KINEMATICS

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Discovery Rekindles Wish for a Journey to the Stars

HINTS: v = speed of light = 3.0×10^8 m/s or 186,000 mi./s, 1600 m = 1 mile ,365 days/yr., 24 yrs./day, 3600 s/hr., x = v t

QUESTIONS: (a) Convert 27×10^{12} miles to meters? This is the distance in 4.4 light years to Alpha Centauri B. (b) Show light traveling for 4.4 years covers a distance of ~27×10^{12} miles? (c) How many seconds are in a year?(d) If a spaceship goes at one tenth the speed of light to Alpha Centauri B(as suggested below), show this trip would take about 46.4 years? This is certainly possible in a human lifespan. (e) Show traveling at Voyager 1 speed of 11 mi/s (as said below) to Alpha Centauri B it would take 78,000 years?

ANSWERS: (a) 4.3×10^{16} meters (b) _____ (c) 3.1×10^7 s/yr. (d) ~ 46.4 years, (e)_____.

The news last week that there is a **planet circling Alpha Centauri B, only a little more than four light-years away,** set off an epidemic of daydreaming among the astronomical and sci-fi set, me among them. For people who believe that interstellar voyages, either for people or for robots, are in the future**, Alpha Centauri, a triple-star system that is the Sun's nearest known neighbor,** has always loomed large and close as a destination. It was the home of the mythical jungle world Pandora in James Cameron's epic "Avatar," for example. The new planet doesn't have jungles, giant blue-skinned cats or, as far as we know, the magical mineral unobtainium. It is, rather, a **hellish unlivable blob of lava probably about the size of Earth, only four million short miles from the fires of Alpha Centauri B**, the second brightest star in the system.

But if astronomers have learned anything over the last few years from devices like the Kepler satellite**, it is that small planets come in packs.** There is plenty of room in the system for more planets, habitable ones. "I think we should drop everything and send a probe there," said Sara Seager, an astronomer at M.I.T., echoing a call made last year by the exoplanet pioneer Geoff Marcy of the University of California, Berkeley.

Darpa, the government agency that helped invent the Internet and now wants to help invent interstellar travel, estimated that just planning for such a trip could take 100 years. You can't measure a light-year by your stride. There are 4.4 of them —((((27 trillion miles — from here to Alpha Centauri B.))))

We won't get there by doing business as usual**. (((Voyager 1, the fastest and most distant human artifact, is more than 11 billion miles from the Sun and is speeding away at *11 miles per second;* it would take 78,000 years to get to Alpha Centauri))) if it were going that way,** which it is not. Other schemes, based on existing or about-to-be-existing technology like solar sails and thermonuclear rockets, have been proposed that could reach a **(((tenth the speed of light and make the crossing in less than a human lifetime.)))**