

Assignment #16: Rate, Time, and Distance

Example: By traveling 20 mph instead of his usual 28 mph, Howie Duhan took 20 minutes longer to get home than usual. How long did he take?

Solution: Here we have to be sure to have consistent units. Since mph is in miles per hour, we'll convert the 20 minutes to $1/3$ hour.

| | Rate | Time | Distance |
|-----------|------|-----------|-------------|
| Usually | 28 | x | $28x$ |
| This time | 20 | $x + 1/3$ | $20(x+1/3)$ |

Assuming the earth didn't stretch, the distances are the same for each trip, so our equation is:

$$28x = 20(x+1/3)$$

Problems

1. How much pure water should Pierre add to his 8 gallon, 30% Koolaid drink to dilute it down to a 23% Koolaid drink? (*Hint: pure water has zero percent Koolaid in it.*)
2. Roz boiled 6 kg of 3% salt water until it concentrated down to a 3.5% solution. What did it weigh then? (*Hint: When you boil a solution, only the water comes out. So the amount of pure salt in the new solution is exactly the same as it was before he boiled it.*)
3. David's investment in Microsoft at 8% is \$500 less than his investment in Techiebonds™ at 5%. He earns \$50 in simple interest per year. How much does he have invested in Techiebonds™?
4. By traveling 40 mph instead of his usual 48 mph, Howie Duhan took 30 minutes longer to get home than usual. How long did he take?

5. Henry and Tyler live 900 miles apart. Henry goes 40 mph faster than Tyler. If they both leave their homes at noon, headed toward each other, they will crash at 3:00 pm. How fast is Tyler?

(Optional): Feaven has two 5-link chains, one 4-link chain, and one 3-link chain. Her jeweler will charge her 1 dollar to open a link and 2 dollars to weld it back closed. What is the least that could be charged to join the four chains into one closed 17-link chain?

