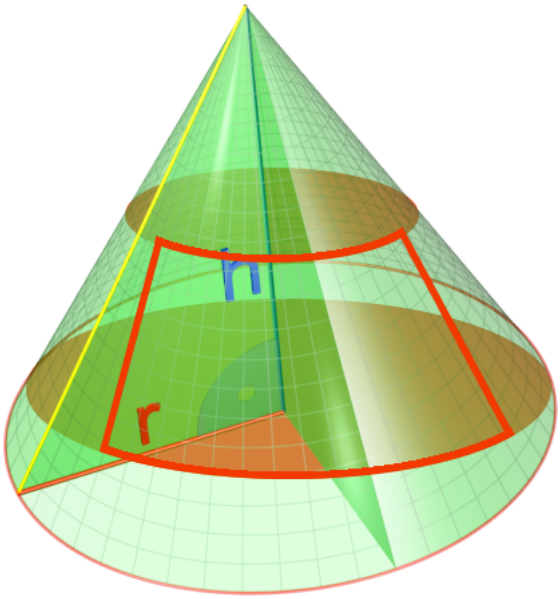
Projecting a surface segment of a cone onto a 2D plane?

Firstly, I'd like to apologise - I do not know the correct terms for what I am asking.



Assume that the top/bottom of the highlighted portion there is actually aligned with the base.

To help explain: I need to wrap that section of the cone using a piece of paper. What shape (exactly) do I need to cut out from said paper so that it will wrap flawlessly?

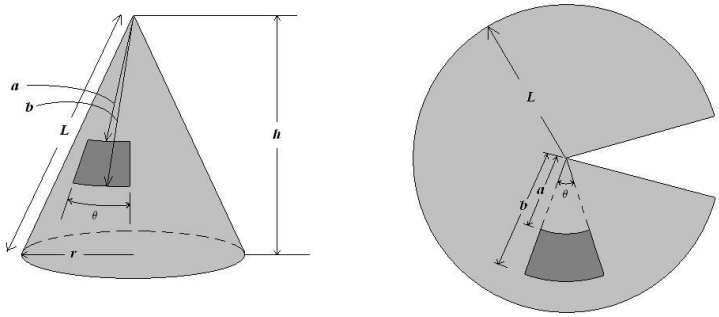
(geometry)

asked May 14 '13 at 22:48

Steffan Donal
113 6

2 Answers

If I've understood your problem correctly, I think this should help. This one's a right circular cone and its opened up paper version. Here we've taken an arbitrary curved surface of the form shown on the cone and visualized.



edited May 15 '13 at 4:42 answered May 14 '13 at 23:39

Maazul
1,920 10 25

What about r? Would that affect the space seen on the paper cutout? – Steffan Donal May 15 '13 at 6:12

It depends. If a and b are given to you, then r is not needed. If the perpendicular heights h_a and h_b are what's given, you will need r to find a and b, respectively. – genepeer May 15 '13 at 8:37

@genepeer Agreed... and obviously the outer circular perimeter of the paper cutout is $2\pi r$. – Maazul May 15 '13 at 9:37

Don't mind me, just forgetting very basic geometry here. – Steffan Donal May 15 '13 at 10:20

Since the distance from the apex to the base is constant. Assuming the cone is made of paper, cutting it open along your yellow line will make a circular sector whose radius is the former distance. Your cross-sections will correspond to bands concentric with the sector's circumference.

answered May 14 '13 at 23:41

genepeer
915 6 18