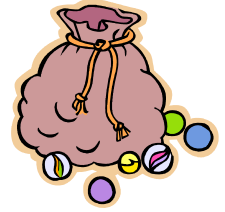# Warm-Up 14

1. _____ Bobby has a bag that contains only red and blue marbles. There are 10 red marbles and x blue marbles. If 5 red marbles are added to the bag, the probability of getting a blue marble decreases by 10%. If the original bag contains more blue marbles then red, how many blue marbles are there in the bag?

2. _____ An equilateral triangle is inscribed in a circle of radius 6. What is the area of the triangle? Express your answer in simplest radical form.

3. _____ Franklin and Peter are playing darts. Each throws two darts. A single dart can score 0, 1, 4, or 8 points. How many combined scores less than 32 cannot be achieved with the four darts?

4. _____ What is the sum of the first 100 terms of the series: $\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \cdots + \frac{1}{n(n+1)}$?

5. _____ The $\triangleleft$ symbol represents two operations. What is $6\triangleleft4$ if $3\triangleleft2=15$, $4\triangleleft4=32$, and $5\triangleleft2=35$?

6. _(____,____)_ Yujian is practicing the quadratic formula. However, instead of solving for $x^2+ax+b=0$, he solved for $x^2+bx+a=0$, and got the solutions, $x=-5$, and $x=1$. What are the real solutions of $x^2+ax+b=0$, expressed in the form (r_1, r_2), where r_1 and r_2 are the two roots, and $r_1 \geq r_2$?

7. _____ Jason is playing scrabble with Gordon. Gordon likes to cheat and often uses letter arrangements that are not actual words. How many different "words" can Gordon create using the letters: M, F, T, E, I, A, Y if a "word" consists of any arrangement of 4 or more letters?

8. _____ Peter has lost his contacts and cannot see very clearly. Mr. Wilson puts the problem $6+3-3\times3$, on the board, but Peter can only see the digits 6 3 3 3. If Peter randomly places a $+, -, \times,$ or $\div$ between each pair of digits, what is the probability that he gets the problem right?

9. _____ Howard is participating in a triathlon. He needs to swim 5 miles, run 15 miles, and then bike 30 miles. If he swims at a rate of 100 feet per minute, runs at a rate of 250 feet per minute, and bikes at a rate of 600 feet per minute, what will his average pace in feet per minute be for the whole triathlon?

10. _____ If the sum of the numbers in the sequence $1^3+2^3+3^3+\ldots+n^3$ is equal to 784, then what is the value of n?