**Mu Alpha Theta 2014 National Convention Algebra II Hustle**

1. Solve for *x*: 
2. Given  and , give a simplified expression for  in terms of *a* and *b*.
3. The Hill family drove from their house to the beach at an average speed of 60 mph, and they returned home on the same route at an average speed of 48 mph. Their total travel time was 6 hours. How far in miles is it from their house to the beach?
4. Find the value of *z*:

 

1. What is the maximum value of  ?
2. Given ; find the *y*-intercept of .
3. Factor  into the form ; what is the sum **?**
4. Solve for *x*: .
5. Simplify the expression , and write your final answer in factored form.
6. A quartic polynomial equation with relatively prime coefficients is known to have roots of . What is the coefficient of the quadratic term of this polynomial equation?
7. Name the coordinates of the point that is the removable discontinuity of .
8. Evaluate .
9. The third term of a geometric sequence is , and the 12th term is . Find the 14th term.
10. Find the fourth term of the expansion .
11. Given , , and , find the value of .
12. The foci of an ellipse are (2, 10) and (2, -2), and the length of the major axis is 20. Find the area of this ellipse.
13. Find the *y*-intercept of the quadratic function whose maximum is 9 and whose zeros are 5 and -1.
14. How many liters of a 16% iodine mixture should be added to 15 liters of an 8% iodine mixture to produce a solution that is 10% iodine?
15. Solve for *n*: .
16. Solve for *x*: .
17. Simplify: .
18. Find the sum of the integer solutions of .
19. Write in slope-intercept form the equation of the line that is tangent to the circle  at the point (5, -1).
20. Which, if any, of the following statements are true?

A)  B)  C) 

1. Convert  to a base 5 numeral.