

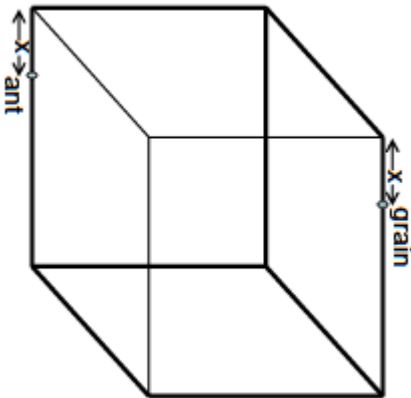
Answer on Question #63152 – Math – Geometry

Question

An ant lives on the surface of a cube with edges of length 7cm. It is currently located on an edge x cm from one of its ends. While traveling on the surface of the cube, it has to reach the grain located on the opposite edge (also at a distance x cm from one of its ends) as shown below.

- (i) What is the length of the shortest route to the grain if $x = 2\text{cm}$? How many routes of this length are there?
- (ii) Find an x for which there are four distinct shortest length routes to the grain.

Solution



- (i) The shortest route is to go straight over the two sides to the other edge - each surface is 7cm long, so 14cm. There are two different ways to do this since he could go right on the flat surface and then to the left. Or he could go left first and then go right.

(ii) There are 4 shortest lengths only in case where x is 3.5 (right in the middle). Then the ant can walk along the edges to the grain and get there in 14 cm, or walk the route from (i) we mentioned before.