

Math Problems

Infinite lines A, B, C are parallel with line B in between lines A and C. The distance from line A to B is x and the distance from line B to C is y . Show that there exists a square with at least one vertex on each line and compute all possible areas of such squares.

Seven astronauts landed on a small spherical asteroid. They wanted to explore it and walked in different directions starting from the same location. Astronaut A walked 30 meters forward, turned 90 degrees left and walked another 30 meters, turned 90 degrees left again and walked another 30 meters. Astronaut B did the same but walked 40 meters at a time. Similarly astronauts C, D, E, F, and G walked 50, 60, 70, 80, and 90 meters at a time respectively.

At the end of their exploration, all but one astronaut were in the same location. Which astronaut was in a different location and what is the radius of the spherical asteroid?

Stained Glass

Color each region either black or white such that over half the regions adjacent to a white dot are white, over half the regions adjacent to a black dot are black, and exactly half the regions adjacent to a gray dot are black and half are white.

