00:00:05.860 --> 00:00:08.056
Alright, this video is on factoring

00:00:08.056 --> 00:00:09.520
perfect squares and factoring

00:00:09.579 --> 00:00:11.064
perfect squares. Of course,

00:00:11.064 --> 00:00:13.108
factor means write it as a product.

00:00:13.110 --> 00:00:15.225
So what we're going to do is we're going

00:00:15.225 --> 00:00:18.120
to look for things that are in this form

00:00:18.120 --> 00:00:19.902
and we're going to say it's in that form.

00:00:19.910 --> 00:00:21.880
And then we're going to write it in

00:00:21.880 --> 00:00:24.790
this form, which is a better form.

00:00:24.790 --> 00:00:27.100
And the thing we have to be

00:00:27.100 --> 00:00:28.942
careful about is first of all,

00:00:28.942 --> 00:00:30.646
we need to remember this form,

00:00:30.650 --> 00:00:32.526
which is itself a little bit tricky.

00:00:32.530 --> 00:00:34.620
But we can always go back, you know,

00:00:34.620 --> 00:00:36.685
just a few times in your life if you

00:00:36.685 --> 00:00:38.685
just go back and sort of recreate this,

00:00:38.690 --> 00:00:41.348
especially out of that area model,

00:00:41.350 --> 00:00:44.288
it will become more natural and the other

00:00:44.288 --> 00:00:46.322
thing is that we have to recognize this

00:00:46.322 --> 00:00:48.590

form and in this form really it's saying OK,

00:00:48.590 --> 00:00:50.746
the first term is a perfect square.

00:00:50.750 --> 00:00:52.868
The last term is a perfect

00:00:52.868 --> 00:00:54.720
square and this middle term.

00:00:54.720 --> 00:00:56.844
Is twice the product of the

00:00:56.844 --> 00:00:58.260
things that were squared,

00:00:58.260 --> 00:01:00.548
which is a mouthful,

00:01:00.548 --> 00:01:02.352
but it it's it's doable.

00:01:02.352 --> 00:01:04.580
So let's let's do 3 examples here.

00:01:04.580 --> 00:01:05.540
Let's start with this guy.

00:01:05.540 --> 00:01:08.914

Let's say that what I have is.

00:01:08.920 --> 00:01:12.720

X ^2 minus 12 X.

00:01:12.720 --> 00:01:13.180

Plus

00:01:15.230 --> 00:01:18.190

36 so I can look at that and say hi.

00:01:18.190 --> 00:01:20.584

Here's a perfect square and there's a

00:01:20.584 --> 00:01:22.934

perfect square, so maybe this whole

00:01:22.934 --> 00:01:25.639

thing is a perfect square and we need

00:01:25.639 --> 00:01:28.530

to check is what's this middle term?

00:01:28.530 --> 00:01:31.335

Well, here what was squared is X here.

00:01:31.335 --> 00:01:35.180

What was squared is 6 and if I take 6X.

00:01:35.180 --> 00:01:35.900

And I double it.

00:01:35.900 --> 00:01:37.652

Remember, there's a true here.

00:01:37.652 --> 00:01:40.100

I get 12X, so there's a minus.

00:01:40.100 --> 00:01:41.580

But that's fine, I just need to think.

00:01:41.580 --> 00:01:43.904

Well, OK, this is negative 6 squared,

00:01:43.910 --> 00:01:48.890

so this is. X - 6.

00:01:48.890 --> 00:01:51.704

Squared, so what's going on here is.

00:01:51.710 --> 00:01:53.610

Right if I expand this,

00:01:53.610 --> 00:01:54.828

I'm going to get an X squared.

00:01:54.830 --> 00:01:56.937

That's great. I'm going to get twice

00:01:56.937 --> 00:01:59.268
the product of these things minus 12X,

00:01:59.270 --> 00:02:00.894
and I'm going to get this thing squared.

00:02:00.900 --> 00:02:02.580
This thing, including that minus,

00:02:02.580 --> 00:02:06.514
so minus 6 squared is plus 36.

00:02:06.520 --> 00:02:08.140
On the other hand, what if I had this guy?

00:02:08.140 --> 00:02:17.640
What if I had? X ^2 plus. 15X plus.

00:02:17.640 --> 00:02:20.510
36 that I can look at it and I can say,

00:02:20.510 --> 00:02:22.130
aw, here's a perfect square,

00:02:22.130 --> 00:02:23.150
and there's a perfect square.

00:02:23.150 --> 00:02:24.866

And so maybe this whole thing

00:02:24.866 --> 00:02:26.010

is a perfect square.

00:02:26.010 --> 00:02:28.242

But what you do is check that middle thing,

00:02:28.250 --> 00:02:29.909

right? Check those.

00:02:29.909 --> 00:02:31.568

Middle the mixture.

00:02:31.570 --> 00:02:34.470

And what was squared here is 6 or minus six.

00:02:34.470 --> 00:02:36.486

What was squared here is X.

00:02:36.490 --> 00:02:40.454

And if I take twice 6X I'm

00:02:40.454 --> 00:02:43.226

going to get 12X not 15X.

00:02:43.226 --> 00:02:45.690

So this is not a perfect square

00:02:45.779 --> 00:02:47.747
and instead I need to kind

00:02:47.747 --> 00:02:50.108
of back up and think oh OK,

00:02:50.110 --> 00:02:51.785
here I'm factoring something where

00:02:51.785 --> 00:02:54.129
there's a one on the X squared,

00:02:54.130 --> 00:02:55.938
and so I can just look and say

00:02:55.938 --> 00:02:57.616
like what are some numbers that

00:02:57.616 --> 00:03:00.170
multiply to 36 and add to 15?

00:03:00.170 --> 00:03:01.850
Those numbers are three.

00:03:05.250 --> 00:03:06.070
And 12.

00:03:11.250 --> 00:03:14.050

So this was not a perfect square.

00:03:14.050 --> 00:03:15.034

And then, in fairness,

00:03:15.034 --> 00:03:16.510

you know you could look at

00:03:16.569 --> 00:03:17.979

this and you could say well.

00:03:17.980 --> 00:03:20.540

I would rather just look for numbers here

00:03:20.540 --> 00:03:25.076

that multiply to 36 and add to negative 12.

00:03:25.080 --> 00:03:27.616

Those numbers are negative 6 and negative 6,

00:03:27.620 --> 00:03:31.060

so I really have X - 6 * X - 6.

00:03:31.060 --> 00:03:33.140

That's exactly what we got,

00:03:33.140 --> 00:03:34.118

and that's fine.

00:03:34.118 --> 00:03:36.074
The issue there is that you're

00:03:36.074 --> 00:03:37.346
occasionally going to come

00:03:37.346 --> 00:03:38.526
across things like this,

00:03:38.530 --> 00:03:41.273
so you could come across 25.

00:03:41.273 --> 00:03:42.739
X ^2

00:03:45.230 --> 00:03:51.775
plus 20X. +4. Now you need the AC

00:03:51.775 --> 00:03:54.879
method and AC is going to be 100,

00:03:54.880 --> 00:03:57.202
so you know like you're going to run across.

00:03:59.290 --> 00:04:02.070
Polynomials that are perfect squares,

00:04:02.070 --> 00:04:04.840
but the AC method is going to take you into.

00:04:04.840 --> 00:04:07.618

Just kind of big messy numbers.

00:04:07.620 --> 00:04:09.713

It's going to work. You're going to

00:04:09.713 --> 00:04:11.919

have time to work out a C method.

00:04:11.920 --> 00:04:13.305

You can just stick with

00:04:13.305 --> 00:04:15.100

a C method if you want.

00:04:15.100 --> 00:04:17.386

But I think it's worth your time to learn

00:04:17.386 --> 00:04:19.726

to recognize this as a perfect square.

00:04:19.730 --> 00:04:20.528

And how do we do that?

00:04:20.530 --> 00:04:21.790

So what we'll do is, we'll say,

00:04:21.790 --> 00:04:23.440

well, that's a perfect square.

00:04:23.440 --> 00:04:25.372

It's five X squared,

00:04:25.372 --> 00:04:29.086

and that's a perfect square. It's 2 ^2.

00:04:29.086 --> 00:04:32.760

So hopefully this is five X + 2 ^2.

00:04:32.760 --> 00:04:35.128

And it's check is this twice the product

00:04:35.128 --> 00:04:38.860

of the things that were squared, so.

00:04:38.860 --> 00:04:40.820

This is coming from 5X.

00:04:40.820 --> 00:04:44.180

This is coming from 2/5 X times

00:04:44.180 --> 00:04:47.348

two is 10 X and right there 20X

00:04:47.348 --> 00:04:49.992

is right is twice the product of

00:04:49.992 --> 00:04:52.316

those things so this is in fact.

00:04:52.320 --> 00:04:56.496

Five X + 2.

00:04:56.496 --> 00:04:59.445

Squared so you can just recognize

00:04:59.445 --> 00:05:02.309

it and just move right through it.

00:05:02.310 --> 00:05:03.710

Let's check it real quick, right?

00:05:03.710 --> 00:05:05.390

Anytime you write something down like this,

00:05:05.390 --> 00:05:07.237

this is getting pretty abstract, right?

00:05:07.237 --> 00:05:09.106

And and so we should just check.

00:05:09.110 --> 00:05:12.008

So if I were to expand this.

00:05:12.010 --> 00:05:12.856

What am I going to get?

00:05:12.860 --> 00:05:15.040

I'm going to get five X squared,

00:05:15.040 --> 00:05:17.190

which is 25 X squared.

00:05:17.190 --> 00:05:18.966

I'm going to get 2 squared,

00:05:18.970 --> 00:05:21.193

which is a four, and I'm going to get

00:05:21.193 --> 00:05:23.110

twice the product of those things,

00:05:23.110 --> 00:05:24.880

so the product is 10X.

00:05:24.880 --> 00:05:26.632

And here's my 20X.

00:05:26.632 --> 00:05:30.050

So that is on factoring perfect squares.