Math Awareness Month Competition

2009 Examination for 7th-9th Grades

DIRECTIONS: [40 Minutes - 5 Questions] Start each new problem on a separate page. **Show your work!** Answers must be **exact**. You are allowed to use a calculator. You are not allowed to borrow or interchange calculators during the test.

1. Two six-sided dice are fair in the sense that each face is equally likely to turn up. However, one of the dice has the 4 replaced by 3 and the other die has the 3 replaced by 4. When these dice are rolled, what is the probability that the sum is an odd number?

2. A 7-digit telephone number abc-defg is memorable if the prefix abc is exactly the same as def or efg (or possibly both). Assuming that each of the letters a,b,c,d,e, f, and g can be any of the ten digits 0,1,2,3,4,5,6,7,8, and 9, find the number of memorable telephone numbers.

3. In the magic square shown, the sums of the numbers in each row, column, and diagonal are the same. What are the values of x, y, z, v, and w?

v	24	w
18	x	y
25	z	21

4. An arc is drawn in a square with center D at one of the vertices of the square and the arc is tangent to the opposite two sides of the square. The arc is also tangent to the hypothenuse of the $30° - 60° - 90°$ triangle BFE as shown, where $BF = 1$. What is the radius of the circle?
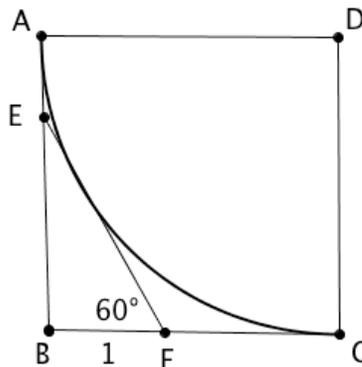
5. Brenda and Sally run in opposite directions on a circular track, starting at diametrically opposite points. They first meet after Brenda runs 100 meters. They next meet after Sally has run 150 meters past their first meeting point. Each lady runs at a constant speed. What is the length of the track in meters?