



Math Olympiad and Problem Solving Programs  
F130 - Advanced Problem Solving

Problem Set 21.2 - Rate

Name:

Date:

1.
2.
3. a)  b)
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5.
6.
7.
8. Remember from the Average lesson that  $total = average \times number$ . So if the average of a book and a magazine is \$6.10, then their total combined cost is  $\$6.10 \times 2 = \$12.20$ . If the average cost of a book and a dictionary is \$10.40, then the total cost is  $\$10.40 \times 2 = \$20.80$ . If the book costs \$6.90, then the cost of the magazine is  $\$12.20 - \$6.90 = \$5.30$ . Also, the dictionary must cost  $\$20.80 - \$6.90 = \$13.90$ . So the average of the magazine and dictionary is  $\frac{\$5.30 + \$13.90}{2} = \frac{\$19.20}{2} = \text{\$9.60}$ .
9. If 6 girls have an average of 18 stickers, then the 6 girls have a total of  $6 \times 18 = 108$  stickers. If 9 girls have an average of 27 stickers, then the 9 girls have a total of  $9 \times 27 = 243$  stickers. So the total that the 3 new girls have is  $243 - 108 = 135$  stickers. If the 10th girl has 25 stickers, then the Three Girls + Tenth Girl have a total of  $135 + 25 = 160$  stickers. Their average is  $\frac{total\ stickers}{number\ of\ girls} = \frac{160}{4} = \text{40}$ .
10. If the total distance is 23.4 miles, then the first two miles cost \$2.20, and the rest of the miles (or  $23.4 - 2 = 21.4$  miles) cost \$0.10 per half-mile or part thereof. This means we round up to the nearest half mile, so she has 21.5 miles to pay for. How many half miles are in 21.5?  $21.5 \div \frac{1}{2} = 21.5 \times 2 = 43$  half-miles. If each half-mile costs \$0.10, then she must also pay  $43 \times \$0.10 = \$4.30$ . So her total owed in taxi fares is  $\$2.20 + \$4.30 = \$6.50$ . If she gives him a \$20, then she gets  $\$20 - \$6.50 = \text{\$13.50}$  in change.