

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

Lowprukmanee, Chetnarong

Naruemon, Thanwarat

Thongsujaritkul, Thananan

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  $E[\pi()][(kP/n \cot A)^f(1-B^k)]$  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.