Board Problems Ch. 19

1. Kasey travelled from City A to City B in 3 hours. Peter travelled the same distance at a rate that was 20 mph faster than Kasey's in 2 hours. Find the distance between the 2 cities.

2. Gary started driving at 50 mph at 9:00 AM from A to B. Thomas started driving at the same time from B to A. If Gary and Thomas crossed each other at 11:00 AM, what is the distance between A and B?

SAVE UNTIL AFTER LECTURE

Test Next Week

Chapter 11 – 19

1) Complete Formula & Definition Sheet

2) Take Practice Test

3) Correct Practice Test

4) Be able to answer all questions!

$6\frac{2}{3}$ km.

4-5. Lewis and Vaughn both drove their families to a camp that was 420 miles away. Lewis drove at 60 mph and Vaughn drove 10 mph less than Lewis. Lewis left at 8:30 a.m. and arrived at 3:30 p.m. Vaughn left at 8:00 a.m. How long did the trip take, and when did Vaughn arrive?

$PL = DV$

$\cdot \dfrac{DL}{DV} \cdot$

Key info

6-7. On the return trip, they decided to try a longer but more scenic route. Vaughn left at 8:40 a.m. and arrived home at 5:00 p.m. Lewis left at 9:30 a.m., yet arrived home at the same time as his friend. Vaughn's average speed was 6 mph less than Lewis's average speed. How long was the new way? What were the speeds of Lewis and Vaughn on the return trip?

Example 1

Two saleswomen left the hotel in opposite directions. Sue headed North at 60 mph. Kelly headed South at 56 mph. If they left at 7:22 AM, what time will it be when they are 290 miles apart?

KEY INFORMATION

$$R_S = \qquad t_S =$$

$$R_K = \qquad t_K =$$

Example 2

On the fundraising bike hike Heidi rode until she was tired, then pushed the bike the rest of the way. She pushed her bike at 4 mph and rode it 9mph. She finished the 44 mile trek in 6 hours. How long did she push and how long did she ride?

KEY INFORMATION

$$R_S = \qquad t_S =$$

$$R_K = \qquad t_K =$$

Ex ample 3

Samul was at the park 6 miles away from Ada. Ada knew he would be leaving at 1:30 PM, so she left in her horse and buggy at the same time. He walks 5 mph and the buggy travels at 10 mph. How soon till they meet?

KEY INFORMATION

$$R_S = \qquad t_S =$$

$$R_K = \qquad t_K =$$

Lesson 19 More Motion Problems

Once again the key is how you draw the problem. After the sketch is made, isolating the variable by substituting other information is critical to solving the equation. Here are four examples with an accompanying discussion.

Example 1 Two saleswomen left the hotel at the same time traveling in opposite directions. Sue headed north at 60 mph, while Kelly headed south at 56 mph. If they left at 7:22 AM, what time will it be when they are 290 miles apart?

Step 1: Identify Unknowns. $D_S = R_S T_S$ $D_K = R_K T_K$ S for Sue & K for Kelly

Step 2: Draw a picture.   ← —————— $\dfrac{D_S \quad \text{Hotel} \quad D_K}{290 \text{ m}}$ ——————

N

The distance adds up to 290 m. $D_S + D_K = 290$

Substitute RT for D in both equations. $R_S T_S + R_K T_K = 290$

Step 3: Figure out what we know, then substitute.

$T_S = T_K$ so we can use T since the time is the same.

Sue's rate is 60 mph. ⎫ $(60)(T) + (56)(T) = 290$

Kelly's rate is 56 mph. ⎭ $116\, T = 290$

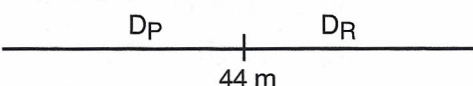Step 4: Solve for the missing info. $T = 2.5 \text{ h}$

The time is 7:22 + 2:30 = 9:52

Step 5: Check the solution. $(60)(2.5) + (56)(2.5) = 290$ It works!

Example 2 On the fundraising bike hike Heidi rode until she was tired, then pushed the bike the rest of the way. She pushed her bike at 4 mph and rode it at 9 mph. She finished the 44 mile trek in 6 hours. How long did she push, and how long did she ride?

Step 1: Identify Unknowns. $D_P = R_P T_P$ $D_R = R_R T_R$ P for push & R for ride

Step 2: Draw a picture.   —————— $\dfrac{D_P \quad\quad D_R}{44 \text{ m}}$ ——————

The distance adds up to 44 m. $D_P + D_R = 44$

Substitute RT for D in both equations. $R_P T_P + R_R T_R = 44$

Step 3: Figure out what we know, then substitute.

Pushing rate is 4 mph. ⎫ $(4)(T_P) + (9)(6 - T_P) = 44$

Riding rate is 9 mph. ⎭ $4T + 54 - 9T = 44$

$T_P + T_R = 6, \ T_R = 6 - T_P$ $T_P = 2 \text{ h}$

Step 4: Solve for the missing info.   Time pushing is 2, so time riding is 4.

Step 5: Check the solution. $(4)(2) + (9)(4) = 44$

Example 3 Samuel was at the park 6 miles away. Ada knew he would be leaving at 1:30PM ,so she harnessed the horse and left in the buggy at the same time. He walks 5 mph and the buggy travels at 10 mph. How soon till they meet?

S for Samuel & A for Ada

Step 1: Identify Unknowns. $D_S = R_S T_S$ $D_A = R_A T_A$

Step 2: Draw a picture.   —————— $\dfrac{D_S \quad\quad D_A}{6 \text{ m}}$ ——————

The distance adds up to 6 m. $\qquad$ $D_S + D_A = 6$

Substitute RT for D in both equations. $\qquad$ $R_S T_S + R_A T_A = 6$

Step 3: Figure out what we know, then substitute.

Samuel's rate is 5 mph.

Ada's rate is 10 mph. $\qquad$ $(5)(T) + (10)(T) = 6$

The Time is the same. So $T_S = T_A$ $\qquad$ $15T = 6$

$\qquad$ $T = 2/5\,h$

Step 4: Solve for the missing info.

2/5 of an hour is 2/5 of 60 = 24 minutes, plus 1:30 PM = 1:54 PM

Step 5: Check the solution. $\qquad$ $(5)(2/5) + (10)(2/5) = 6$

Practice Problems

1) The CB radio had a range of 20 miles. David walked west at a rate of 4 mph and Jonathan left at the same time, jogging at a rate of 8 mph towards the east. How long did it take them to reach the maximum range of their radios?

2) The lake was 3,000 yards wide. Glenda and Jessica were on opposite shores and decided to swim toward each other. Glenda swims at a rate of 120 yards per minute, while Jessica strokes along at 80 yards per minute, so Jessica was given a 5 minute head start. When did they meet?

3) While rafting down a 19.5 mile stretch of the Youghigheny River, we went through the rapids at 5 mph, then paddled in the slower current at 3 mph. We spent twice as much time in the rapids as in the slower current. How long were we in each?

Solve these motion problems. Include a sketch of each problem.

1. Two trains left the station at 8:30 a.m., traveling in opposite directions. The first train traveled at 50 mph and the second at 90 mph. What time will it be when the trains are 350 miles apart?

2. A horse trotted at 12 mph, and then walked at 5 mph for a total distance of 39 miles. If the trip took five hours, how long did the horse trot, and how long did it walk?

3. The prodigal son and his father began running toward each other when they were one mile apart. The father ran at a rate of 10 miles an hour, and the son, who was weak and tired, ran at a rate of 5 miles an hour. How long did it take them to meet?

4. Mike left his home in California two days before Luke left his home in Massachusetts. Mike traveled at an average rate of 400 miles a day, and Luke traveled at an average rate of 500 miles a day. If their homes are 3,050 miles apart, how many days must Luke travel before they meet?

5. Mike (#4) left the place where he met Luke at 9 a.m. and traveled on east at 65 mph. Luke left three hours later and traveled west at 70 mph. At what time will they be 600 miles apart?

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