HUSTLE Algebra II 2012 MAQ National Convention

1. Mr. Norris is thinking of three numbers. If they are added in pairs the results are 38, 40, and 52. Find the smallest of the three numbers.
2. The Davis family has 4 children. If it is known that the children are not all girls, what is the probability that they have 1 girl and 3 boys?
3. Solve for *x* if .
4. The vertex of a non-right circular cone lies directly above the edge of the cone’s base. The cone has a base of area of 6 and a height of 5. Find the volume of this cone.
5. Evaluate: 
6. The sum of the digits in a two-digit number is 10. If the tens digit is decreased by 2 and the units digit is increased by 2 and then the digits are reversed, the resulting number is 36 less than the original number. What was the original number?
7. There exist two complex numbers, *x* and *y*, such that, and *x* + *y* = 6 . Determine the value of *xy*.
8. What is the coefficient of the constant termin the expansion of ?
9. What is the sum of the numbers missing in the following sequence:  ?
10. Given  , find the value of the expression *x* + *y* – *xy*.
11. Find the value of *S*, if *S* = 
12. What is the number of non-negative integral solutions of the inequality ?
13. What number is located two-thirds of the distance from ¼ to ¾ on the numberline?
14. Consider a quadratic equation in the form  , with *a*, *b*, and *c* integers whose greatest common factor is 1, and with a > 0, that has 2+3i as one of its solutions. Find the value of *a* + *b* + *c.*
15. Solve for *x* over the set of real numbers: .
16. Find the equation in slope-intercept form of the line perpendicular to  with *x*-intercept of -5.
17. A committee of 8 is to be selected randomly from a group of 6 girls, 5 boys, and 3 teachers. What is the probability that the committee will have 4 girls, 3 boys, and one teacher?
18. For the system  *x + y >* 2 what is the maximum value of the function f(x,y) = 5*y* - 3*x* ?

4*y < x +* 8

2*y >* 3*x -* 6

1. Find the area of the region bounded by the intersection of the graphs of  and .
2. What is the y-intercept of the line tangent to the circle  at the point (-1, 2).
3. What is the positive power of *b* in the simplified form of  , given *abc* ≠ 0.
4. A water tank is in the form of a right circular cone with the vertex pointing downward. The cone has a radius of 6 feet and a height of 24 feet. What is the depth of the water in feet, when the cone is filled to 1/6 of its full volume?
5. Evaluate: 
6. What is the one point (the removable discontinuity) at which the graph of  is not defined?
7. Factor the polynomial  into the form , with *A*  > 0. What is the value of  ?