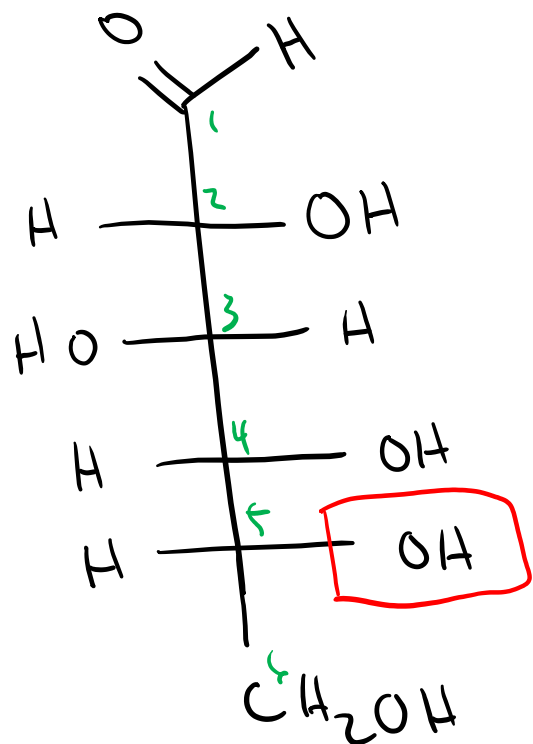


Cyclic Carbohydrates

4/14/2023

Classifying Carbohydrates: "D-" vs "L-"

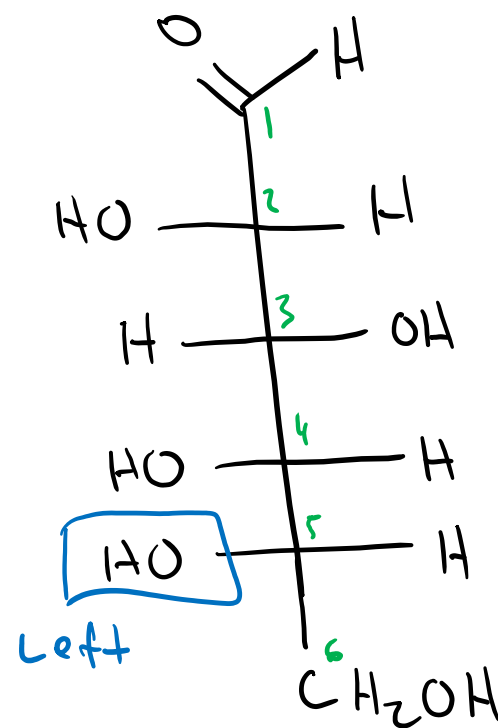
Both structures below are glucose?



D-glucose

enantiomers
every chiral
center
changed!

right



L-glucose

Aldose Sugars

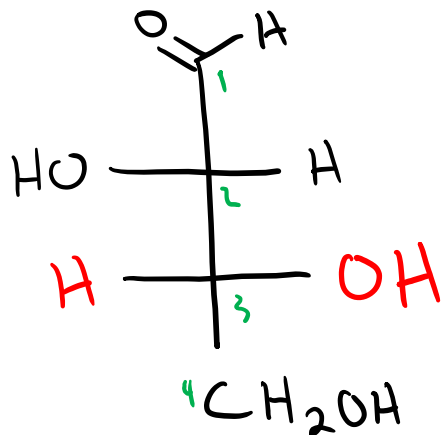
(24.3)

Aldotetroses → carbohydrate
→ 4 carbons
→ aldehyde

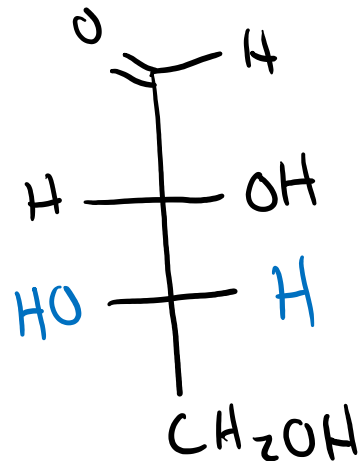
★ know this part of naming,
not common names of each sugar
(threose, etc) ★

★ know D- & L- sugar of same name are enantiomers ★

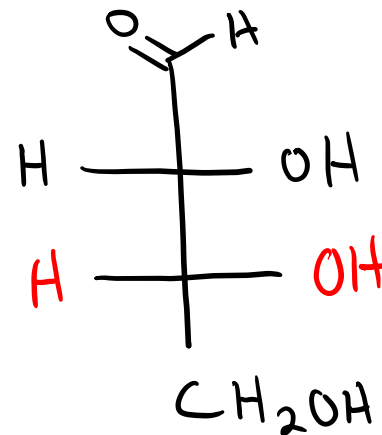
D - Threose



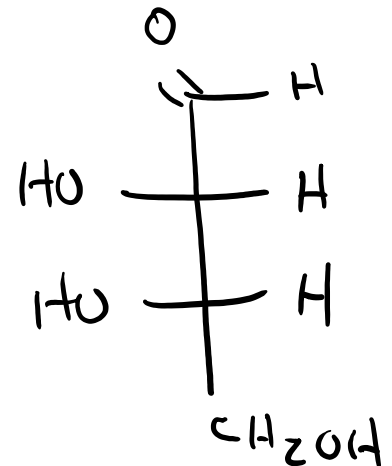
L - Threose



D - Erythrose



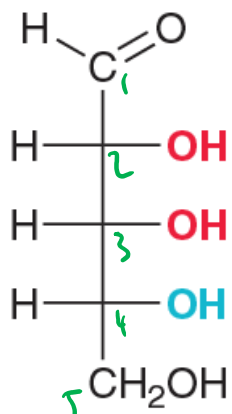
L - Erythrose



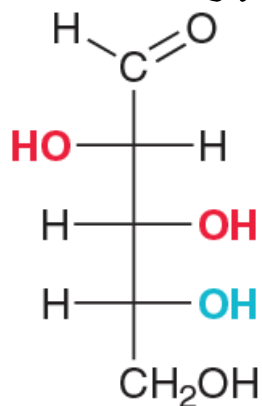
Aldose Sugars

(24.3)

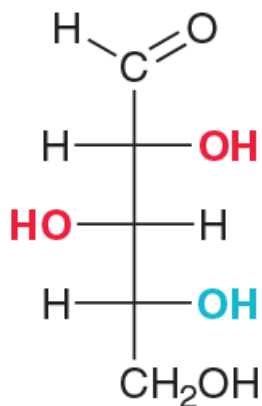
3 chiral centers $\rightarrow 2^3 = 8$ isomers



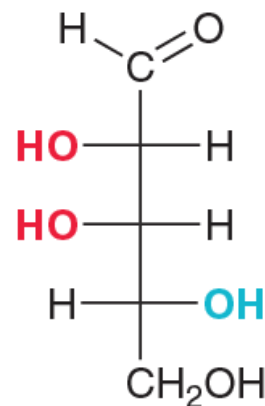
D-Ribose



D-Arabinose



D-Xylose



D-Lyxose

Aldo pentoses

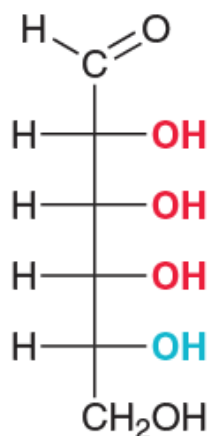
5-carbons

(+ L enant. of each) = 8 total

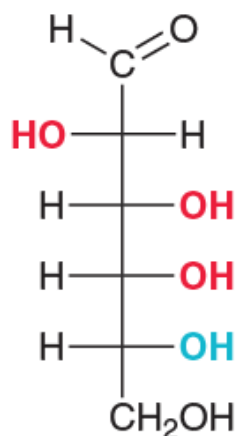
Aldo hexoses

6 carbons

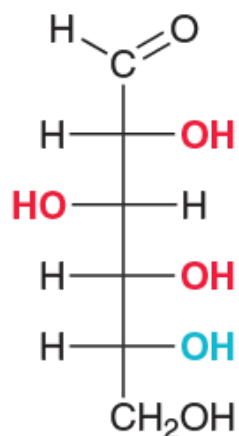
(+ L enantiomers of each) = 16 total



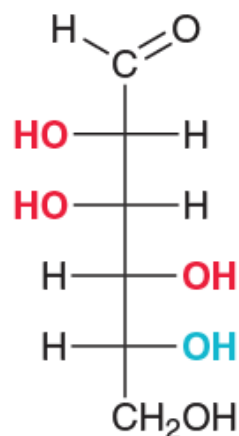
D-Allose



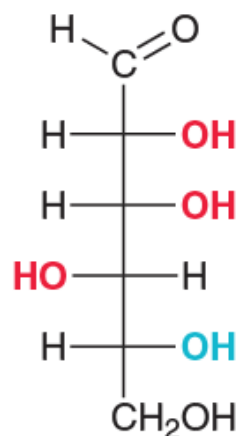
D-Altrose



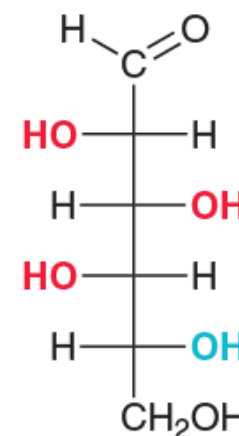
D-Glucose



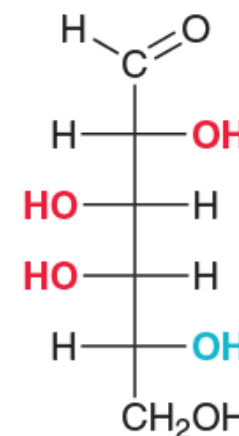
D-Mannose



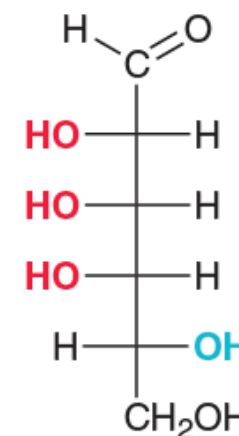
D-Gulose



D-Idose



D-Galactose



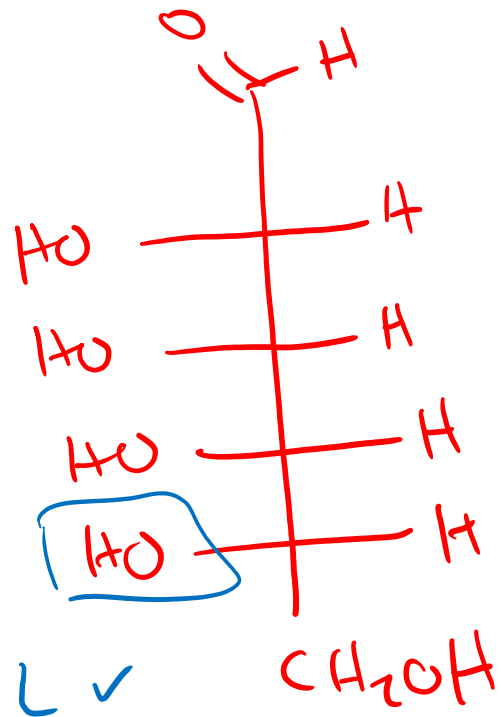
D-Talose

Epimers diastereomers that differ at exactly one chiral center

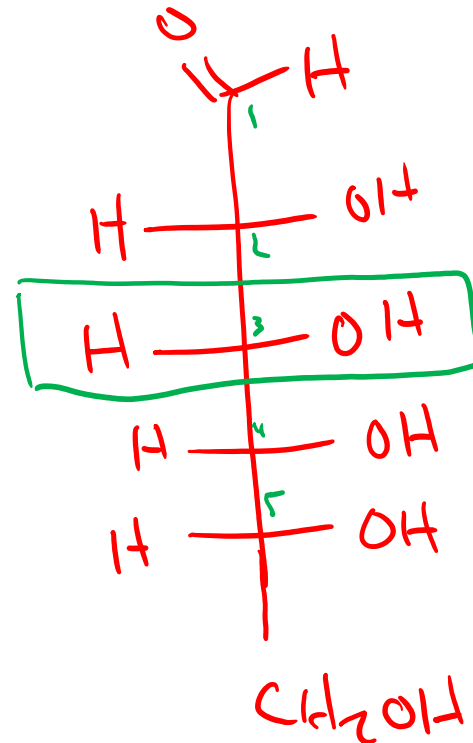
Allose is a C3 epimer of glucose
↳ Carbon #3 is different config!

from C=O
as C1.

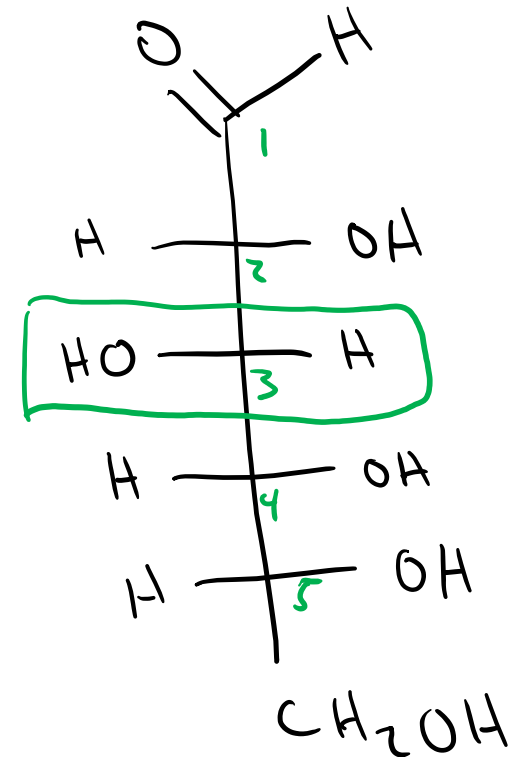
Draw L-allose.



D-allose



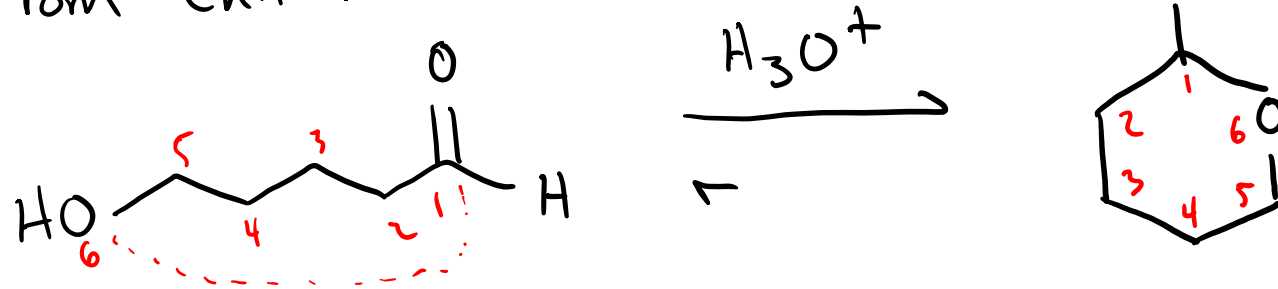
D-glucose



Cyclic Carbohydrates: Pyranose Rings

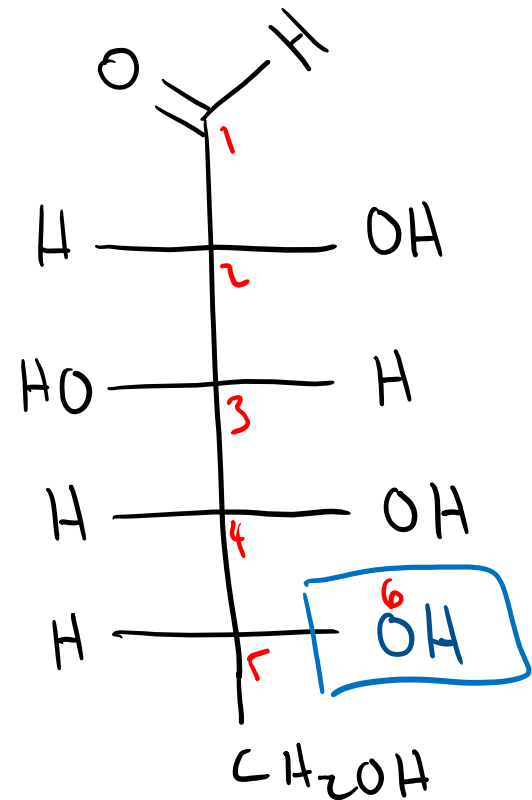
(24.5)

From Ch. 19:

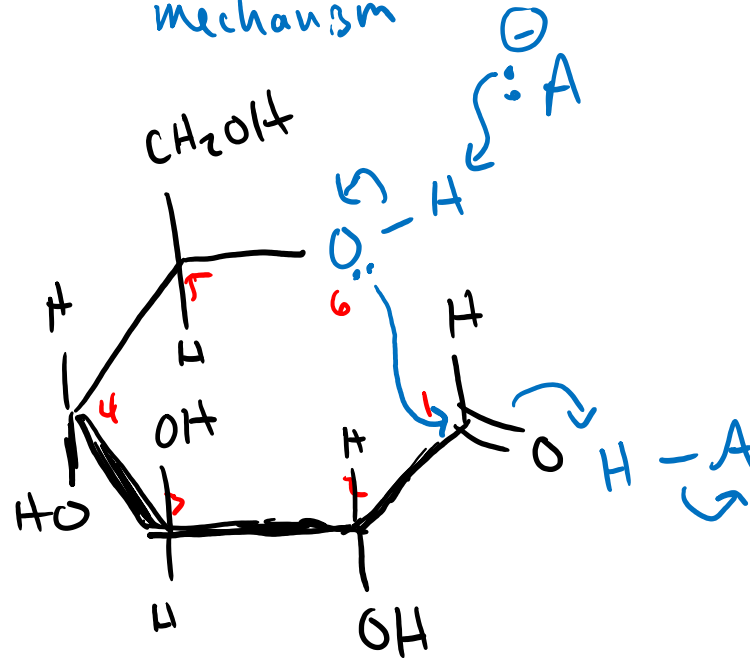


cyclic hemiacetal
very stable when
6-membered ring

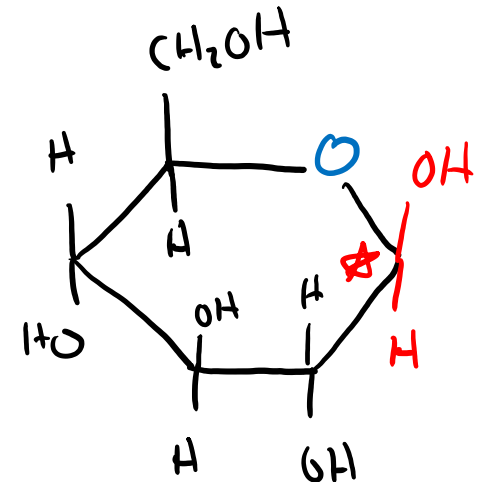
D-glucose



Don't need to know
mechanism



Haworth projection

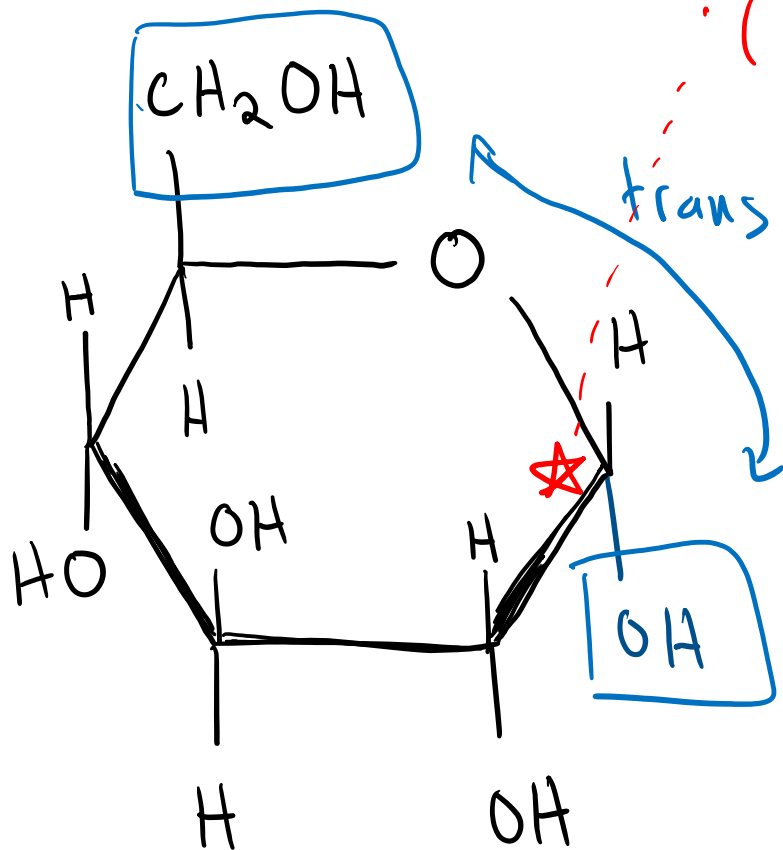


new chiral center!
could be either config

Anomers of Glucopyranose

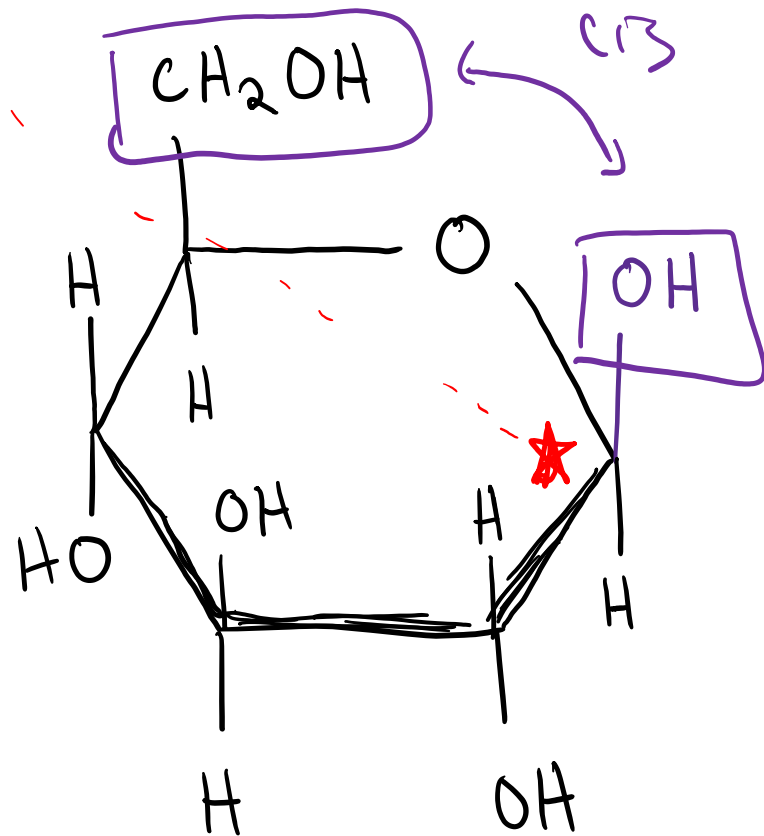
6 member ring form of glucose

↳ differ in config of anomeric carbon only
(★)



α-trans

α - D - glucopyranose
(α-anomer)



β - D - glucopyranose
(β-anomer)

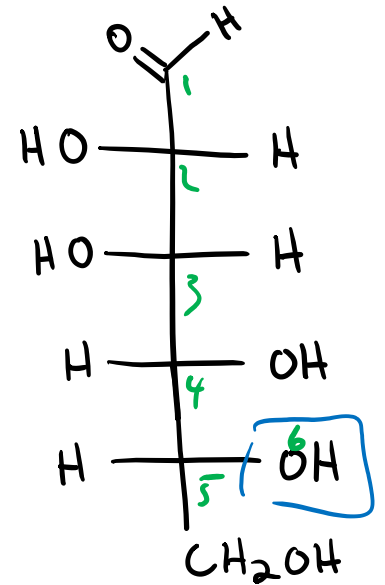
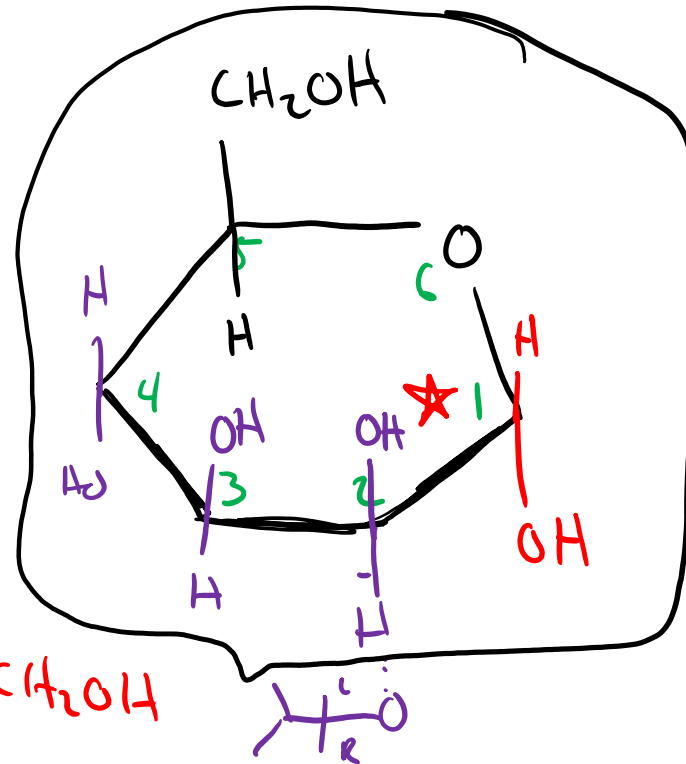
Converting Fischer Projection into Haworth Projection (of the Pyranose)

Draw α -D-mannopyranose

1) Draw 6-member ring w/ Oxygen at top right

2) If D-sugar, put $-\text{CH}_2\text{OH}$ up on C5
(down if L-sugar)

3) place $-\text{OH}$ on anomeric C $\star$
carbon (C1)
 α -sugar $\rightarrow$ $-\text{OH}$ trans to $-\text{CH}_2\text{OH}$



D-Mannose

4) Float your astral projection around to assign the rest.
Start w/ your head aligned w/ Carbon #1. (or, right = down
left = up)