Differential manifold

Clever Curious Chen 2020/1/6

1. Write down the definitions of manifold, embedded submanifold, Riemann manifold, etc.
2. Prove cotangent bundle is a manifold with dimension of 2m.
3. Calculate three Lie Bracket.
4. Prove $\frac{xdx+ydy}{x^2+y^2}$ is a closed form, and decide whether it is an exact form.
5. Prove the space with $G=\frac{dx\otimes dx+dy\otimes dy+dz\otimes dz}{(1+K(x^2+y^2+z^2)^2)}$ has constant curvature.
6. Singular point exists in tangent vector field on even order sphere.

Note: the exam is in Chinese.

Memorizer: students from college of physics