Math 3214: HW2 (Due Wednesday 2/5, 5pm)

To obtain (full) credit, show all reasoning and work.

If you use a formula, include it in the write-up of that problem.

No calculator or other electronic devices for HWs.

1. Section 2.5: 3a. The book asks: Use the chain rule for vector functions and compute directly.
2. Review exercises for Ch. 2 (p. 144): 5. Use the chain rule for vector functions.
3. Review exercises for Ch. 2 (p. 144): 7. Use the chain rule for vector functions.
4. Let $\boldsymbol{f}(u,v) = (u - v^2, 2uv)$ and $\boldsymbol{g}(x,y) = (\mathrm{e}^{x+2y}, x - y)$. Compute
   (a) $\boldsymbol{D}(\boldsymbol{g} \circ \boldsymbol{f})(1,1)$ using the chain rule for vector functions.
   (b) $\boldsymbol{D}(\boldsymbol{f} \circ \boldsymbol{g})$ using the chain rule for vector functions.
5. Section 2.4: 1. First find an equation in x and y that represents the curve.
   Explain the orientation of the curve and indicate it with an arrow in your sketch.
6. Sketch the curve that has parametrization $\boldsymbol{c}(t) = (\sin t,\ 2t,\ \cos t)$ with $-2\pi \le t \le 2\pi$.
   First sketch the surface along which the curve lies.
   Name the curve and include orientation and relevant positions.
7. Sketch and parametrize the following curves using a single parametrization.
   Include the bounds of the parameter and the orientation of your curve.
   (a) The curve $x + y^4 = 3$.
   (b) The curve $(x-2)^2 + y^2 = 4$.
   (c) The curve of intersection of $x^2 + z^2 = 4$ and $y = 2x$.
   (d) The part in the first octant of the curve of intersection of $y = x^2$ and $y + z = 5$.
8. Review exercises for Ch. 4 (p.260): 3.
9. Section 2.4: 13.
10. Section 2.4: 19.
11. Find the path $\boldsymbol{c}(t)$ such that $\boldsymbol{c}(0) = (1,0,2)$ and $\boldsymbol{c}'(t) = (t^2,\ \mathrm{e}^{-2t},\ 1)$.
12. Review exercises for Ch. 4 (p.261): 15c.
13. Section 4.1: 24.
14. Section 4.1: 26 (Don't answer part 3: whether this is the case for planetary motion).