00:00:08.900 --> 00:00:11.810

Alright, this video is on simplifying

00:00:11.810 --> 00:00:13.750

radical expressions that have.

00:00:13.750 --> 00:00:15.420

Quotients in them, so things

00:00:15.420 --> 00:00:16.970

like this, so we might have,

00:00:16.970 --> 00:00:18.070

for example the cube root.

00:00:21.160 --> 00:00:26.388

Of 54 X X ^2 y.

00:00:30.020 --> 00:00:31.410

Over X to the 7th.

00:00:34.970 --> 00:00:39.730

Y ^2 we want we want to simplify this guy so.

00:00:39.730 --> 00:00:41.740

What we should do first of all, is.

00:00:44.950 --> 00:00:46.840

I mean, ideally simplify the

00:00:46.840 --> 00:00:48.730

inside before we really start

00:00:48.802 --> 00:00:50.825

messing with this cube root, right?

00:00:50.825 --> 00:00:52.190

You can kind of forget that it's

00:00:52.190 --> 00:00:53.561

under a cube root at all and

00:00:53.561 --> 00:00:54.830

just try to simplify the inside.

00:00:54.830 --> 00:00:55.994

So the first thing I would

00:00:55.994 --> 00:00:56.770

do is exactly that.

00:00:56.770 --> 00:00:57.390

I would say, well,

00:00:57.390 --> 00:00:58.165

this is the cube root.

00:01:02.350 --> 00:01:04.726

Of 54 nothing to do there,

00:01:04.730 --> 00:01:07.410

but then X ^2 / X to the 7th.

00:01:07.410 --> 00:01:12.352

This is like X * X / X * X * X seven times.

00:01:12.352 --> 00:01:14.830

So two of these axes will cancel.

00:01:14.830 --> 00:01:17.982

Two of these axes and I'm just going

00:01:17.982 --> 00:01:19.880

to get X to the fifth down here.

00:01:22.090 --> 00:01:24.332

And likewise this y / y ^2.

00:01:24.332 --> 00:01:25.487

Well, this is just Y.

00:01:25.490 --> 00:01:27.310

And then here's y * Y.

00:01:27.310 --> 00:01:30.040

So this is like y / y.

00:01:30.040 --> 00:01:31.561

Times 1 / Y if you want like one

00:01:31.561 --> 00:01:33.275

of these will cancel one of these,

00:01:33.280 --> 00:01:37.360

so we'll get just a Y down here.

00:01:37.360 --> 00:01:38.432

That's first of all,

00:01:38.432 --> 00:01:40.276

that's already a lot easier to look

00:01:40.276 --> 00:01:43.274

at and then we need to think about.

00:01:43.280 --> 00:01:44.908

What is 54 like?

00:01:44.908 --> 00:01:47.350

What's the prime factorization of 54?

00:01:47.350 --> 00:01:48.920

So you could pause the

00:01:48.920 --> 00:01:50.490

video and work that out.

00:01:50.490 --> 00:01:51.468

And then let's write it down.

00:01:51.470 --> 00:01:53.310

So it's going to be.

00:01:53.310 --> 00:01:54.398

The cube root here.

00:01:56.640 --> 00:01:59.840

And 54 is 2 * 27.

00:01:59.840 --> 00:02:06.180

27 is 3 cubed, so this is 2. Times 3 ^3.

00:02:06.180 --> 00:02:11.660

Divided by X to the 5th. Over why?

00:02:11.660 --> 00:02:13.655

Now, OK, so we want cube root,

00:02:13.660 --> 00:02:16.404

So what what's going to happen is?

00:02:16.410 --> 00:02:17.301

This cube root.

00:02:17.301 --> 00:02:18.786

It's looking for things to

00:02:18.786 --> 00:02:20.550

come out in groups of three.

00:02:20.550 --> 00:02:23.613

So for example, the cube root of three cubed.

00:02:23.613 --> 00:02:24.846

That's just three.

00:02:24.850 --> 00:02:27.865

The cube root of X ^3 that's just X,

00:02:27.870 --> 00:02:30.145

so groups of three on the inside,

00:02:30.150 --> 00:02:34.390

they come out as. Like a singles so.

00:02:34.390 --> 00:02:35.880

What we'll get here is.

00:02:39.150 --> 00:02:41.124

We'll have this three will come out.

00:02:43.260 --> 00:02:44.807

On the bottom we get an X.

00:02:46.990 --> 00:02:47.560

And then.

00:02:49.810 --> 00:02:51.987

Let's see. So we used up those

00:02:51.987 --> 00:02:53.988

threes cube root of three cubed.

00:02:53.990 --> 00:02:56.680

That's our three cube root of X to the fifth.

00:02:56.680 --> 00:02:58.633

Again, it's like we're dividing that five

00:02:58.633 --> 00:03:00.767

by three and we're getting one right.

00:03:00.770 --> 00:03:03.087

This is like X to the one.

00:03:03.090 --> 00:03:04.506

But the remainder there is 2,

00:03:04.510 --> 00:03:05.710

so in here there is an

00:03:05.710 --> 00:03:06.920

X squared on the bottom.

00:03:09.460 --> 00:03:12.226

Cube root of why that's just.

00:03:12.230 --> 00:03:15.550

That's just going to be cute of Y and then.

00:03:15.550 --> 00:03:17.890

And two. So that's it.

00:03:17.890 --> 00:03:19.190

And what's really going on

00:03:19.190 --> 00:03:20.674

here is of course, right.

00:03:20.674 --> 00:03:22.858

Cube roots and square roots and

00:03:22.858 --> 00:03:25.208

4th roots and fruits and so on.

00:03:25.210 --> 00:03:27.975

They split really well across

00:03:27.975 --> 00:03:30.187

multiplication and across division.

00:03:30.190 --> 00:03:32.222

So here like the cube root of this

00:03:32.222 --> 00:03:34.038

this big fraction for example,

00:03:34.040 --> 00:03:35.824

it's just the cube root of the top

00:03:35.830 --> 00:03:37.334

divided by the cube root of the bottom

00:03:37.334 --> 00:03:38.866

and then the cube root of the bottom.

00:03:38.870 --> 00:03:40.678

Well, that's the cube root of X to

00:03:40.678 --> 00:03:42.630

the seven times the cube root of X ^2.

00:03:42.630 --> 00:03:44.844

So we can sort of trade out like well.

00:03:44.850 --> 00:03:46.490

Where is this cube root?

00:03:46.490 --> 00:03:48.212

And so for example here this cube

00:03:48.212 --> 00:03:49.893

root is just going to act on

00:03:49.893 --> 00:03:51.590

the three and give us the three.

00:03:51.590 --> 00:03:53.526

And it's going to act on the two,

00:03:53.530 --> 00:03:55.510

and so we get over here cube or two.

00:03:55.510 --> 00:03:57.913

So as long as the things inside are all

00:03:57.913 --> 00:04:00.200

connected with multiplications and divisions.

00:04:00.200 --> 00:04:03.245

Cube Root works really well and same

00:04:03.245 --> 00:04:06.647

with square root and fruit and so on.

00:04:06.647 --> 00:04:09.161

So that's it that's simplifying radical

00:04:09.161 --> 00:04:11.128

expressions. With quotients in them.