

CENTRIPETAL FORCE PROVIDED BY GRAVITY

Unit 14 mainly & some 4 & 5: Dr. John P. Cise, Professor of Physics, Austin Com. College, 1212 Rio Grande St., Austin Tx. 78701 & New York Times, Science Section, September 9, 2016 by Liam Stack. Dedicated to Dr. Brian May, lead Guitar for Queen

Freddie Mercury Now Races Around the Sun



Freddie Mercury in 1984. An asteroid has been named for him.

Freddie Mercury, the lead singer of the 1970s rock group Queen, already shared his name with one celestial body, but another has been added to the list.

INTRODUCTION: Asteroids (like planets, moons, comets) are held in orbit by gravity: $G Mm/R^2 = m V^2/R$, Thus, $R = GM_{SUN}/V^2$ eq.1, $G = 6.67 \times 10^{-11} \text{ N m}^2/\text{kg}^2$, $M_{SUN} = 2 \times 10^{30} \text{ kg}$, Asteroid Freddie Mercury orbit speed is given in article below as 12.5 mi./s.

QUESTIONS: (a) Convert 12.5 mi./s. to m./s.?, (b) Find R? R = distance Asteroid Freddie Mercury is from sun with eq. 1? (c) The solar system asteroid belt is reported to be between Mars ($R = 227.9 \times 10^6 \text{ km}$.) & Jupiter ($R = 778.3 \times 10^6 \text{ km}$.). Does computed asteroid Freddie Mercury's R fit between Mars & Jupiter as stated in article?, (d) Wikipedia states Freddie Mercury period of rotation T about sun is 3.69 years. Find orbit speed using circumference & period?

HINTS: 1609 m./mile, $V = C/T = 2\pi R/T$

ANSWERS: (a) 20,112 m./s., (b) $R = 329.8 \times 10^6 \text{ km}$., (c) YES! (d) $V \approx 17,800 \text{ m./s}$. **NOTE:** In article below the speed is said to be "ABOUT" 12.5 mi./s.. Thus, (d) computed V is close enough within 10%

An asteroid soaring between Mars and Jupiter has been named for the singer, who died in

1991. The honor was announced on Sunday in a YouTube video by Brian May, the former Queen guitarist who became an astrophysicist after the band broke up. It coincided with a posthumous birthday celebration for Mr. Mercury in Montreux, Switzerland. He would have been 70. Brian May announces Asteroid 17473 Freddiemercury

04/09/2016 Video by BrianMayCom Mr. May said the **(((asteroid measured roughly 2.2 miles across and was located in an asteroid belt between the orbits of Mars and Jupiter.)))** He said it reflected only about one third of the sunlight that hit it. "It's like a cinder in space, as many of these asteroids are," said Mr. May. "You need a pretty decent telescope to see it. It's just a dot of light but it's a very special dot of light, and maybe one day we'll get there." The rock was previously called Asteroid 17473, Mr. May said. Its new designation was recognized by the International Astronomical Union's Minor Planet Center at the [Smithsonian Astrophysical Observatory](#) in Cambridge, Mass., which **studies and names minor planets, asteroids, comets and moons in the solar system.** (There is also [an asteroid named for Mr. May.](#)) Mr. May appeared to choke up briefly while reading a citation from the astronomical union celebrating Mr. Mercury's musical achievements. "His incredible vocal range and distinctive sound and performance style made him **one of the most well-known icons of rock music,**" Mr. May said, reading the citation. "And he is regarded as one of the greatest rock singers of all time." Mr. Mercury, who was born Farrokh Bulsara, died in London in 1991 at age 45 from complications of AIDS. The asteroid now bearing his name was discovered the same year,

Mr. May said. **(((The asteroid races around the sun at a speed of about 12.5 miles per second)))** but has an elliptical orbit that never brings it closer than 218 million miles from

Earth, [The Guardian reported.](#) "It's not quite traveling at the speed of light," Joel Parker, an astronomer and director at the Southwest Research Institute in Boulder, Colo., who helped secure the asteroid's new name, told The Guardian. "But from an Earth perspective, this certainly has made a supersonic man out of him."