

Motion Formula

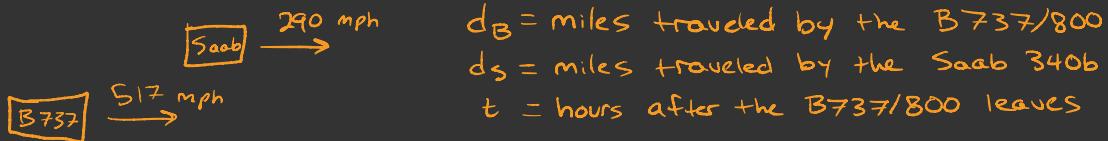
The distance, d , traveled by an object moving at a rate, r , in time t , is given by

$$d = r \cdot t$$

Ex Pg 68

Delta Airlines' fleet includes B737/800's, each with a cruising speed of 517 mph and Saab 340b's, each with a cruising speed of 290 mph.

Suppose Saab 340b takes off & travels its cruising speed. One hour later a B737/800 takes off and follows the same route, traveling at its cruising speed. How long will it take for the B737/800 to overtake the Saab 340b?



	Distance	Rate	Time
B737/800	d_B	517	t
Saab 340b	d_S	290	$t+1$

$$\Rightarrow d_B = 517 \cdot t$$

$$\Rightarrow d_S = 290 \cdot (t+1)$$

When does $d_B = d_S$?

$$517t = 290(t+1)$$

$$517t = 290t + 290$$

$$227t = 290$$

$$t = \frac{290}{227} \approx 1.28 \text{ hours}$$

Check: $d_B = 517(1.28) = 661.76 \text{ mi}$

$$d_S = 290(1.28+1) = 290(2.28) = 661.2 \text{ mi}$$

Answer the question: About 1.28 hours after the B737/800 takes off, it will overtake the Saab 340b

Ex P75 #42

A private airplane leaves an airport & flies east at a speed of 180 km/h. 2 hours later a jet leaves the same airport at a speed of 900 km/h. How far from the airport will the jet overtake the airplane?

$$d_A = 180 \cdot (t + 2)$$

d_A = KM traveled by the airplane

$$d_J = 900 \cdot t$$

d_J = KM traveled by the jet

$$d_J = d_A$$

t = hours after the jet leaves

$$900 \cdot t = 180(t + 2)$$

$$900t = 180t + 360$$

$$720t = 360$$

$$t = \frac{1}{2} \quad (\frac{1}{2} \text{ hr after } d_J \text{ leaves})$$

$$d_J = 900(\frac{1}{2}) = 450 \text{ KM}$$

$$\text{Check } d_A = 180(\frac{1}{2} + 2) = 180(\frac{5}{2}) = 450 \text{ KM } \checkmark$$

Answer: The jet will overtake the airplane at 450 km east of the airport

