Furman Wylie Mathematics Tournament
Junior Exam Answers
February 16, 2002

1. The answer is 33. The numbers are 10, 11, and 12.
2. The answer is 1000. Darby is my youngest daughter. We've never actually done the egg race, but maybe we will this year.
3. The answer is $(10b - c)/5$.
4. The answer is 3. The numbers are 1, -1, and 0.
5. The answer is 4.
6. The answer is none of the above, since the order should actually be Jess, Hannah, Rachel and Eliza. Hannah is my daughter and Jess, Rachel and Eliza are her best friends. None of them actually collect stamps though.
7. The answer is 72.
8. The answer is 3.
9. The answer is 180.
10. The answer is $B < C < A$. For some reason this surprises me.
11. The answer is 1. This is an easy problem disguised as a not-so-easy one.
12. The answer is 50. (I'm not really that old, but it make the problem work ....)
13. The answer is 5. Darby and Taylor are actually third graders, so it will be a while before they are taking calculus quizzes.
14. The answer is 2.5%.
15. The answer is 60.
16. The answer is 5.
17. The answer is $250,000$.
18. The answer is 24.
19. The answer is 6. If you got something less you missed a train or two.
20. The answer is 24/5.
21. The answer is 3. The numbers are 1, 4, and 7.
22. The answer is 2.
23. The answer is 60.
24. The answer is $-1/2$.
25. The answer is 36. Professor Ab Sentminded bears no resemblance to any of my colleagues.

26. The answer is 1, since $x = 4$ is the only solution.
27. The answer is 1/3.
28. The answer is 3:38. Sarah and Eleasa are the only two of my daughter's friends who actually live close enough to each other to make this problem possible.
29. The answer is 13.
30. The answer is 145. The polynomial is $x^2 - 30x + 125$, which has roots 5 and 25.
31. The answer is 9241.
32. The answer is 4. Such Februarys occur about every 28 years, since you need a leap year in which the first is on a Saturday. This took place in 1908, 1936, 1964, and 1992.

Bonus No. 1 Among any three consecutive integers, at least one is even, and at least one must be divisible by 3. Thus the product must be divisible by 6.

Bonus No. 2 Applying the last problem to the integers $(n-1), n, (n+1)$, we see that the product of these (which is $n^3 - n$) must be divisible by 6. Now $n^3 + 5n = (n^3 - n) + (6n)$, and since both $n^3 - n$ and $6n$ are divisible by 6, their sum is divisible by 6.