I'm having trouble with this word problem. Please show all work.

8. Ignoring resistance, a sailboat starting from rest accelerates  at a rate proportional to the difference between the velocities of the wind and the boat.

(a) The wind is blowing at 20 knots, and after 1 half-hour the boat is moving at 10 knots. Write the velocity  as a function of time .

(b) Use the result of part (a) to write the distance traveled by the boat as a function of time.