

Can Javelin Throws be Measured with a Broken Tape?

On the day of the school sports meet, the physical education teacher notices that the broken measuring tape hasn't been replaced. The javelin throw event is about to begin in 30 minutes, and there's no time to get a new tape. They need to measure the distance from the centre of the sector subtending the throwing arc to where the javelin lands (Figure 1). The issue is that the damaged tape can only measure up to 12 metres, while javelin throws typically cover distances of 10 to 60 metres.

She changes the field layout by drawing circular arcs around point O using ropes, with a 10-metre difference in radii (Figure 2). This way, she thinks that she only has to measure from where the javelin lands to the nearest arc.

The event takes place with this adjusted layout. However, by the end of the day, the runner-up questions the fairness of the teacher's method. He wonders how the point on the nearest arc is selected and questions the validity of the approach.

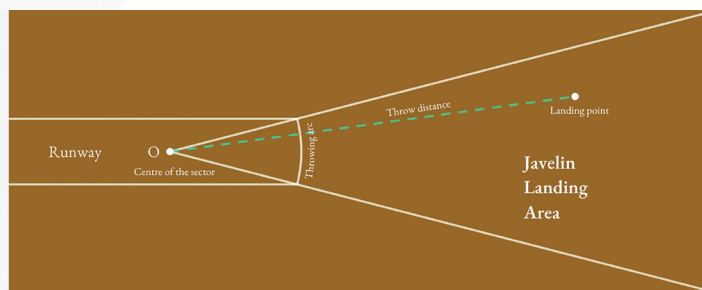


Figure 1. Layout for Javelin throw event

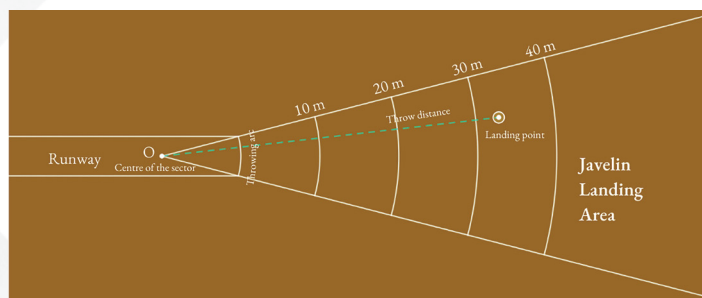


Figure 2. Modified layout

Question.

If the method used by the physical education teacher is mathematically sound, can you, on her behalf, describe the method of choosing the point on the arc and justify that the method is fair and sound?

For a solution turn to page number 59