

Algebra I

4-8

Distance Word Problems

1) At noon, a private plane left Austin for Los Angeles, 2100 km away, flying at 500 km/h. One hour later, a jet left Los Angeles for Austin at 700 km/h. At what time did they pass each other?

2:20 PM

r	t	= d
700	x-1	700(x-1)
500	x	+ 500x

Let x = time of A → LA

LA → A

A → LA

Let x = time of A → LA

$$700(x-1) + 500x = 2100$$

$$700x - 700 + 500x = 2100$$

$$1200x - 700 = 2100$$

$$1200x - 700 + 700 = 2100 + 700$$

$$1200x = 2800$$

$$\frac{1200x}{1200} = \frac{2800}{1200}$$

$$x = \frac{7}{3} = 2\frac{1}{3}$$

2 hrs 20 min

1) At noon, a private plane left Austin for Los Angeles, 2100 km away, r · t = d flying at 500 km/h. One hour later, a jet left Los Angeles for Austin at 700 km/h. At what time did they pass each other? Let x = time of private plane

Alternate Method

private plane rate: $\frac{500 \text{ km}}{\text{hr}} \times x \text{ hrs} = 500x \text{ km}$

jet rate: $\frac{700 \text{ km}}{\text{hr}} \times (x-1) \text{ hrs} = 700(x-1) \text{ km}$

2:20 P.M.

2100 km

500x + 700(x-1) = 2100

500x + 700x - 700 = 2100

1200x - 700 = 2100

1200x - 700 + 700 = 2100 + 700

1200x = 2800

$\frac{1200x}{1200} = \frac{2800}{1200}$

x = 2 $\frac{1}{3}$ hrs

2 hr 20 min

2) At 8:00 A.M. the Smiths left a campground, driving at 48 mi/h. At 8:20 A.M. the Garcias left the same campground and followed the same route, driving at 60 mi/h. At what time did they overtake the Smiths?

8:20 + 1:20 = 9:40 AM

r	t	= d
48	x + $\frac{1}{3}$	48(x + $\frac{1}{3}$)
60	x	60x

Let x = time of Garcia's

$$48(x + \frac{1}{3}) = 60x$$

$$48x + 16 = 60x$$

$$48x - 48x + 16 = 60x - 48x$$

$$16 = 12x$$

$$\frac{16}{12} = \frac{12x}{12}$$

$$\frac{4}{3} = 1\frac{1}{3} = x$$

1 hr 20 min

2) At 8:00 A.M. the Smiths left a campground, driving at 48 mi/h. At 8:20 A.M. the Garcias left the same campground and followed the same route, driving at 60 mi/h. At what time did they overtake the Smiths?

Smiths' rate: $\frac{48 \text{ mi}}{\text{hr}} \times x \text{ hrs} = 48x \text{ mi}$

9:40 A.M.

Alternate Method

Garcias' rate: $\frac{60 \text{ mi}}{\text{hr}} \times (x - \frac{1}{3}) \text{ hrs} = 60(x - \frac{1}{3}) \text{ mi}$

need distance

48x = 60(x - $\frac{1}{3}$)

48x = 60x - 20

48x - 60x = 60x - 60x - 20

-12x = -20

$\frac{-12x}{-12} = \frac{-20}{-12}$

x = $\frac{5}{3}$ or $1\frac{2}{3}$ hrs 1 hr 40 min

pg 170
2-16 even