KINEMATICS

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They Believe They Can Fly

Jumpers leap off cliffs or out of airplanes wearing winged
Jumpsuits that let them control their free fall.

INTRODUCTION: **From WikipediaWingsuit_flying**
A wingsuit modifies the body area exposed to wind to increase desired amount of lift with regards to drag generated by the body. The glide ratio of most wingsuits Is 2.5. This means that for every meter dropped, two and a half meters are gained moving forward. The ratio is called efficiency. The body shape manipulation and by choosing the design characteristics of the wingsuit a flier can alter both his forward speed and fall rate.

INFORMATION TO BE USED IN QUESTION BELOW:
The longest winged suit jump was from the Eiger Mt. in Switzerland on November 2,2011. That jump was from 9,200 ft. and a length of 9.6 miles(24,288 ft.) for 3 min. 20s.
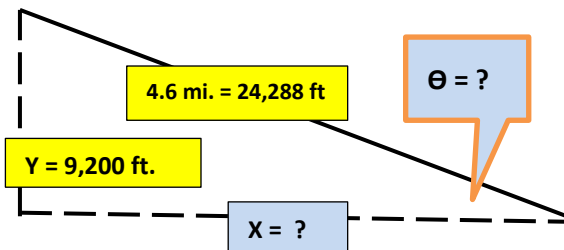
This primal urge has given rise to wingsuit fliers: thrill-seekers who leap off cliffs or out of airplanes wearing winged jumpsuits that give them the gliderlike capacity to control and delay their free fall. With practice, some wingsuiters can stay airborne for up to 90 minutes and hit speeds over 100 miles an hour, achieving what they say is the closest thing to engineless flight that humans have ever experienced. "It's a weird, risky thing to do," said Taya Weiss, 35, a professional wingsuit pilot and charity organizer. "But the dream of flight is ancient, and some of us feel like it's something we were born with and can't get rid of."

4.6 mi. = 24,288 ft

Ө = ?

Y = 9,200 ft.

X = ?

QUESTIONS: **(a) In the longest wingsuit jump on record mentioned above(and in graphic at left) find the angle θ? (b) Find horizontal distance X traveled in this 4.6 mile 3 min 20 s wingsuit longest jump?**
(c) Above in the introduction the concept of efficiency of the jump is explained. What is the efficiency of this jump?
(d) Find speed(in mph) of this 4.6 mile longest jump? (e) Find Vertical speed V_y ? (f) Find the horizontal speed V_x ?

HINTS: $\sin\theta$ = opp/hyp. , $\tan\theta$ = opp/adj , $\cos\theta$= adj/hyp
60 mph = 88 ft/s ,   for a right triangle: $r^2 = x^2 + y^2$

ANSWERS: **(a) 22.26^O , (b) X = 22,493 ft. , (c) efficiency = 2.445
(d) 82 .8 mph ,   (e) V_y= -31.36 mph ,   (f) V_x = 76.63 mph**