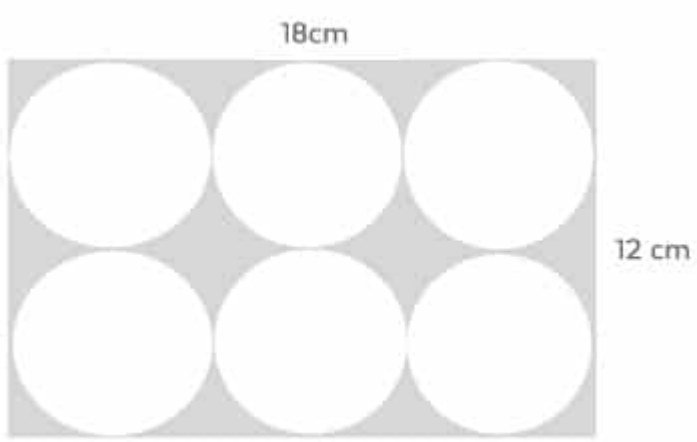
Circular Patterns on the ISEE

Middle and Upper Level

LESSON GOAL: Learn to work with complex figures involving circles.

ISEE Question: Jackson uses a circular cookie cutter to cut out six identical cookies from a rectangular sheet of dough that measures 18cm by 12cm, as shown in the diagram. What is the total area of the six cookie circles?

A) 9π cm^2
B) 18π cm^2
C) 36π cm^2
D) 54π cm^2



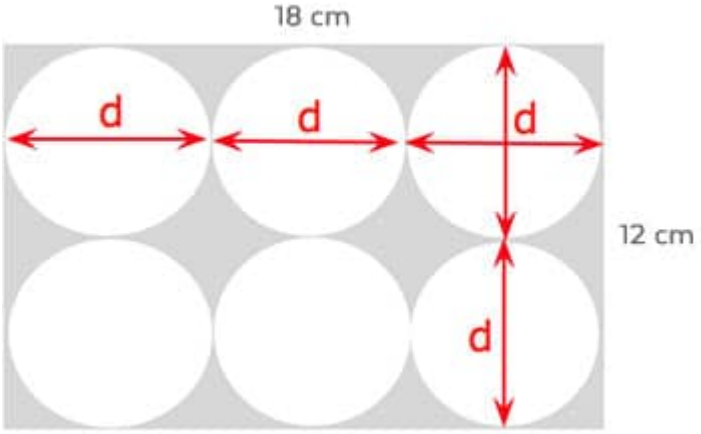
Solution: In any problem with circles on the ISEE, it is essential to find the ***radius***.

STEP 1: Let's analyze the figure.

The six cookies cuts are in two rows of three. The length of the rectangle is 18cm, or three cookies, so each cookie is 6cm-long.

We can find the same cookie length from the width of the dough sheet, which is 12cm, or two cookies.

In mathematical terms, the width of a cookie is its ***diameter***, d, which is twice the radius, r. This means that each of the cookies has a radius of 3cm.



Using the ***area formula*** $A = \pi r^2$ or $A = r^2\pi$ (see Basic Circle Graphs on the ISEE), we can find that the area of each cookie is $A = 3^2\pi = 9\pi$ cm^2

STEP 2: Answer choice A) is a trap, because that's the area of only one cookie. The question asks for the "total area of the six cookie circles," so we need to multiply 9π by 6. The correct answer is 54π cm^2, or D).

Helpful Tip: Don't waste your time multiplying by 3.14! Most ISEE problems give you the answers in terms of π.