Statistics – Devon, Emily, Jay

Q: When determining the correlation coefficient, what type of vector do you use?

Q: What effect do outliers have on the correlation coefficient?

Q: How are orthogonal projections related to least squares solutions?

Geometry of the Torus – Lindsay, Chris S.

Q: What is a homeomorphism?

Q: What is a basic matrix? Which of these is not a basic matrix?

$$\begin{matrix} 1 & 5 \\ 0 & 1 \end{matrix} \qquad \begin{matrix} 1 & 5 \\ 5 & 1 \end{matrix}$$

Q: What is a geodesic?

Q: What does GL(2,Z) stand for?

Angle Trisection – Peter, Sam, Noah, Michael

Q: What is a constructible point?

Q: What is ONE difference between a vector space and a field?

Q: You can trisect an angle using which of the following methods/tools? Circle all that apply.

a) The Guzita-Justin axioms of origami
b) A straight-edge and compass
c) A ruler and compass
d) A piece of string, two paper clips, and one thumbtack
e) Tin foil and a stuffed buffalo

Determinants – Chris N., James

Q: How does the determinant of a matrix relate to its expansion factor?

Q: What geometric measurement does the determinant of a 2x2 matrix correspond to?

Q: Give an example of a parallelpiped in R^3.

Economics – Chris H., Karl, Stew, Doug

Q: Given the $(I_n - A)^{-1}$ matrix and the equation $(I_n - A)^{-1}\,\mathbf{b} = \mathbf{x}$

$$\begin{bmatrix} 1.78 & 1.3 & 0.4 \\ 0.76 & 1.98 & 0.2 \\ 0.41 & 0.7 & 1.4 \end{bmatrix}$$

What would be the increased production for the three industries if the consumer demand were to increase for industry 1 by one unit?

Q: Name one disadvantage to using input-output models to model an inter-industry relationship.

Q: Given the industry demand vectors:

$$v_1 = \begin{bmatrix} .2 \\ .3 \\ .1 \end{bmatrix},\ v_2 = \begin{bmatrix} .45 \\ .3 \\ .2 \end{bmatrix},\ v_3 = \begin{bmatrix} .2 \\ 0 \\ .2 \end{bmatrix}$$

How much does industry 1 need from industry 2 for every dollar it produces?