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BIRTHDAYS

2009B

6. **Answer (D):** The age of each person is a factor of $128 = 2^7$. So the twins could be $2^0 = 1$, $2^1 = 2$, $2^2 = 4$, $2^3 = 8$ years of age and, consequently, Kiana could be $\frac{128}{1^2} = 128$, $\frac{128}{2^2} = 32$, $\frac{128}{4^2} = 8$, or $\frac{128}{8^2} = 2$ years old, respectively. Because Kiana is younger than her brothers, she must be 2 years old. The sum of their ages is $2 + 8 + 8 = 18$.

2013A

6. **Answer (D):** The 5-year-old and the two brothers who went to play baseball account for three of the four brothers who are younger than 10. Because the only age pairs that sum to 16 are 3 and 13, 5 and 11, and 7 and 9, the brothers who went to the movies must be 3 and 13 years old. Hence the 7-year-old and 9-year-old brothers went to play baseball, and Joey is 11.

2007A

10. **Answer (E):** Let N represent the number of children in the family and T represent the sum of the ages of all the family members. The average age of the members of the family is 20, and the average age of the members when the 48-year-old father is not included is 16, so

$$20 = \frac{T}{N+2} \quad \text{and} \quad 16 = \frac{T-48}{N+1}.$$

This implies that

$$20N + 40 = T \quad \text{and} \quad 16N + 16 = T - 48,$$

so

$$20N + 40 = 16N + 64.$$

Hence $4N = 24$ and $N = 6$.