MPM2D March 3 **Speed, Distance, Time (Trickier)** Unit 2 Test on Thursday

Example 1 Ian flew his airplane at best cruise speed for 2 h, then at economy cruise speed for 3 h, covering a total of 850 km. On the following day, he flew at best cruise speed for 3 h, and at economy cruise for 2 h, covering a total of 900 km. Find the best cruise speed and the economy cruise speed for Ian's airplane.

Let x be best cruise speed.

Let y be economy cruise speed.

	Distance (km)	Speed (km/h)	Time (h)
Day 1	850 km	x	2h
		y	3h
Day 2	900 km	x	3h
		y	2h

* Distance = speed × time

Distance he travelled at economy cruise

Day 1: $2x + 3y = 850$ — (A)

Distance he flew at best cruise

Day 2: $3x + 2y = 900$ — (B)

(A)×3 : $6x + 9y = 2550$ — (A')

(B)×2 : $6x + 4y = 1800$ — (B')

(A') − (B') $0 + \frac{5y}{5} = \frac{750}{5}$

$y = 150$

Sub $y = 150$ into (B)

$3x + 2(150) = 900$

$3x + 300 = 900$

$\frac{3x}{3} = \frac{600}{3}$

$x = 200$

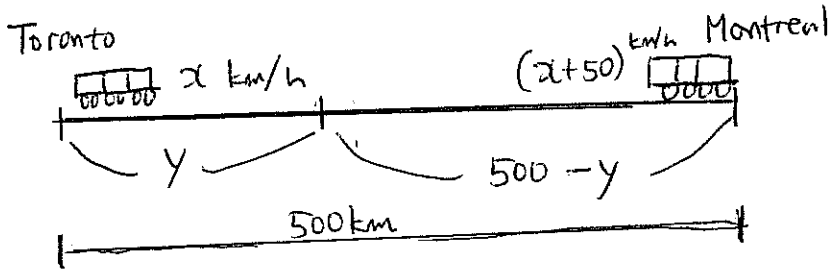
∴ The best cruise speed is 200 km/h and the economy cruise speed is 150 km/h.

Example 2 A train leaves Toronto for Montreal at the same time as another train leaves Montreal for Toronto. The cities are 500 km apart. The trains pass each other 2 h later. The train from Montreal is travelling 50 km/h faster than the one from Toronto. At what distance away from Toronto do the trains pass each other?

Let x be speed of the train from Toronto to Montreal → Train (A)

Let y " distance " " " Toronto to Montreal

	Distance (km)	Speed (km/h)	Time (h)
Train (A)	y	x	2 hours
Train (B)	$500 - y$	$x + 50$	2 hours



* Distance = speed x time

Distance = speed × time

(C) $y = 2x$

(D) $500 - y = 2(x + 50)$

Sub $y = 2x$ into (D)

(D) $500 - 2x = 2(x + 50)$

$-2x = 2x + 100 - 500$

$-2x - 2x = -400$

$\frac{-4x}{-4} = \frac{-400}{-4}$

$x = 100$

Sub $x = 100$ into (C)

$y = 2 \times 100$

$y = 200$

∴ The trains will pass each other at 200 km point from Toronto.

Homework: Speed/Distance/Time 2 Worksheet