8

COMBINATIONS

2008B 1. **Answer (E):** The number of points could be any integer between $5 \cdot 2 = 10$ and $5 \cdot 3 = 15$, inclusive. The number of possibilities is $15 - 10 + 1 = 6$.

2004B 2. **(B)** There are 10 two-digit numbers with a 7 as their 10's digit, and 9 two-digit numbers with 7 as their units digit. Because 77 satisfies both of these properties, the answer is $10 + 9 - 1 = 18$.

2018B

3. **Answer (B):** Both the multiplications and the addition can be performed in either order, so each possible value can be obtained by putting the 1 in the first position and one of the other three numbers in the second position. Therefore the only possible values are

$$\begin{aligned} (1 \times 2) + (3 \times 4) &= 14, \\ (1 \times 3) + (2 \times 4) &= 11, \\ \text{and} \quad (1 \times 4) + (2 \times 3) &= 10, \end{aligned}$$

so just 3 different values can be obtained.

2010B

3. **Answer (C):** If a set of 4 socks does not contain a pair, there must be one of each color. The fifth sock must match one of the others and guarantee a matching pair.

2018A

4. **Answer (E):** There are 4 choices for the periods in which the mathematics courses can be taken: periods 1, 3, 5; periods 1, 3, 6; periods 1, 4, 6; and periods 2, 4, 6. Each choice of periods allows $3! = 6$ ways to order the 3 mathematics courses. Therefore there are $4 \cdot 6 = 24$ ways of arranging a schedule.

2004B

5. **(D)** If $d \neq 0$, the value of the expression can be increased by interchanging 0 with the value of d. Therefore the maximum value must occur when $d = 0$. If $a = 1$, the value is c, which is 2 or 3. If $b = 1$, the value is $c \cdot a = 6$. If $c = 1$, the value is a^b, which is $2^3 = 8$ or $3^2 = 9$. Thus the maximum value is 9.