00:00:08.210 --> 00:00:10.010
OK, this video is on

00:00:10.010 --> 00:00:11.090
simplifying radical expression.

00:00:11.090 --> 00:00:11.924
So what we want to do

00:00:11.924 --> 00:00:12.690
here is stuff like this.

00:00:12.690 --> 00:00:13.650
We want to simplify.

00:00:16.030 --> 00:00:19.194
The square root of.

00:00:19.194 --> 00:00:24.770
X ^3 y ^2 for example. And.

00:00:24.770 --> 00:00:27.266
The thing to remember is that

00:00:27.266 --> 00:00:29.550
these square roots they split

00:00:29.550 --> 00:00:31.686
really well across products.

00:00:31.690 --> 00:00:33.306

So what I mean by that is this.

00:00:33.310 --> 00:00:35.670

There's this kind of.

00:00:35.670 --> 00:00:37.825

You know, formally there's this

00:00:37.825 --> 00:00:42.050

little rule that says sqrt a * B.

00:00:42.050 --> 00:00:43.070

Is the square root of a.

00:00:45.300 --> 00:00:47.346

Times the square root of P.

00:00:47.350 --> 00:00:48.827

So I I would call that like

00:00:48.827 --> 00:00:49.850

splitting across this product.

00:00:49.850 --> 00:00:52.700

It does not work with sums, right?

00:00:52.700 --> 00:00:54.450

If you're adding in here, that's it.

00:00:54.450 --> 00:00:55.800

You're just kind of stuck there,

00:00:55.800 --> 00:00:57.410

but if things are multiplied

00:00:57.410 --> 00:00:58.698

it works really well.

00:00:58.700 --> 00:01:01.157

So what we can do is we can imagine.

00:01:01.160 --> 00:01:02.260

Let's write at one time,

00:01:02.260 --> 00:01:04.268

but typically we're just going to kind of.

00:01:04.270 --> 00:01:05.310

Pulled things out and so

00:01:05.310 --> 00:01:06.350

let's write it like this.

00:01:06.350 --> 00:01:09.310

This is going to be a square root.

00:01:09.310 --> 00:01:12.082

Off X ^2.

00:01:12.082 --> 00:01:16.548

Y ^2 and then just get this extra X.

00:01:16.550 --> 00:01:18.838

There at the end.

00:01:18.840 --> 00:01:21.288

Right, so those two things are the same,

00:01:21.290 --> 00:01:23.712

but what I've done is pulled all

00:01:23.712 --> 00:01:25.720

the squared stuff to the front,

00:01:25.720 --> 00:01:26.847

and then I'm going to think, well,

00:01:26.847 --> 00:01:28.569

OK, this square root just splits

00:01:28.569 --> 00:01:30.338

really well across all those things,

00:01:30.340 --> 00:01:33.007

so I'll get sqrt X ^2 sqrt,

00:01:33.010 --> 00:01:35.061

y ^2, and then just the square

00:01:35.061 --> 00:01:39.348

root of X so sqrt X ^2.

00:01:39.350 --> 00:01:40.950

Now.

00:01:40.950 --> 00:01:43.400

What we really want to write is

00:01:43.400 --> 00:01:45.745

like sqrt X ^2 is X right and

00:01:45.745 --> 00:01:48.340

sqrt y ^2 is Y but we have to be

00:01:48.340 --> 00:01:49.650

careful because if they're negative.

00:01:49.650 --> 00:01:52.056

We need these absolute values here.

00:01:52.060 --> 00:01:54.568

And then we have here square root of X.

00:01:56.800 --> 00:01:57.358

So that's it.

00:01:57.358 --> 00:01:58.474
That's what we're going to do,

00:01:58.480 --> 00:02:00.076
and we can kind of think well,

00:02:00.080 --> 00:02:02.990
what we're doing is square root

00:02:02.990 --> 00:02:05.934
divides this exponent by by two,

00:02:05.934 --> 00:02:08.448
because for example sqrt X ^2,

00:02:08.448 --> 00:02:11.374
roughly speaking, is X sqrt X to the 4th.

00:02:11.380 --> 00:02:12.298
Well, that's going to be X

00:02:12.298 --> 00:02:14.488
^2 * X ^2 will get us there.

00:02:14.490 --> 00:02:16.478
Right, so square root of X to

00:02:16.478 --> 00:02:17.759

the 4th is X ^2.

00:02:17.760 --> 00:02:19.370

Square root of X to the 6th.

00:02:24.440 --> 00:02:27.530

That's going to be X ^3. Because X,

00:02:27.530 --> 00:02:29.490

^3, ^2, right when I square this,

00:02:29.490 --> 00:02:32.118

I multiply that exponent by two.

00:02:37.640 --> 00:02:40.496

Right, so taking the square root essentially

00:02:40.500 --> 00:02:43.484

divides your exponent by two and then,

00:02:43.484 --> 00:02:44.576

so that's what's going on here.

00:02:44.580 --> 00:02:46.860

We're dividing these exponents by two,

00:02:46.860 --> 00:02:49.471

and then we're anything that's sort of

00:02:49.471 --> 00:02:51.648

a remainder just stays inside right.

00:02:51.648 --> 00:02:55.200

So 3 / 2 is 1, where the remainder of 1.

00:02:55.200 --> 00:02:57.000

So we get one guy on the outside

00:02:57.000 --> 00:02:59.348

and one on the inside, and 2.

00:02:59.348 --> 00:03:01.618

/ 2 is just one.

00:03:01.620 --> 00:03:03.168

And that's how it's going to work for cube

00:03:03.168 --> 00:03:04.736

roots and 4th roots and 5th roots and so on.

00:03:04.740 --> 00:03:07.244

So let's do one more with those so.

00:03:07.250 --> 00:03:08.340

Let's say that we have.

00:03:11.870 --> 00:03:13.886

And I'm quite aware I fit in here anymore.

00:03:13.890 --> 00:03:16.248

Let's say that we have the 4th root.

00:03:19.860 --> 00:03:22.428

And we have 32.

00:03:24.530 --> 00:03:27.978

X to the 6th. And why the eight?

00:03:27.980 --> 00:03:30.220

And this is a 6.

00:03:30.220 --> 00:03:31.256

So the first thing is to think.

00:03:31.260 --> 00:03:32.840

Well, OK, wait a minute.

00:03:32.840 --> 00:03:34.320

What is 32? You know?

00:03:34.320 --> 00:03:36.252

Like I, I want to rewrite that

00:03:36.252 --> 00:03:38.070

in terms of like exponents

00:03:38.070 --> 00:03:39.910

because these these radicals

00:03:39.910 --> 00:03:42.020

really are about exponents so.

00:03:42.020 --> 00:03:43.276

I'm going to put here the 4th root.

00:03:45.750 --> 00:03:49.040

Of two to the 5th.

00:03:49.040 --> 00:03:51.263

Right and you can check that so 32.

00:03:51.263 --> 00:03:53.096

Well, what's its prime factorization, right?

00:03:53.096 --> 00:03:54.841

It's divisible by two and you get 2 * 16,

00:03:54.841 --> 00:03:57.100

and you kind of go down and you get

00:03:57.164 --> 00:04:00.174

5 twos and then I have X to the six.

00:04:00.180 --> 00:04:03.010

And why to the 8?

00:04:03.010 --> 00:04:06.550

So what I'll get here is.

00:04:06.550 --> 00:04:10.668

From this 2 to the 5th, I'm going to two.

00:04:10.670 --> 00:04:11.916

And then at the end there's going

00:04:11.916 --> 00:04:13.450

to be 2 leftover on the inside

00:04:13.450 --> 00:04:15.790

from this X to the 6th.

00:04:15.790 --> 00:04:18.358

I'm going to get an X.

00:04:18.360 --> 00:04:19.716

And at the end there's going

00:04:19.716 --> 00:04:21.299

to be X squared left inside.

00:04:21.300 --> 00:04:25.330

And from this, Y to the eight I get y ^2.

00:04:25.330 --> 00:04:26.650

And there's not going to be

00:04:26.650 --> 00:04:28.750

any Y left inside, right?

00:04:28.750 --> 00:04:29.758

And let's see.

00:04:29.758 --> 00:04:33.626

So then I'm left here with the 4th root.

00:04:33.630 --> 00:04:36.660

Of two X ^2.

00:04:39.350 --> 00:04:41.012

OK, and then I need one

00:04:41.012 --> 00:04:42.799

more thing I need to check.

00:04:42.800 --> 00:04:44.510

Do I need absolute values here?

00:04:44.510 --> 00:04:46.318

So if X were negative, right?

00:04:46.318 --> 00:04:47.982

If I put in a negative value for

00:04:47.982 --> 00:04:49.774

X up here I would lose track of

00:04:49.774 --> 00:04:51.544

the fact that it's negative and I

00:04:51.544 --> 00:04:52.726

would get a positive answer right?

00:04:52.730 --> 00:04:54.346

If I put a negative 5 or something?

00:04:54.350 --> 00:04:55.876

This in here would be positive and

00:04:55.876 --> 00:04:57.549

I'll get a positive number out.

00:04:57.550 --> 00:04:58.600

But down here it would give me

00:04:58.600 --> 00:05:00.229

a negative number, so I need.

00:05:00.229 --> 00:05:02.194

Absolute values around the X.

00:05:02.200 --> 00:05:05.176

And that's that's it. That's the idea of.

00:05:05.180 --> 00:05:08.500

Simplifying. Radical expressions.