



Problem of the Week

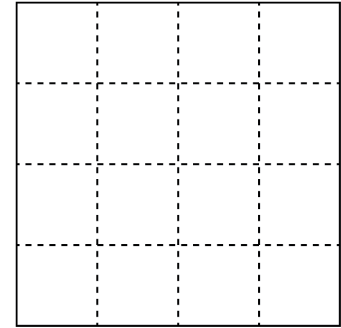
Problem B

Equal Cake and Icing

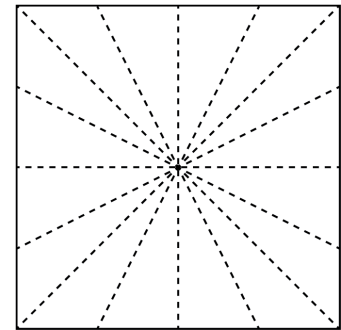
Serenity is having 16 guests for dinner. She baked a cake for dessert using a square cake pan with side length 36 cm. The cake is 8 cm tall. The top face and side faces of the cake are covered in icing.

She would like to slice the cake into 16 pieces. She calls a slicing a “fair cake” if each piece has the same amount (volume) of cake and the same amount (surface area) of icing.

- (a) To cut the cake into 16 pieces, suppose she makes three equally-spaced vertical slices and three equally-spaced horizontal slices through the top face of the cake. Is this a fair cake?



- (b) To cut the cake into 16 pieces, suppose she first divides each edge of the top face into four equal lengths. She then makes a straight slice from each end of a length, through the centre of the square, to an end of a length on the opposite edge. Is this a fair cake? Show calculations to support your answer.



EXTENSION:

Only 9 guests want to eat dessert. Serenity decides to cut the cake into 9 pieces by dividing the entire perimeter of the cake into nine equal lengths, starting in the top-left corner and moving clockwise. She then makes a slice from each end of a length to the centre of the square. Is this a fair cake? Show calculations to support your answer.

