

## Multi-Step Speed Calculations

(a) Billie walks from home to school and then to the shops. The distance from home to school is 6 km and from school to the shops is 2 km. Billie walks at a speed of 4 km/h for the first part of the journey, and the whole journey takes her 2 hours 45 minutes. Find Billie's speed as she walks from school to the shops.

	Home to School	School to Shops	Whole Journey
Speed	4 km/h		
Distance	6 km	2 km	8 km
Time	1.5h	1.25h	2.75 hours

$$(a) \text{ Speed} = \frac{2}{1.25} = 1.6 \text{ km/h}$$

(b) Tim drove 63 km from Leeds to Manchester, then 56 km from Manchester to Liverpool. His average speed from Leeds to Manchester was 84 km/h. The time taken from Manchester to Liverpool was 75 minutes. Find the average speed for the whole journey from Leeds to Liverpool and the total time taken.

(c) Ishaq travels from Stockport to Preston at an average speed of 66 mph. Henry travels the same route at an average speed of 48 mph. Given that the journey takes Ishaq 72 minutes, how long does it take Henry to travel from Stockport to Preston? Give your answer in minutes.

	LEEDS - MAN	MAN - LIV	WHOLE JOURNEY
SPEED	84 km/h		
DIST	63 km	56 km	119 km
TIME	45 min	75 min	2h

$$\text{Total time} = 2\text{h}$$

$$\text{Speed} = 59.5 \text{ km/h}$$

	ISHAQ	HENRY
SPEED	66 mph	48 mph
DIST	79.2 mi	79.2 miles
TIME	72 min	1.65h

= 99 minutes

(d) Zala travels for 50 miles at a speed of 40 mph, then another 50 miles at a speed of 50 mph. Work out Zala's average speed across her whole journey.

(e) Hassan sets off on his delivery route at 9 am. He travels 90 miles from home to Penrith at a speed of 60 mph. He then travels from Penrith to Lancaster in 45 minutes, at a speed of 68 mph. Finally, he travels from Lancaster to home, travelling 45 miles and arriving home at 12.05 pm. Calculate (i) Hassan's average speed across the whole journey to 1 decimal place and (ii) his speed when travelling from Lancaster to home.

$$(d) \text{ Total distance} = 100 \text{ miles}$$

$$\text{Total time} = 1.25 + 1 = 2.25\text{h}$$

$$\text{Speed} = 44.4 \text{ mph}$$

	H → P	P → L	L → H	WHOLE JOURNEY
SPEED	60	68	54 mph	60.3 mph
DIST	90 mi	51 mi	45 mi	186 mi
TIME	1.5h	0.75h	50 min	3h 5m

$$\text{SPEED} = 60.3 \text{ mph}$$