



Student: Keith

Date: July 10th, 2017

Now simplify inside the square root.

$$x = \frac{2 \pm \sqrt{4 - (-312)}}{12}$$

$$x = \frac{2 \pm \sqrt{316}}{12} \quad \text{Simplify.}$$

Simplify the radical. *what was done here? where did the "2" come from?*

$$x = \frac{2 \pm \sqrt{316}}{12}$$

$$x = \frac{2 \pm 2\sqrt{79}}{12} \quad \text{Simplify.}$$

Jul 10th 11:29:23 pm

Hello Keith :)

**Greets student by name*

Jul 10th 11:29:58 pm

Welcome back to Yup!

Jul 10th 11:30:01 pm

My name is Ms. Kothari and I will be your tutor for this session. How are you today?

**Warm greeting*

Jul 10th 11:30:04 pm

Thanks

Jul 10th 11:30:09 pm

:)

Jul 10th 11:30:16 pm

I have reviewed your problem. We will find the answer together in no time! Are you ready to begin now?

Jul 10th 11:30:20 pm

Yes

Jul 10th 11:30:28 pm

I am now going to ask you questions about what you already understand and why you are stuck. This will make the session go faster! The more you participate with me the quicker we will get to solving your problem :)

Jul 10th 11:30:33 pm

You want to know where that '2' came from, right?

**1.1 - Tutor confirms understanding of the student's problem*

Jul 10th 11:30:42 pm

Keith? Are you with me?

**Checks in with student by name*

Jul 10th 11:31:26 pm

Yes. And how was the radical simplified...316 to 79

Jul 10th 11:31:31 pm

Ok.

Jul 10th 11:31:35 pm

I'll explain that.

Jul 10th 11:31:38 pm

But before that, can you tell me what you have learned about simplifying radicals?

**1.1 - Probes existing knowledge*

Jul 10th 11:31:52 pm

Like for example, if we have radical(20) then how would we simplify that?

Jul 10th 11:32:10 pm

Any idea?

Jul 10th 11:32:12 pm

Just started the chapter... Don't really know. It doesn't give any information

Jul 10th 11:32:51 pm

Ok, then let me explain the simplification of radicals first.

Jul 10th 11:33:03 pm

Ok

Jul 10th 11:33:15 pm

We factor the number under the radical such that we get at least one perfect square number if possible.

**3.1 - Adapts explanation to student's needs*

Jul 10th 11:33:23 pm

So if it was 20 in there, we'd split it to 4 times 5

**2.2 - Provides relevant example to illustrate concept*

Jul 10th 11:33:31 pm

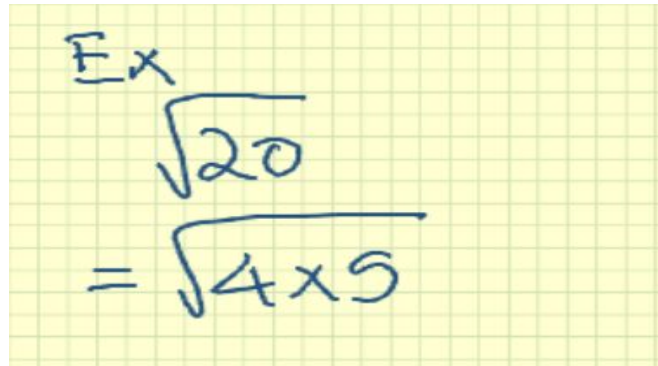
**2.2 - Provides relevant example to illustrate concept*

4 is a perfect square.

Jul 10th 11:33:35 pm

Let me draw that out and show you.

Jul 10th 11:33:40 pm



Ex
 $\sqrt{20}$
 $= \sqrt{4 \times 5}$

Jul 10th 11:34:02 pm

Ok

Jul 10th 11:34:15 pm

That would be the first step.

Jul 10th 11:34:24 pm

I think I understand

Jul 10th 11:34:28 pm

So can you try doing the same for your problem?

**1.2 - Encourages student to try on their own*

Jul 10th 11:34:33 pm

For the 316?

Jul 10th 11:34:36 pm

Keith, can you try that for your problem?

Jul 10th 11:35:18 pm

316/4=79

Jul 10th 11:35:19 pm

Right, so how would we split the 316 ?

**2.1 - Invites student input*

Jul 10th 11:35:30 pm

Can you show me in a similar way as I showed you for the example?

Jul 10th 11:36:20 pm

Do you wouldn't replace the 316 with $4 * 79$? Like in your example?

Jul 10th 11:36:40 pm

Yes!! That is exactly what you'd do!

**3.3 - Encouraging language*

Jul 10th 11:36:56 pm

Good!

Jul 10th 11:36:59 pm

Is this step clear to you?

**3.1 - Checks understanding*

Jul 10th 11:37:09 pm

Keith? Are you with me on this so far?

Jul 10th 11:37:49 pm

So you had 20 in the square root sign and our $4*5$ in place of the 20. I guess that's what's confusing me

Jul 10th 11:38:00 pm

Yes that is exactly what we did for the example.

Jul 10th 11:38:26 pm

We replaced the 20 under the square root with 4 times 5, because 4 times 5 = 20 and 4 is a perfect square.

**3.1 - Clarifies approach*

Jul 10th 11:38:43 pm

Are you still confused with that first step?

**3.1 - Checks understanding*

Jul 10th 11:38:51 pm

Yes. Because I see the 79. Where's the four

Jul 10th 11:39:29 pm

That comes in the next step.

Jul 10th 11:39:48 pm

If you are clear with this first step, 4 times 79 under the square root, then I'll show you the next step.

Jul 10th 11:40:04 pm

Shall I?

**3.1 - Makes sure student is ready to move on*

Jul 10th 11:40:09 pm

Yes

Jul 10th 11:40:15 pm

Ok.

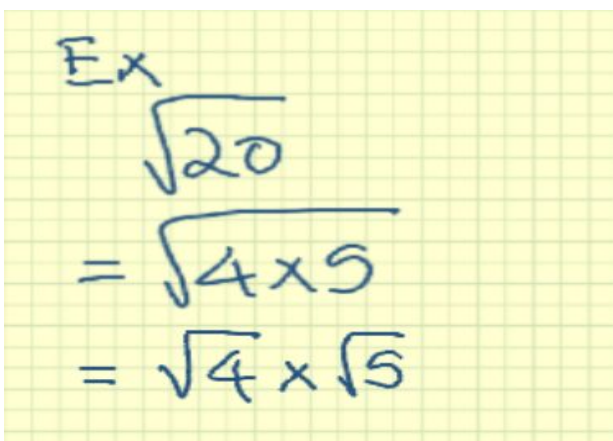
Note: Here would have been a good place to use a :) to avoid sounding dry.

Jul 10th 11:40:19 pm

Once again with the example.

**2.2 - Use of whiteboard example to facilitate learning*

Jul 10th 11:40:23 pm


$$\begin{aligned} \text{Ex} \\ \sqrt{20} \\ = \sqrt{4 \times 5} \\ = \sqrt{4} \times \sqrt{5} \end{aligned}$$

Jul 10th 11:40:43 pm

That is second step.

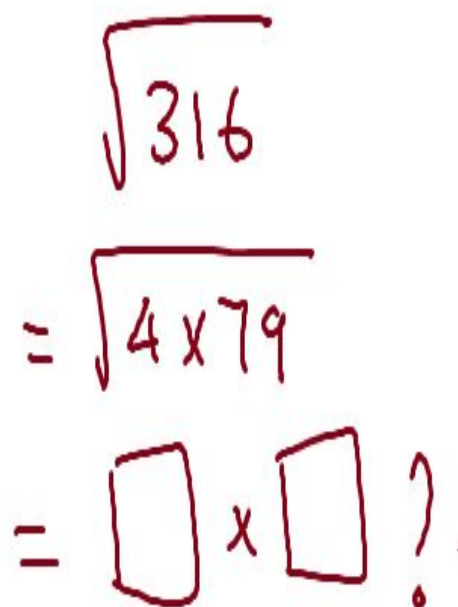
Jul 10th 11:40:46 pm

We split the term to two radicals like that.

Jul 10th 11:40:52 pm

So for your problem we had:

Jul 10th 11:40:57 pm


$$\begin{aligned} \sqrt{316} \\ = \sqrt{4 \times 79} \\ = \square \times \square ? \end{aligned}$$

Jul 10th 11:41:31 pm

This.

Jul 10th 11:41:31 pm

Can you do the same second step for your problem as well?

**2.1 - Encourages student to take the next step*

Jul 10th 11:41:40 pm

Keith, can you try doing that second step for your problem?

Jul 10th 11:42:30 pm

I don't get it

Jul 10th 11:42:35 pm

Did you see how I split the 4 times 5 to two separate radicals in the example?

**3.1 - Adapts explanation to student's confusion*

Jul 10th 11:42:56 pm

Oh ok

Jul 10th 11:43:11 pm

I'll take picture

Jul 10th 11:43:19 pm

Ok.

Jul 10th 11:43:22 pm

Are you still not able to see how that radical 4 times radical 5 came?

**3.1 - Checks for understanding*

Jul 10th 11:44:15 pm

The image shows a photograph of a student's handwritten work on lined paper. The work demonstrates the simplification of the square root of 316. It starts with $\sqrt{316}$, then shows it as $= \sqrt{4 \times 79}$, and finally as $= \sqrt{4} \times \sqrt{79}$. The numbers are written in blue ink.

Jul 10th 11:44:17 pm

Yes!!

**3.3 - Positive language*

Jul 10th 11:44:23 pm

Perfect!!

Jul 10th 11:44:24 pm

Is this step clear to you so far?

**3.1 - Checks understanding*

Jul 10th 11:44:29 pm

Yes

Jul 10th 11:44:37 pm

Good!

Jul 10th 11:44:39 pm

Now last step.

Jul 10th 11:44:42 pm

Do you know what radical 4 would equal?

**1.2 - Invites student input*

Jul 10th 11:44:51 pm

square root of (4) = ____?

Jul 10th 11:45:03 pm

2

Jul 10th 11:45:12 pm

Exactly!!

Jul 10th 11:45:17 pm

So we replace the radical 4 with just 2

Jul 10th 11:45:25 pm

I'll show on the example.

**2.2 - Continues to illustrate steps*

Jul 10th 11:45:29 pm

Like that.

Jul 10th 11:45:58 pm

Ex

$$\begin{aligned} &\sqrt{20} \\ &= \sqrt{4 \times 5} \\ &= \sqrt{4} \times \sqrt{5} \\ &= 2 \times \sqrt{5} \\ &= \boxed{2\sqrt{5}} \end{aligned}$$

Jul 10th 11:45:59 pm

Were you able to understand this step?

**3.1 - Checks for understanding*

Jul 10th 11:46:13 pm

Yes I get it now...

Jul 10th 11:46:38 pm

Great!

Jul 10th 11:47:00 pm

So can you try doing the same for your problem?

**1.2 - Invites student to proceed on their own*

Jul 10th 11:47:10 pm

Show me your work please.

Jul 10th 11:47:13 pm

Ok

Jul 10th 11:47:25 pm

Good! :)

Jul 10th 11:47:30 pm

A photograph of a piece of lined paper with handwritten mathematical work. The work shows the simplification of the square root of 316. The steps are as follows: $\sqrt{316}$ is written at the top. Below it is $= \sqrt{4 \times 79}$. Then $= \sqrt{4} \times \sqrt{79}$. This is followed by $= 2 \times \sqrt{79}$. Finally, it is simplified to $= 2\sqrt{79}$.

Jul 10th 11:48:06 pm

Perfect!!

**3.3 - Positive Language*

Jul 10th 11:48:12 pm

so that's how the 2 came and the 79 also.

Jul 10th 11:48:22 pm

Were you able to understand that now?

**3.1 - Checks for understanding*

Jul 10th 11:48:27 pm

Yes. Thanks

Jul 10th 11:48:41 pm

My pleasure :)

Jul 10th 11:49:08 pm

Anything else for now?

**Checks to see if they need more help*

Jul 10th 11:49:15 pm

No that'll do it. Thanks again

Jul 10th 11:49:33 pm

Thank you for using Yup!

**Thanks student for using Yup*

Jul 10th 11:49:41 pm

You have a good night as well :)

**Warm send off*

Jul 10th 11:49:48 pm

Bye :)

Jul 10th 11:49:51 pm

Good night

Jul 10th 11:49:55 pm