Furman Wylie Mathematics Tournament
Junior Exam Answers
March 13, 2004

1. The answer is 144000.
2. The answer is 13, which is none of the above.
3. The answer is 35.
4. The answer is 2, since $f(2) = 4$.
5. The answer is 60.
6. The answer is that my brother is mistaken (or lying.) He has been known to do that.
7. The answer is 6. This one is easy.
8. The answer is 144.
9. The answer is 44.
10. The answer is 3, since the solutions are 5 and -2.
11. The answer is IV, since the vertex is at $(1, -1)$.
12. The answer is "3 only".
13. The answer is $5x$. Try letting the remainder $r(x) = ax^2 + bx + c$, and then write the quotient of $m(x)$ and $n(x)$ as $m(x) = n(x)q(x) + r(x)$. By plugging in the roots of $n(x) = x^3 - x$, you can find the coefficients of $r(x)$.
14. The answer is $.112123123412345\ldots$.
15. The answer is 44. Hint: Think of $\overline{CB}$ is the diameter of a circle on which A lies.
16. The answer is 15.
17. The answer is 9, which is none of the above.
18. The answer is $\frac{2br}{b-3r}$.
19. The answer is that Tom wins by 3 minutes.
20. The answer is y^2.
21. The answer is that there are no points in the intersection. Note that the first curve isn't defined when $x = 4$.
22. The answer is 18 minutes.
23. The answer is $g(t) = \frac{2-t}{t+3}$.
24. The answer is 3. The midpoint is $(\frac{5}{2}, \frac{1}{2})$.
25. The answer is 3.

26. The answer is 8. The number is 2178.

27. The answer is $4x^2 - 11x + 6 = 0$. The roots of the original are 4/3 and 1/2, so this equation has roots 3/4 and 2.

28. The answer is 11.

29. The answer is 2.49, which occurs when $x = 4.3$.

30. The answer is 216, which is none of the above.

31. The answer is 3, since the red, green and yellow cups will each contain a ball.

32. The answer is .29. Don't forget that when Tom is finished, both Kevin and Mark are still on the course.

Bonus 1 The average is $\frac{n_1 a_1 + n_2 a_2}{n_1 + n_2}$.

Bonus 2 Note: The reference should be to problem 16, not problem 15. The height is $\frac{ab}{a+b}$.