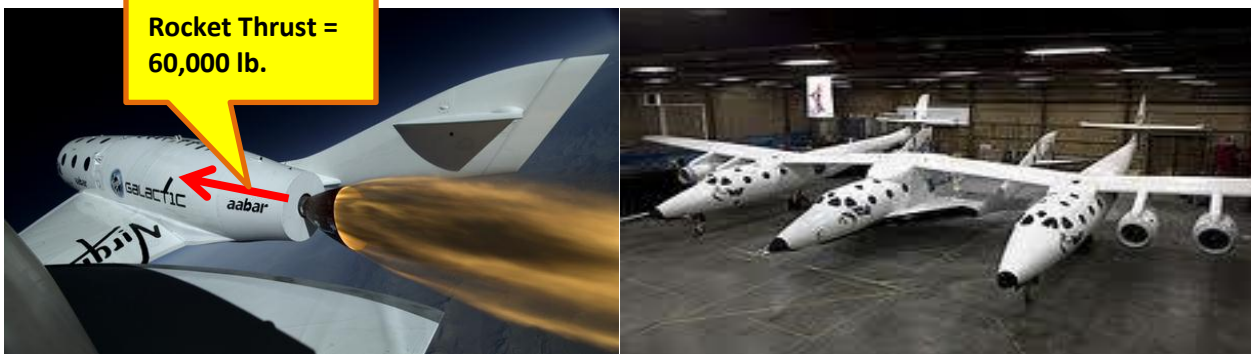


NEWTON'S 2ND LAW/ Virgin Atlantic's Space Ship 2(SS2) Unit 6 &7

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Privately Financed Spaceship Roars Closer to Space



INTRODUCTION: As you can see in the picture at right SpaceShip2(SS2) is carried by a mother Plane(WhiteKnight) at 200 mph to 47,000 ft. where it is released and **60,000 lb thrust rocket** ignited. All stats/parameters are listed below in the article. Assume air friction to be minimal at 47,000 – 55,000 ft.

QUESTIONS: (a) Convert 200 mph to ft/s? (b) Find acceleration a of SS2 from 200 mph to Mach 1.2 in 16 s? (c) Find mass(in slugs) of SpaceShip 2 ? (d) Find weight of SS2?

HINTS: 60 MPH = 88 FT/S. , $F_{net} = ma$,
 $V_{final} = V_{initial} + at$, $W = mg$, $g = 32 \text{ ft/s}^2$

ANSWERS: (a) 293 ft/s , (b) 66.125 ft/s^2
(c) 907.4 slugs (d) ~ 29,036 lb.

NOTE: This weight is close to stated weight of SS2 by builders of SS2....Scaled Composites.

For the more than 500 space tourists who have signed up for a trip on Richard Branson's [Virgin Galactic](#), Monday was a milestone: the day the spaceship that will be carrying them aloft made its first powered flight **and broke the sound barrier for its first time.** "We will be going to space at the end of this year," Mr. Branson said in a telephone interview after the test flight over Mojave, Calif. Or, he added, **possibly in the first quarter of next year(2014). He and his children are to be passengers on that first flight.** Mr. Branson hired Burt Rutan, SpaceShipOne's designer, and Mr. Rutan's company, Scaled Composites, to build a larger version called **SpaceShipTwo with seats for six passengers, each of whom would pay \$200,000 to reach space.** On Monday morning, with Mr. Branson among the spectators, a carrier aircraft(WhiteKnight) lofted **((at 200 mph))** SpaceShipTwo to a height of 47,000 feet before letting it go.

The ((engine roared for 16 seconds)), ((accelerating SpaceShipTwo to Mach 1.2(1351 ft/s – 1.2 times the speed of sound)) – and pushing it to an altitude of 55,000 feet, about 10.5 miles. More test flights will follow as SpaceShipTwo goes faster and higher before the start of commercial operations, which will be launched from Spaceport America outside Las Cruces, N.M. Virgin Galactic **currently has 560 ticket holders.**