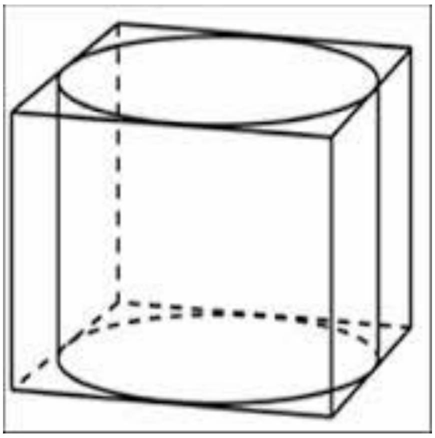
# Answer on Question #44413 – Math - Algebra

1. A largest possible cylinder will be removed from a cube of edge (4x) cm. Express the volume of the remaining solid as product of two polynomials.

2. The radius of th circular base of a cone is (3x - 2) meters. If its slant height is (9x^2 - 6x) meters, express the cone's surface area as a product of polynomials in x.

**Solution:**

1. We have such drawing :



Edge of cube is equal 4x cm. The volume of the remaining solid (cube without cylinder) is equal to volume of cube subtract volume of cylinder.

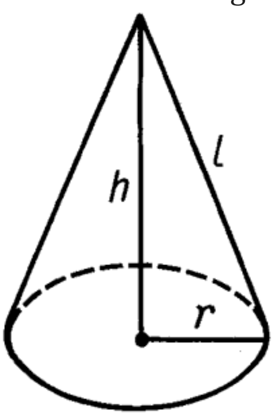
For a cube of edge with length a, volume is equal to $a^3$. For **right circular cylinder**, i.e., the cylinder with the generating lines perpendicular to the bases, with its ends closed to form two circular surfaces, as in the figure, we have, If the cylinder has a radius r and length (height) h, then its volume is given by

$V = \pi r^2 h.$

For our **cylinder** we have $r=\frac{4x}{2}=2x$ (half edges of a cube ) and h=4x (equal edges of a cube). Hence $V_{cube} = (4x)^3 = 64x^3 (cm^3)$ and $V_{cylinder} = \pi(2x)^2 4x = 16\pi x^3 (cm^3)$. Therefore volume of the remaining solid $V_{rem.solid}=64x^3 - 16\pi x^3 = 16x^3(4-\pi)\ (cm^3)$

**Answer:** $V_{rem.solid}=16x^3(4-\pi)\ (cm^3)$( it is product of two polynomial of x: thihrd and nill deqrees)

2. We have drawing:



The lateral surface area of a right circular cone is $LSA = \pi rl$ where $r$ is the radius of the circle at the bottom of the cone and $l$ is the slant height of the cone (given by the Pythagorean theorem

$l = \sqrt{h^2 + r^2}$ where $h$ is the height of the cone). The surface area of the bottom circle of a cone is the same as for any circle, $\pi r^2$. Thus the total surface area of a right circular cone is:

$SA = \pi r^2 + \pi rl = \pi r(r + l)$ .

We hawe $r = 3x - 2$ and $l = 9x^2 - 6x$. Hence h=

$\sqrt{(9x^2 - 6x)^2 - (3x - 2)^2} = \sqrt{81x^4 - 108x^3 + 27x^2 + 12x - 4}$.

Therefore **answer**

$SA = \pi r(r + l) = \pi(3x - 2)( 3x - 2 + \sqrt{81x^4 - 108x^3 + 27x^2 + 12x - 4})$.

**P. S.:**

**I assume in the task mistake, because**

$$\boldsymbol{\pi(3x - 2)( 3x - 2 + \sqrt{81x^4 - 108x^3 + 27x^2 + 12x - 4})}$$

***is not* a product of polynomials in x.**

**Maybe in the task was meant to find lateral surface area of cone $\boldsymbol{LSA = \pi rl}$. If that true, then**

**$\boldsymbol{LSA = \pi(3x - 2)(9x^2 - 6x) = 3\pi x(9x^2 - 12x + 4)}$ is a product of polynomials in x.**

**Remark: when writing "cone's surface area " in most cases it's mean, total surface area.**