

The calculation of surface area and volume of k-balls inscribed in a regular prism and pyramid.

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The purpose of this project was to find relation between the volume of a prism and a truncated pyramid with regular n-sided polygon base and to show that the surface area and volume of the k-balls inscribed can be calculated if the perimeter is known. We found that the volume of the truncated pyramid is $\frac{1}{3} [(P'/P)^2 + (P'/P) + 1]$ times the volume of the prism when the perimeter of the prism base is P and P' is the perimeter of the truncated pyramid. The surface area or volume formula of the k-balls inscribed in the shape of a prism with regular n-sides polygon base is $Ck[\pi()](P/n \cot A)^d$ Where $A = \pi()/n$, C is a constant for calculating surface area or volume of the k-balls inscribed in the shape of the prism, namely, we denoted $C=1$ and $C=1/6$ for calculating surface area and volume respectively. The exponent d is a constant, $d=2$ was denoted for calculating surface area and $d=3$ for volume of the k-balls inscribed in the prism. The formula for surface area or volume of the k-ball inscribed in the shape of a pyramid with a regular n-sided polygon base is $E[\pi()][(kP/n \cot A)^f](1-B^{kf})$ When $B = [(4k^2+1)^{1/2}-1][(4k^2+1)^{1/2}+1]$ and E is a constant denoted for finding surface area or volume of the k-balls inscribed in the shape of the pyramid, $E=1/(4k^2+1)^{1/2}$ for calculation of surface area and $E=1/[6(3k^2+1)]$ for calculation of volume. The exponent f is a constant for calculating surface area or volume of the k-balls inscribed in the shape of the pyramid. We denoted $f=2$ and $f=3$ for calculating surface area and volume of the k-balls inscribed in the pyramid respectively.