





Problem of the Week

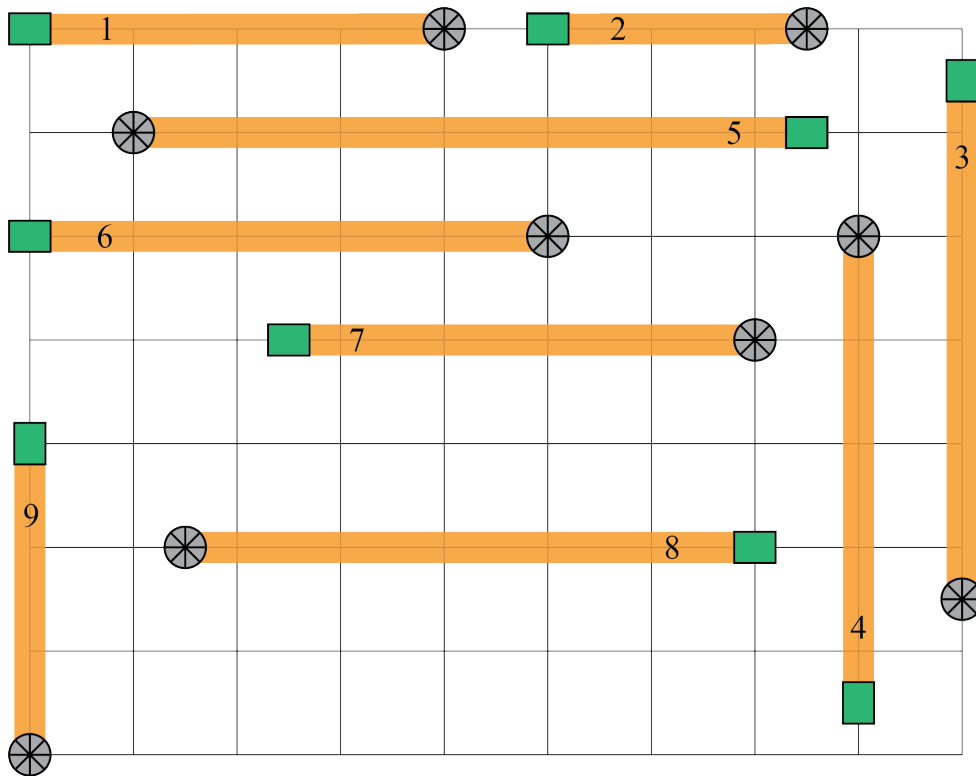
Problem A and Solution

Disc Golf Distance

Problem

Disc golf is a sport where players throw a flying disc towards a target. A disc golf course is made up of several holes, each with their own tee box and basket. Players start by standing in the tee box and throwing the disc towards the basket.

Hypatia Public School is building a new nine-hole disc golf course on their property. They drew a plan for the course on grid paper, showing the tee box , basket , and hole number for each hole. The distance between grid lines is 20 m, and the centre of each tee box and basket is placed either on a grid line, or halfway between two grid lines.



The length of a hole is the distance from the centre of the tee box to the centre of the basket. The length of a course is the sum of the lengths of all the holes, not including the distances between the holes.

Calculate the length of the disc golf course the school is planning to build.



Solution

Since the distance between the grid lines represents 20 m, then the distance halfway from one grid line to the next would be 10 m. Keeping this in mind, we can calculate the length of each hole by counting the number of grid squares between its tee box and basket.

Hole Number	Number of Grid Squares Between Tee Box and Basket	Length of Hole (m)
1	four	$4 \times 20 = 80$
2	two and a half	$2 \times 20 + 10 = 50$
3	five (a half, plus 4, plus a half)	$5 \times 20 = 100$
4	four and a half	$4 \times 20 + 10 = 90$
5	six and a half	$6 \times 20 + 10 = 130$
6	five	$5 \times 20 = 100$
7	four and a half	$4 \times 20 + 10 = 90$
8	five and a half	$5 \times 20 + 10 = 110$
9	three	$3 \times 20 = 60$

So the length of the course is:

$$80 + 50 + 100 + 90 + 130 + 100 + 90 + 110 + 60 = 810 \text{ m.}$$

Alternatively, we can calculate the total number of grid squares between the tee boxes and the baskets, and then use this to calculate the length of the course.

First we add the complete squares: $4 + 2 + 4 + 4 + 6 + 5 + 4 + 5 + 3 = 37$.

Then we add the half squares, using the fact that $\frac{1}{2} + \frac{1}{2} = 1$.

$$\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 1 + 1 + 1 + \frac{1}{2} = 3 + \frac{1}{2}$$

Then we add these together to obtain $37 + 3 + \frac{1}{2} = 40 + \frac{1}{2}$.

Finally we can calculate the length of the course in meters. Since $40 \times 20 = 800$, the length of the course is $800 + 10 = 810 \text{ m.}$