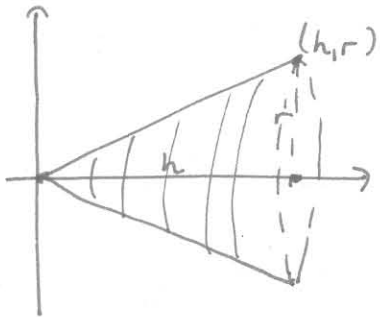


You will not get any points if your answer is wrong, that is no points to your explanations if your answer is wrong. And of course no points to a correct answer if your explanation or proof is not correct or clear.

YOU must write GOOD Mathematics

1. Use the parametric equation of a line to find the surface area of a cone whose radius is r and height is h , generated by revolving the line about x axis.

Solution:



The parametric equation of the line passing through $(0,0)$ and (h,r) is

$$x = 0 + (h-0)t \quad \text{with } 0 \leq t \leq 1,$$

$$y = 0 + (r-0)t$$

is the line segment from $(0,0)$ to (h,r) .

The surface area formula is

$$A = 2\pi \int_a^b y(t) \sqrt{(x'(t))^2 + (y'(t))^2} dt$$

Thus the required area is

$$A = 2\pi \int_0^1 r t \sqrt{h^2 + r^2} dt$$

since $x'(t) = h$ and $y'(t) = r$. Then

$$A = 2\pi r \sqrt{h^2 + r^2} \left[\frac{t^2}{2} \right]_{t=0}^{t=1} = \pi r \sqrt{h^2 + r^2}$$