

# Differential Geometry I: Week 14

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**CAT(2021).** Commander Blorx is invited as a special guest to the **Congress of Astro-Topologists 2021**. Blorx feels quite honoured, but is also a bit afraid that there might be too many too uninspiring talks and not enough chocolate cookies. This year's hot topic of the congress is planetary design products. Help Blorx to get through this event!



**Problem 13.1** (the opening anthem). Same procedure as every year: The congress begins with the opening anthem. The exact key of the opening anthem is a well-kept secret. However, there are some rumours. Which of the following keys are musically geometrically sound?

$R^\sharp = Rm$	BL
$R^b = Rm$	JU
$Rm^\sharp = R$	PI
$Rm^b = R$	OR

**Problem 13.2** (CAT-prize). Commander Blorx is awarded the prestigious *CAT-prize for non-felines* for his contributions to inter-planetary roguery. During the ceremony, Blorx is handed the ornate CAT cup, bearing his name. Unfortunately, the committee misspelled Blorx's name as  $R_{BLOX}$ . Which of the following inscriptions would be equivalent to  $R_{BLOX}$  ?

$-R_{BOLX}$	XI
$R_{BBOX}$	TER
$R_{OXBL}$	TE
$-R_{LBOX}$	RI
$R_{LOXB}$	XIS
$-R_{LBXO}$	R
$R_{XOOX}$	ST

**Problem 13.3** (disc-shaped planets). After these preliminaries, the actual scientific part of the congress begins. The first session is about disc-shaped planets (which used to be the state of the art for a long time!). Which of the following properties can a complete Riemannian metric have on an open disc in the plane?

$sec < 0$	SFL
$sec = 0$	ATT
$sec > 0$	NOT

*Please turn over*

