

# tcore 112: Quiz 4

You may find the following table of approximations helpful if you did not bring a calculator for the quiz.

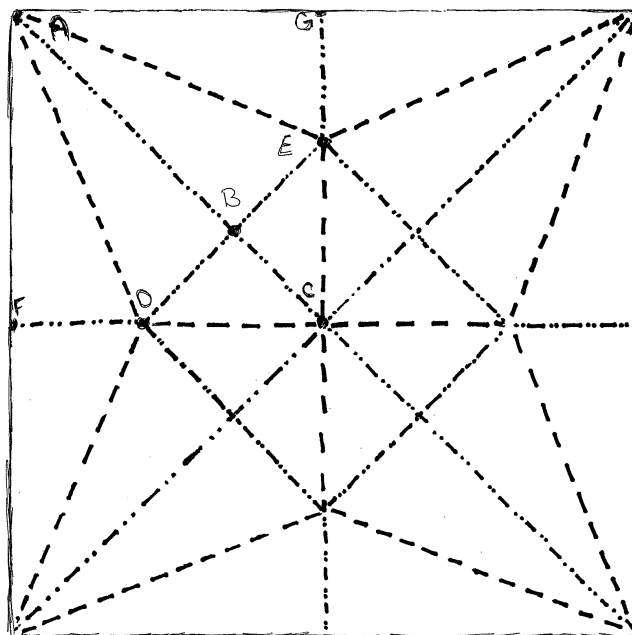
$x$	$22.5^\circ$	$30^\circ$	$45^\circ$	$60^\circ$	$67.5^\circ$	$135^\circ$
$\cos(x)$	$\frac{\sqrt{2+\sqrt{2}}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{2-\sqrt{2}}}{2}$	$-\frac{\sqrt{2}}{2}$
$\sin(x)$	$\frac{\sqrt{2-\sqrt{2}}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2+\sqrt{2}}}{2}$	$\frac{\sqrt{2}}{2}$
$\tan(x)$	$\sqrt{\frac{2-\sqrt{2}}{2+\sqrt{2}}}$	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	$\sqrt{\frac{2+\sqrt{2}}{2-\sqrt{2}}}$	-1

1. The crease pattern for the bird base is shown below. This bird base is the same as that presented in Lang and what you have worked with in class. Since you know how to make the bird base you know such things as  $\overline{AB}$  bisects the  $\angle GAF$ . Let the side length of the square be 1 unit and find the following measures *exactly*.

(a) [1] the measure of side  $\overline{AF}$

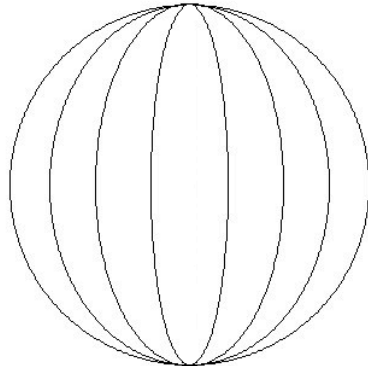
(b) [2] the measure of  $\angle DAF$

(c) [3] the measure of side  $\overline{AB}$

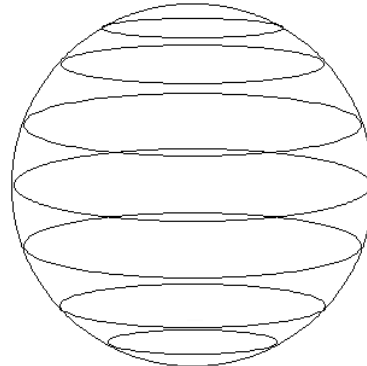


2. [1] Recall that the bird base has four flaps. Use your work from number 1 to find the length of the flaps in the bird base.

3. [4] TRUE/FALSE: Refer to the diagram below when answering the following questions. If true, circle T and explain briefly why the statement is true. If false, circle F and explain briefly why the statement is false.



**Lines of Longitude**



**Lines of Latitude**

- T F All of the ‘lines’ of latitude are geodesics on the sphere.
- T F The equator (the middle ‘line’ of latitude) is perpendicular to the ‘lines’ of longitude.
- T F The ‘lines’ of latitude are parallel geodesics on the sphere.
4. [2] How would you describe the style and/or content of mathematicians in the 17<sup>th</sup> and 18<sup>th</sup> centuries?
5. [2] What is it that Lang calls “grafting”?