MATH 243 Midterm 1

0: A few students put a different answer in the long answer entry box than on their scratchwork, or committed typos. I was lenient when grading this time and just pointed out when it happened, but be careful next time. At least one student got caught cheating. If you cheat, you will get a **0.**

1: Everyone got this right, congratulations.

2: One student rushed tangent plane and selected it after mixing up 3 and 4. Some students miscopied f and did the partial derivative improperly as a result. Some who copied it correctly were unable to differentiate the last term correctly, thinking for example that $\sin(\sin(y))$ disappears when you take x and z derivatives. This is false because it is attached to the term $(2z+x)^4$ and hence acts like a constant when those derivatives are taken. Almost everyone analyzed arc length correctly. Two students thought it was false because they computed $\|r\|$ instead of $\|r'\|$. Everyone got the plane equation except a student who copied down the plane and points incorrectly.

3: A few students mixed up perpendicular and parallel, thinking the condition on $\mathbf{u} \times \mathbf{v}$ must be equivalent to the volume one. Many students said the determinant one is false because swapping rows changes the sign of the determinanet, so it can't remain the same. They overlooked the fact that $0 = -0$.

4: A few computed $a \times b$ or $(a \times b) \times a$, then stopped and found the sum of coordinates for those. A few guessed, came up with random answers, or tried to say $\mathbf{v} = 0$ because $\mathbf{a} \times \mathbf{a} = 0$. Many students who spotted a pattern with every other cross product before reaching the final answer, or when writing the final answer in the form $r^s t$. Almost all students who spotted the pattern didn't explain why it always continues, but I only took off 0.5 points for this.

5: Almost everyone who tried this got it right. One student forgot to convert to degrees.

6: A few students copied down the polynomials incorrectly, leading to incorrect algebra. A few left the problem incomplete after trying to factor the denominator. Many students said the answer was 3 due to the 3 lines from the denominator, forgetting to factor the numerator and recognize a removal singularity arising from $\frac{(y-x)\cdots}{(y-x)\cdots}$.

7: Many students lost points on finding the segment by not including the bounds, not trying to find the bounds, finding bounds but having an algebra mistake when computing A and G.

8: Almost everyone who tried this problem got it right.

9: Almost everyone who tried this problem got it right. One student found an equation for f_x, f_y, didn't find another, and left it incomplete. One student found $f_x + f_y = 4\sqrt{2}$ instead of 8 and ended up with a mess left unsimplified by the end. Two students restated the problem without doing any work.