

Student: Gavin
Date: August 16th, 2017

## 094 (part 1 of 2) 10.0 points

The formula for lateral surface area of a frustrum of a right circular cone is $S=\pi s(R+r)$.
a) Solve for $R$.

1. None of these
2. $R=\frac{S-\pi s r}{\pi s}$
3. $R=S-\pi s r$
4. $R=S-r$
5. $R=\frac{S}{\pi s}$

Aug 16th 6:30:10 pm
Hi Gavin! Welcome to Yup!
*Greets student by name, welcomes them to Yup Aug 16th 6:30:49 pm

How are we doing this evening?
*Builds rapport with warm greeting
Aug 16th 6:30:59 pm
I'm good just stuck
Aug 16th 6:31:04 pm
Okay no worries. Where are you stuck?
*1.1 - Determine where the student is stuck
Aug 16th 6:31:22 pm
I don't remember what to do

Aug 16th 6:31:36 pm
So let's start at square one.

Aug 16th 6:32:42 pm
Ok

Aug 16th 6:32:49 pm
Do you remember how you have started solving for variables in the past?
*1.1 - Determines what the student knows Aug 16th 6:33:13 pm

Not rlly no
Aug 16th 6:33:30 pm

Ok
Aug 16th 6:34:01 pm
The general process of solving for R is by trying to isolate it. We do this by "moving" the other variables to the other side.
*3.1 - Pushes information based on apparent gap
Aug 16th 6:34:21 pm
Aug 16th 6:34:21 pm
Does that sound kind of familiar?
*1.1 - Determines existing knowledge Aug 16th 6:34:26 pm

Yeah

Aug 16th 6:34:30 pm
Awesome. Now, do you remember order of operations?
*1.1 - Determines existing knowledge Aug 16th 6:35:11 pm

Pemdas?

Aug 16th 6:35:24 pm
Exactly. So we want to want to pay attention to that. When we look at pi*s*( $R+r$ ), we can't separate the variables in the parenthesis yet because that is the most "powerful" of the order of operations.
*3.1 - Builds up student's knowledge gap
Aug 16th 6:37:53 pm
Let's first focus on the pi*s and try to get those terms to the other side.
Aug 16th 6:38:18 pm
Can't we divide the pi and a
Aug 16th 6:38:48 pm
S
Aug 16th 6:38:50 pm
Yes we can! And by doing that, what are we left with?
*1.2-Guiding question Aug 16th 6:39:11 pm


Aug 16th 6:39:36 pm
Perfect! Now we are just one step away from isolating R. Can you think of our next step?
*1.2 - Invites student input Aug 16th 6:40:24 pm

## Subtract the $r$

Aug 16th 6:40:36 pm


Aug 16th 6:41:39 pm
Okay, not quite. When we subtract r from $\mathrm{S} / \mathrm{pi}^{*} \mathrm{~s}$, we cannot just put it in the numerator. What should we do instead?
*3.1/2.1 - Redirects student's mistake with guiding question
Aug 16th 6:43:06 pm
Put it in both?

Aug 16th 6:43:20 pm
Or put it in the outside

Aug 16th 6:44:02 pm

Aug 16th 6:44:19 pm
That is how we have to subtract fractions.
Aug 16th 6:44:30 pm
Could you show me what that gives us?
*1.2 - Invite student to try the next step
Aug 16th 6:45:05 pm


Aug 16th 6:45:14 pm
*1.2 - Invite student to share existing knowledge Aug 16th 6:47:34 pm

## No

Aug 16th 6:47:53 pm
Okay no worries. The first step involves finding a common denominator. Does that part sound
familiar?
*3.1 - Adapts explanation to student's knowledge gap
Aug 16th 6:48:32 pm
I've never subtracted a fraction that had no value

Aug 16th 6:49:11 pm
So when subtracting or adding fractions, they have to have the same denominator


$$
\text { Aun } 1 \mathrm{hth} 6 \cdot 51 \cdot 11 \mathrm{~nm}
$$ Aug 16th 6:51:11 pm

In our case, pi*s is the first denominator, and 1 is the second denominator. Can you see this?

Aug 16th 6:51:28 pm
Yea

Aug 16th 6:51:42 pm
So, look at the second denominator. How can we get that denominator to also equal pi*s?
*1.2 - Guiding question Aug 16th 6:52:35 pm

How?
Aug 16th 6:53:06 pm
What if we multiplied pi*s to 1 ? Wouldn't that change the denominator to pi*s?
*1.2 - Guiding question Aug 16th 6:53:59 pm

I guess
Aug 16th 6:54:32 pm
Okay good. Now, the last thing we need to worry about is that you can't just multiply the denominator of a fraction while ignoring the numerator.

Aug 16th 6:56:07 pm
If we do something to the denominator, we also have to do it to the numerator.

So, if we multiply pi*s to the denominator, what do we also have to do to the numerator?
*1.2 - Guiding question Aug 16th 6:56:41 pm

## Multiply

Aug 16th 6:56:55 pm
Good! And what do we multiply it by?
*1.2 - Guiding question
Aug 16th 6:57:12 pm
S and -r

Aug 16th 6:57:41 pm
Not quite. We multiplied the denominator by pi*s and we have to do the exact same thing to the
numerator. I see what you were thinking though
*3.1 - Adapt explanation to student's confusion / 3.3-Acknowledge error without causing stress
Aug 16th 6:58:57 pm
Ok

Aug 16th 6:59:18 pm
So instead, what are we going to multiply the numerator by?
*1.2 - Invite student input Aug 16th 6:59:44 pm


Aug 16th 6:59:58 pm

Aug 16th 7:00:22 pm
So this was definitely a tricky problem. Do you have any other questions about it?
*3.1 - Check for understanding
Aug 16th 7:01:05 pm
No not really
Aug 16th 7:01:15 pm
Thank u!

Aug 16th 7:01:30 pm
No problem! Did you have any other questions you wanted to work?
*Make sure student doesn't need more help Aug 16th 7:01:50 pm

Nope

