WSMA Math Bowl - March 2, 2013

College Bowl Round 1 Proctors' Answer Sheet

1	A video rental store has two rental plans. Plan A has a yearly payment of $30 and each video can be rented for $2.50. Plan B has a yearly payment of $25 and each video can be rented for $3.50. If you intend on renting 40 videos over the next two years, which plan will be cheaper?	Plan A
2	You have a standard deck of 52 playing cards. What is the probability of drawing a royal card (J, Q, K) that is not a spade? Simplify your answer as a fraction.	$^{9}/_{52}$
3	Find the 7th term of the following geometric sequence: $1, \ -3, \ 9$ ….	729
4	Find the sum of the prime factors of 2013.	75
5	Find the area of a triangle whose vertices in the Cartesian coordinate plane are (1, 2), (3, 12), and (6, 12).	15
6	$F(x) = x^3$ is transformed into a new function, $G(x)$, through the following transformations: • horizontal dilation by a factor of five, • vertical dilation by a factor of 3, • translation 7 units along the positive *x*-axis, • translation 8 units along the negative *y*-axis. Find $G(x)$.	$G(x) = 3(\frac{1}{5}x^3 - \frac{7}{5}) - 8$
7	A farmer has 40 feet of fencing. If he can only create a rectangle with integer side lengths, what is the difference between the maximum and minimum areas the farmer could enclose?	81
8	Angle A of triangle ABC is divided by an angle bisector that intersects with side BC at point D. If AB=13, BD=10, DC=2.3, and AC=2, find the length of AD.	4
9	Solve the following equation: $\sqrt{x+3} - \sqrt{x-3} = 1$	$\frac{37}{4}$

Extra	Triangle OAB is positioned on a Cartesian plane where O(0,0), A(2,4), and B(3,1). If the line y=kx passes through point O and intersects with AB so that the area of triangle OAB is split into two triangles with equal areas, find the value of k.	1