CENTRIPETAL FORCE

Unit 14 Dr. John P. Cise, Professor of Physics, Austin Community College, Austin Tx. Jpcise@Austincc.edu & New York Times , Oct. 27, 2017 by Karen Schwartz

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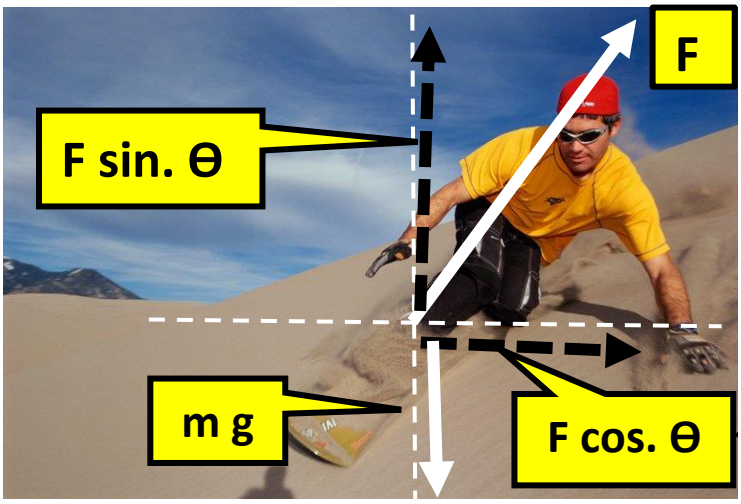
Do the Dunes: Where You Can Ride the Sand



INTRODUCTION: This sand boarder is making a turn to the left of radius 40 feet. The angle he is making with horizontal of 53°. The force F providers a force ON the sand boarder which has two components shown in the graphic at left. The centripetal force on sand boarder is provided by F cos. Θ. Vertically the snow boarded is in equilibrium with F sin.Θ = mg .

QUESTIONS: (a) Show how to find the tan.53° = R g /v^2 . (b) Find the speed v (in ft./s.) at which the sand boarded is making the turn? (c) Find speed in mph? , (d) Does this speed seem plausible?

The professional snowboarder Brett Tippie sandboarding on Great Sand Dunes National Park.
There were only two sand sleds left in the rental rack when I arrived one June morning at the Oasis store near Great Sand Dunes National Park and Preserve in Southern Colorado. And then there were none.
Taking the last sleds to the cashier, I learned it was the second time in two months that they had run out, despite an inventory of 300 sleds and sandboards and a remote location in the San Luis Valley, 250 miles from either Denver or Albuquerque, N.M.As a novice, my sand experience ended up being more R2D2 on Tatooine than Shaun White at the X Games. Even so, it was easy to understand why sand sports have become so popular.There were no lift tickets, no lines, no trails and no trees to avoid.

The tallest dunes in North America are at Great Sand Dunes National Park, with the highest rising 750 feet. Because it's so arduous to walk up the soft sand, **it takes five hours to hike the six miles to the top and back**, according to the National Park Service.

HINTS: sin.Θ / cos. Θ = tan. Θ , centripetal force = m v^2/R , 88 ft./s. = 60 mph , g = 32 ft./$s.^2$, equals divided by equals are still equal,

ANSWERS: (a) sin.Θ / cos.Θ = [mg]/(mv^2/R) , (b) v = ~ 31. 05 ft./s. , (c) v + ~ 21.2 mph , (d) Seems very plausible or possible.