Performance Task

10.2 Consequences of Special Relativity 17.

People are fascinated by the possibility of traveling across the universe to discover intelligent life on other planets. To do this, we would have to travel enormous distances. Suppose we could somehow travel at up to 90 percent of the speed of light. The closest star is Alpha Centauri, which is 4.37 light years away. (A light year is the distance light travels in one year.)

a. How long, from the point of view of people on Earth, would it take a space ship to travel to Alpha Centauri and back at $0.9c$?
b. How much would the astronauts on the spaceship have aged by the time they got back to Earth?
c. Discuss the problems related to travel to stars that are 20 or 30 light years away. Assume travel speeds near the speed of light.