Problem of the Week
Problem B
A Round Trunk in a Square Hole

Rhab’s mother and father decided that they wanted him to spend more time outdoors, so they built him a tree fort. A red maple tree goes right through the middle of the fort, like in the tree fort shown in the photo below.

[Image: Tree fort with a red maple tree going through it]

Source: Creative Commons

Useful things to know:
The distance around a circle is about 3.14 times the distance from one edge of the circle to another, through the middle of the circle.

This is called the diameter d of the circle.

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a) Rhab’s mom found two pieces of plywood with dimensions 1.2 m (120 cm) by 2.4 m (240 cm) to use for the floor. What will be the total floor area of the tree fort if they use both sheets of plywood to form a square floor for the tree fort?

b) Rhab’s parents thought about how they should make the hole in the plywood floor so that the tree would fit. They decided that a square would be the easiest solution. Rhab’s dad measured the distance around the tree (the circumference) and found that it was 140 cm. He was about to cut a square with side length 35 cm when Rhab, remembering what he learned in school, stopped his dad before it was too late. Why did Rhab stop his dad?

c) Rhab found the diameter of the tree to be about 45 cm. If they decide to cut a square hole through which the trunk will fit, what are the dimensions and area of the square hole that his dad should cut?

d) What is the remaining area of the floor of the tree fort after the square hole has been cut out?

e) Where Rhab’s family lives, red maples grow to around 60 cm in diameter. How might this affect the design of the tree fort?

STRAND Measurement