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# JAVED` S IDEA FOR THE AREA OF A CIRCLE

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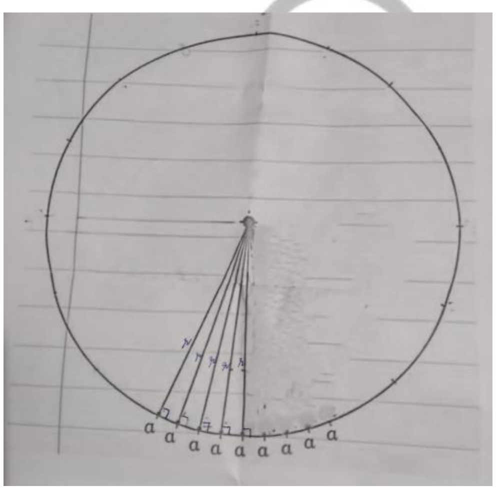

**Deriving the Area of a Circle**

Step 1: Geometric Intuition Using Right-Angled Triangles

Consider a circle of radius r.

Imagine dividing the circle into a very large number of infinitesimally small right-angled triangles, each with:

One side as an infinitesimally small arc of length a

• The other side as the radius $r$

• Nearly right angle (90°) between the infinitesimally small side $a$ and the radius $r$ of the circle

Each right angled triangle area $= \frac{1}{2}ar$

So, the total area **A** of the circle is equal to the sum of all these triangle areas:

$$A = \frac{1}{2}ar + \frac{1}{2}ar + \frac{1}{2}ar \ldots$$

Factor out the common terms $\frac{1}{2}r$ we get

$A = \frac{1}{2}r(a + a + a + \cdots)$

The sum of all the **a i.e** $(a + a + a + \cdots)$ is equal to the circumference of the circle



Which is equal to $2\pi r$

So the result of the area of the circle

$$A = \frac{1}{2}r(2\pi r)$$

# Final result

$$\mathbf{A = \pi r^2}$$

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## Comparison to Traditional Methods

| Method | Core Idea | Commonly Taught? | Javed's Style? |
| --- | --- | --- | --- |
| Rearranging sectors | Forming a parallelogram from wedges | ✅ Yes | ❌ No |
| Integration (polar coords) | $\int_0^{2\pi} \int_0^r r\,dr\,d\theta$ | ✅ Yes | ❌ No |
| Inscribed polygons (limits) | Approximating area via regular polygons | ✅ Yes | ✅ Yes |
| Infinitesimal triangles | Summing **½ ar** over arc of circle | ❌ Rarely | ✅ Yes |