8) A light pulse is emitted at 30 degrees to the x-axis in frame $S$, as shown. Find the angle at which this light pulse propagates in the frame $S'$ which moves at a velocity $\mathbf{u} = \sqrt{3}\hat{x}/2$.

9&10) A spaceship of proper length $L = 200$ m travels at a speed of $0.68c$ past a radio station. At the instant that the tail end of the ship passes the radio station as noted by an observer in the station, a signal is sent by the station’s transmitter and subsequently detected by the receiver in the nose of the spaceship. Assume that the instant the nose of the spaceship passes the radio station, the clocks aboard the ship and at the station are synchronized to $t = t' = 0$. a) At what time, according to the clock aboard the spaceship, is the signal sent? b) At what time, according to the clock at the radio station, is the signal received by the spaceship? c) At what time, according to the clock aboard the spaceship, is the signal received? d) Where, according to an observer at the radio station, is the nose of the spaceship when the signal is received? (This problem is from Blatt, but the answer in the back of the book is wrong.)