Problem

Ticket prices in Sportsville are as follows:

	Adults	Children
HOCKEY:	$2.00	$1.00
BASKETBALL:	$3.00	$1.50
SOCCER:	$5.00	$2.50

a) If Mr. and Mrs. Sportsfan take their three children to see the soccer game, and pay for their tickets with a $20 bill, how much change will they get?

b) If they paid a total of $10.50 for all five tickets for the same game, which game did they see?

c) Suppose the family has only $8 to spend on tickets. If they don't all necessarily go to the same game, in how many different ways can they buy tickets so that every family member gets to see a game?

Hints

Part c)

Hint 1 - Could the parents both have gone to the soccer game? Why or why not?

Hint 2 - Could all three children go to the soccer game? Why or why not?

Hint 3 - If both parents went to the basketball game, would there be enough money left for all three children to see a game?

Hint 4 - What is the least the parents' tickets could cost? What tickets could the children then buy?

Solution

a) Since the tickets for the soccer game cost $(2 \times \$5.00) + (3 \times \$2.50) = \$17.50$, the change is $\$20.00 - \$17.50 = \$2.50$.

b) Since the cost ends with 50¢, they must have attended either soccer or basketball. We know from a) that soccer costs more than $10.50, so they must have gone to the basketball game. Check: $(2 \times \$3) + (3 \times \$1.50) = \$6 + \$4.50 = \$10.50$

c)   1. If they all attend the hockey game, the cost is $(2 \times \$2.00) + (3 \times \$1.00) = \$7.00$. (This is the cheapest option)

        2. If one parent and three children go to hockey, paying $(\$2.00 + 3 \times \$1.00)$, and the other parent attends basketball, paying $(1 \times \$3.00)$, the cost is $8.00.

        3. If the parents and one child go to hockey, paying $(2 \times \$2.00) + (1 \times \$1.00)$, and the other two children go to basketball, paying $(2 \times \$1.50)$, the cost is $8.00.

Note that both parents to hockey, or one to hockey and one to basketball are the only possible combinations for the parents to leave enough money for all the children to see a game.

So there are three ways they can all get to see a game for a total cost not over $8.00.

Note: Students may want to count different combinations of children/parents in 2. and 3. If so, there are two ways for 2. (Mom to hockey, Dad to basketball or vice versa), and three ways for 3. (child A to hockey and B, C to basketball, or B to hockey and A, C to basketball, or C to hockey and A,B to basketball.) This gives a total of six ways.