Student Name: _____

1. There are 27 students in a class. Out of all the students, 18 are taking art lessons and 13 are taking swimming lessons. If we know that every student is enrolled in at least one of an art lesson or swimming lesson, how many students are taking both art and swimming lessons?

   Each student can either be taking only the art lesson, only the swimming lesson or both the art and swimming lessons (since we are told that each student is enrolled in at least one of the classes, they have to be taking at least one lesson). Thus if there are 18 students taking the art lesson, 13 students taking the swimming lesson and 27 students in total, there are $(18 + 13) - 27 = 4$ students enrolled both in the arts and swimming lessons.

2.
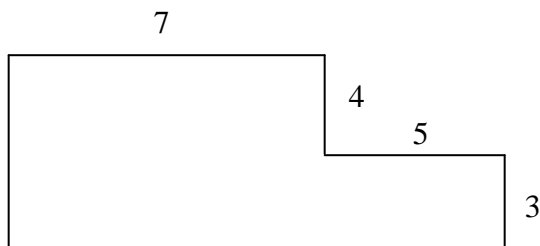
   Determine the perimeter of the above shape.

   We can split the figure into two rectangles as so:
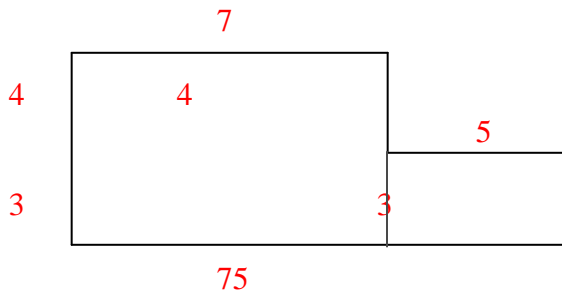
   Adding all the numbers together, we get that the perimeter is 38.

3. Cindy noticed that, apart from her, there are 10 girls and 9 boys in her Math class. What percentage of her class are girls?

   In total, there are 11 girls and 9 boys in the class (since Cindy herself is a girl in the class). Thus the percentage of girls in the class is $\frac{11}{20} * 100\% = 55\%$.

4. A certain restaurant offers two different types of appetizers, three different entrée, and two different desserts. If I want to buy one appetizer, one entrée, and one dessert for my dinner, how many combinations can I choose from?

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Since there are 2 choices for appetizers, 3 choices for entrées and 2 choices for desserts, in total we have $2 \times 3 \times 2 = 12$ combinations of buying 1 appetizer, 1 entrée and 1 dessert.

5. A pair of shoes originally costs $100 but is marked 40% off. In addition, Carol has a card that saves 30% off the discounted price. How much does Carol need to pay for the shoes? (Assume that there is no tax.)

The sale price of the pair of shoes is 60% of $100 (since they are marked 40% off). Then from the remaining $60 Carol has a card that saves 30%. Thus she only needs to pay for 70% of $60, which is $42.

6. The product of 3 consecutive whole numbers is 990. What is the smallest of the 3 numbers?

Since 990 is divisible by 10, then one of the three numbers must be divisible by 10. Also notice that 18 * 19 * 20 = 6840, which is greater than 990. Thus one of the numbers has to be 10. Trying the three possibilities we see that 9 * 10 * 11 = 990, making 9 the smallest of the three numbers.

7. Triangle ABC has side lengths AB = 2, and BC = 4. What are the possible whole number side lengths for AC?

The triangle inequality tells us that AB + BC > AC, and that AB + AC > BC. Thus 2 < AC < 6, making the only possible whole number side lengths for AC 3, 4 and 5.

8. What is the maximum number of times a square and a circle can intersect?

The maximum times a circle and a square can intersect is 8 (as shown below).