EXAM II, MTH 211, Fall 2009

Ayman Badawi

QUESTION 1. We want to tile a plane using one type of triangles, say ABC, Color the angle A with red, color the angle B with green, and color the angle C with blue. We want to do the tiling so that all around A is red, all around B is green, and all around C is blue. What type of triangles must we use? How many triangles of this type are there? GIVE a MATHEMATICAL justification for your answer.

QUESTION 2. Let C be a circle of radius 2 cm with CENTER O, and ABC is a triangle such that $\mid OA \mid = \mid OB \mid = 4$, and $\mid OC \mid = 8$. Sketch the inversion of the triangle ABC with respect to the circle C. what is the Euclidean distance between $Inv(A)$ and $Inv(C)$.

QUESTION 3. Let ABC be a triangle with vertices $(2,0)$, $(2,1)$, and $(3,1)$. Rotate ABC around the origin 60 degrees. Then we get a new triangle $A'B'C'$. Find the vertices A', B', and C'. (note $\cos(60) = 1/2$, $\sin(60) = \sqrt{3}/2$.)

QUESTION 4. Let H be a hyperbolic circle with center O and radius 2cm. Locate two points inside H, say A and B, such that C_A is parallel to C_B, then connect A to B by a hyperbolic line.

QUESTION 5. Let H be a hyperbolic circle with radius 2 and center O. Construct inside H a hyperbolic circle with a hyperbolic radius equals to $ln(3)$.

QUESTION 6. Let H be a hyperbolic circle with radius 2. Let B be a point on H (so B is a horizon point). Construct two parallel hyperbolic lines, say L_1 and L_2, such that L_1 meets L_2 at B. (another way of saying that: using EUCLIDEAN eyes , parallel hyperbolic lines might interest!!!). State briefly the steps of construction.

QUESTION 7. What type of of Freize pattern is the below? Given that we initially started with the letter b.

Faculty information

Ayman Badawi, Department of Mathematics & Statistics, American University of Sharjah, P.O. Box 26666, Sharjah, United Arab Emirates.
E-mail: `abadawi@aus.edu, www.ayman-badawi.com`