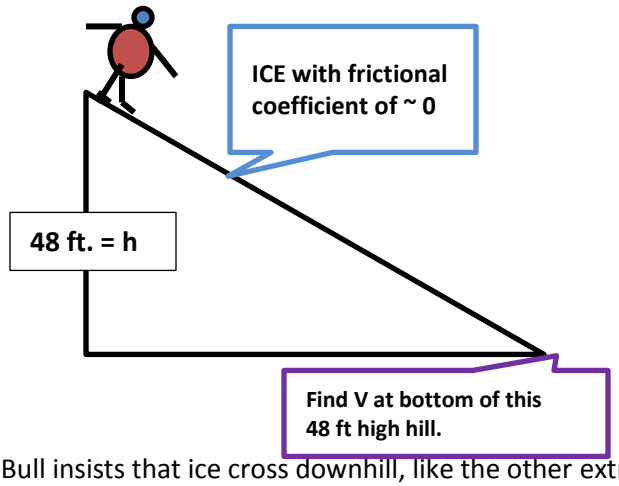
In Ice Cross, Race to Top Is a Sprint to the Bottom



Ice cross racers sprint down a steep course studded with moguls. Gravity can help, or hurt.

ST. PAUL — A company at the top of the marketing game, Red Bull insists that ice cross downhill, like the other extreme sports the company has created, is not about selling beverages but rather an obligation to improve the lives of adrenaline junkies worldwide. The participants at the Crashed Ice qualifier at Xcel Energy Center here this week seemed convinced.Ice cross downhill combines elements of downhill skiing and motocross, and it is performed by four skaters at a time who race in full hockey gear down a steep, twisting, mogul-studded course**(((at speeds reaching 45 miles an))) hour.** Red Bull's Crashed Ice World Championship consists of five ice cross downhill tournaments, only one of which takes place in the United States. **The Crashed Ice course, plunging from a bluff-top cathedral to downtown St. Paul, took 20 days and an army of workers with snowmobiles to construct, just for this three-day event. As the rookie Sever Lundquist climbed the 84 metal steps to the (((starting gate 48 feet above ground))) for the first time,** realizing that within two strides he would be hitting vehicular speeds on thin steel blades, he said his only thought was, I can't wait.

INTRODUCTION: **These 160 lb. "hill" ice cross skaters come down a 48 ft ice hill and are said to reach 45 mph(see article).**

QUESTIONS: **(a) Find gravitational potential energy of a ice cross competitor? (b) Since the frictional coefficient between ice skates and icy hill is "almost" zero, find the Kinetic energy of a competitor at hill bottom? (c) Using conceptual idea of energy conservation find a competitor's speed(in ft./s & mph) at Hill bottom? (d) Why is answer to (c)less than 45 mph as stated in the article?**

HINTS: **Gravitational Potential energy(U) = mgh , Kinetic energy(K) = ½ mv^2 , W(work done on object) =ΔU + ΔK**
g = 32 ft/s^2 , 88 ft/s = 60 mph

ANSWERS: **(a) 7,680 ft. lb. (b) 7,680 ft.lb. , (c) 55.43 ft/s or ~ 37.8 mph , (d) The skaters get a skating start which adds Kinetic energy to gravitational potential at 48 ft hill top.**