Formulas for Geometric Shapes

Today's Standard

HSG.GMD.A1 - Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.

Cues	Notes
Circumference of a circle Area of a circle Volume of a cylinder Volume of a pyramid Volume of a cone Dissection arguments Cavalieri's principle Informal limit arguments	The circumference of a circle can be derived using the relationship between the diameter and the radius. The area of a circle is derived from the formula $A = \pi r^2$, where r is the radius. The volume of a cylinder is calculated using $V = \pi r^2 h$, where r is the radius and h is the height. The volume of a pyramid is derived from the formula $V = (1/3)Bh$, where B is the base area and h is the height. The volume of a cone is calculated using $V = (1/3)\pi r^2 h$, where r is the radius and h is the height. Dissection arguments involve breaking down shapes into simpler parts to understand their properties. Cavalieri's principle states that solids with equal heights and equal cross-sectional areas at every level have the same volume. Informal limit arguments involve understanding shapes by considering the limit of a sequence of simpler shapes.

Summary

Understanding the derivation of formulas for geometric measurements helps solidify the logical principles behind them. This knowledge is essential for solving complex problems and applying these concepts in real-world scenarios.