Distance Problems

Unit 5: Real World Applications

Solve each question. Round your answer to the nearest hundredth when needed.

1. A passenger train left Miami and traveled north at an average speed of 50 km/h. A cattle train left one hour later and traveled in the opposite direction with an average speed of 50 km/h. How long does the cattle train need to travel before the trains are 1150 km apart?

11.00 hours

2. A freight train left Champaign and traveled toward the fueling station at an average speed of 10 mph. A diesel train left at the same time and traveled in the opposite direction with an average speed of 90 mph. How long does the diesel train need to travel before the trains are 500 miles apart?

5.00 hours

3. Anne left the movie theater at the same time as Sam. They traveled in opposite directions. Sam traveled at a speed of 80 mph. After four hours they were 560 miles apart. How fast did Anne travel?

60.00 mph

4. Mia left the hospital and traveled toward the town hall at an average speed of 21 mph. Chelsea left sometime later traveling in the opposite direction with an average speed of 35 mph. After Mia had traveled for 4.5 hours, they were 210 miles apart. How long did Chelsea travel?

3.30 hours

5. Mo left school and drove toward the ferry office at an average speed of 32.8 km/h. Amy left at the same time and drove in the opposite direction with an average speed of 39.8 km/h. How long does Amy need to drive before they are 326.7 km apart?

4.50 hours

6. A freight train left Miami traveling north 6.7 hours before a diesel train. The diesel train traveled in the opposite direction going 21.3 mph faster than the freight train for five hours after which time the trains were 373.7 miles apart. How fast did the freight train travel?

16.00 mph

7. Amanda traveled to her friend's house and back. It took three hours longer to get there than it did to come back. The average speed on the trip there was 24 km/h. The average speed on the way back was 60 km/h. How many hours did the trip there take?

5.00 hours

8. A diesel train traveled to the repair yards and back. On the trip there it traveled 20 km/h and on the return trip it went 50 km/h. How long did the trip there take if the return trip took six hours?

15.00 hours

9. A freight train made a trip to New York and back. The trip there took six hours, and the trip back took five hours. It averaged 14 km/h faster on the return trip than on the outbound trip. What was the freight train's average speed on the outbound trip?

70.00 Km/h

10. A cattle train traveled to the outer-most station and back. It took 2.6 hours longer to get there than it did to come back. The average speed on the trip there was 38 mph. The average speed on the way back was 45.6 mph. How many hours did the trip there take?

15.60 hours

11. Stefan traveled to the train station and back. It took 0.8 hours less time to get there than it did to get back. The average speed on the trip there was 52.2 mph. The average speed on the way back was 45 mph. How many hours did the trip there take?

5.00 hours

12. Ryan drove to the ferry office and back. The trip there took 3.5 hours, and the trip back took four hours. He averaged 31.5 mph on the return trip. Find the average speed of the trip there.

36.00 mph

13. A passenger train left Berlin and traveled toward the outer-most station at the average speed of 15 km/h. A cattle train left sometime later traveling in the same direction at an average speed of 25 km/h. After traveling for six hours the cattle train caught up with the passenger train. Find the number of hours the passenger train traveled before the cattle train caught up.

10.00 hours

14. A jet left Los Angeles and flew toward the airshow at an average speed of 228 km/h. A passenger plane left sometime later flying in the same direction at an average speed of 380 km/h. After flying for six hours the passenger plane caught up with the jet. How long did the jet fly before the passenger plane caught up?

10.00 hours

15. DeShawn left the White House and traveled toward his cabin on the lake. Mike left one hour later traveling 20 mph faster in an effort to catch up to him. After two hours Mike finally caught up. What was DeShawn's average speed?

40.00 mph

16. A jet left Tokyo and flew toward Istanbul at an average speed of 261 km/h. A passenger plane left 0.8 hours later and flew in the same direction but with an average speed of 297 km/h. How long did the jet fly before the passenger plane caught up?

6.60 hours

17. A jet left the airport and flew east at an average speed of 150.5 mph. Sometime later an Air Force plane left flying in the same direction but at an average speed of 481.6 mph. After flying for three hours the Air Force plane caught up with the jet. How long did the jet fly before the Air Force plane caught up?

9.60 hours

18. Daniel left the mall and traveled north. Sammy left 2.4 hours later traveling at 54.5 mph in an effort to catch up to Daniel. After traveling for 1.6 hours Sammy finally caught up. What was Daniel's average speed?

21.80 mph

①

	R	· T	= D
Passenger Train	50 Km/h	t	$50t$
Cattle Train	50 Km/h	$t-1$	$50(t-1)$

Opposite directions so add the distances to get the 1150 Km apart, and solve.

$$50t + 50(t-1) = 1150$$

$$50t + 50t - 50 = 1150$$

$$100t - 50 = 1150$$
$$+50 \quad +50$$

$$\frac{100t}{100} = \frac{1200}{100}$$

$$t = 12$$

Cattle trains time was

$t - 1$

$12 - 1$

11.00 hours

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②

	R	· T	= D
freight train	10 mph	t	$10t$
diesel train	90 mph	t	$90t$

Opposite directions so add the distances to get the 500 miles apart, and solve.

$$10t + 90t = 500$$

$$\frac{100t}{100} = \frac{500}{100}$$

$$t = 5.00 \text{ hours}$$

(3)

	R	· T	= D
Anne	r	4 hrs	4r
Sam	80mph	4 hrs	320 miles

Opposite directions so add the distances to get the 560 miles apart, and solve.

$$4r + 320 = 560$$
$$-320 \quad -320$$

$$\frac{4r}{4} = \frac{240}{4}$$

$$r = \boxed{60.00 \text{ mph}}$$

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(4)

	R	· T	= D
Mia	21 mph	4.5 hrs	94.5 mi
Chelsea	35 mph	t	35t

Opposite directions so add the distances to get the 210 miles apart, and solve.

$$94.5 + 35t = 210$$
$$-94.5 \quad -94.5$$

$$\frac{35t}{35} = \frac{115.5}{35}$$

$$\boxed{t = 3.30 \text{ hours}}$$

(5)

	R	· T	= D
Mo	32.8 km/h	t	32.8 t
Amy	39.8 km/h	t	39.8 t

Opposite directions so add the distances to get the 326.7 km apart, and solve.

$$32.8t + 39.8t = 326.7$$

$$\frac{72.6t}{72.6} = \frac{326.7}{72.6}$$

$$\boxed{t = 4.50 \text{ hours}}$$

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(6)

	R	· T	= D
freight train	r	6.7 + 5 = 11.7	11.7r
diesel train	r + 21.3	5	5(r + 21.3)

Opposite directions so add the distances to get the 373.7 miles apart, and solve.

$$11.7r + 5(r + 21.3) = 373.7$$

$$11.7r + 5r + 106.5 = 373.7$$

$$16.7r + 106.5 = 373.7$$
$$-106.5 \quad -106.5$$

$$\frac{16.7r}{16.7} = \frac{267.2}{16.7}$$

$$\boxed{r = 16.00 \text{ mph}}$$

(7)

	R	· T	= D
To friends	24 km/h	t + 3	24(t+3)
Back home	60 km/h	t	60t

Going to one location and returning, set distances equal to each other and solve.

$$24(t+3) = 60t$$

$$24t + 72 = 60t$$

$$-24t \qquad -24t$$

$$\frac{72}{36} = \frac{36t}{36}$$

$$2 = t$$

To the friends time was

$t + 3$

$2 + 3$

5.00 hours

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(8)

	R	· T	= D
To Repair yard	20 km/h	t	20t
Back	50 km/h	6 hrs	300

Going to one location and returning, set distances equal to each other and solve.

$$\frac{20t}{20} = \frac{300}{20}$$

t = 15.00 hours

(9)

	R	· T	= D
To NY	r	6 hrs	6r
From NY	r + 14	5 hrs	5(r+14)

Going to one location and returning, set distances equal to each other and solve.

$$6r = 5(r+14)$$

$$6r = 5r + 70$$

$$-5r \quad -5r$$

$$r = 70.00 \text{ km/h}$$

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(10)

	R	· T	= D
To outer most station	38 mph	t + 2.6	38(t + 2.6)
Back from outer most station	45.6 mph	t	45.6t

Going to one location and returning, set distances equal to each other and solve.

$$38(t+2.6) = 45.6t$$

$$38t + 98.8 = 45.6t$$

$$-38t \quad -38t$$

$$\frac{98.8}{7.6} = \frac{7.6t}{7.6}$$

$$13 = t$$

To the outer most station time was

$t + 2.6$

$13 + 2.6$

15.60 hours

(11)

	R	· T	= D
To Station	52.2 mph	$t - 0.8$	$52.2(t-0.8)$
Back Station	45 mph	t	$45t$

Going to one location and returning, set distances equal to each other and solve.

$$52.2(t-0.8) = 45t$$

$$52.2t - 41.76 = 45t$$
$$-52.2t \qquad -52.2t$$

$$-41.76 = -7.2t$$

$$\frac{-41.76}{-7.2} = \frac{-7.2t}{-7.2}$$

$$5.8 = t$$

Trip to station
$t - 0.8$
$5.8 - 0.8$
5.00 hours

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(12)

	R	· T	= D
To office	r	3.5 hrs	3.5r
Back	31.5 mph	4 hrs	126 mi

Going to one location and returning, set distances equal to each other and solve.

$$\frac{3.5r}{3.5} = \frac{126}{3.5}$$

$$r = 36.00 \text{ mph}$$

(13)

	R	· T	= D
Passenger Train	15 km/h	t	$15t$
Cattle Train	25 km/h	6 hrs	150 km

Both going the same direction and caught up to each other. Set distances equal and solve.

$$\frac{15t}{15} = \frac{150}{15}$$

$$\boxed{t = 10.00 \text{ hours}}$$

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(14)

	R	· T	= D
Jet	228 km/h	t	$228t$
Passenger Plane	380 km/h	6 hrs	2280 km

Both going the same direction and caught up to each other. Set distances equal and solve.

$$\frac{228t}{228} = \frac{2280}{228}$$

$$\boxed{t = 10.00 \text{ hours}}$$

(15)

	R	· T	= D
De Shawn	r	3	$3r$
Mike	$r+20$	2	$2(r+20)$

Both going the same direction and caught up to each other. Set distances equal and solve.

$$3r = 2(r+20)$$

$$3r = 2r + 40$$
$$-2r \quad -2r$$

$$r = 40.00 \text{ mph}$$

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(16)

	R	· T	= D
Jet	261 km/h	t	$261t$
Passenger Plane	297 Km/h	$t - 0.8$	$297(t-0.8)$

Both going the same direction and caught up to each other. Set distances equal and solve.

$$261t = 297(t-0.8)$$

$$261t = 297t - 237.6$$
$$-297t \quad -297t$$

$$\frac{-36t}{-36} = \frac{-237.6}{-36}$$

$$t = 6.60 \text{ hours}$$

(17)

	R	· T	= D
Jet	150.5 mph	t	$150.5t$
Air Force Plane	481.6 mph	3	1444.8

Both going the same direction and caught up to each other. Set distances equal and solve.

$$\frac{150.5t}{150.5} = \frac{1444.8}{150.5}$$

$$\boxed{t = 9.60 \text{ hours}}$$

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(18)

	R	· T	= D
Daniel	r	1.6 + 2.4 = 4 hrs	$4r$
Sammy	54.5 mph	1.6 hrs	87.2 mi

Both going the same direction and caught up to each other. Set distances equal and solve.

$$\frac{4r}{4} = \frac{87.2}{4}$$

$$\boxed{r = 21.80 \text{ mph}}$$