00:00 Ok, people have already started doing this which I'm really excited to see. What we'd like you to do is actually move them around and put them in groups.

00:07 And they can be groups that you see commonality between. So what we what you to do is to organize the graphs into groups,

00:14 create as many different groupings as you can and then be able to describe, come up with language to describe each group. Al right?

00:22 And I'll stop you in about five minutes to talk.

00:41 Do we have to find the equation?

00:45 …this one goes with that one.

01:05 This is like both.

01:10 This is too.

01:11 Not necessarily. Not that one. Positive.

01:23 These are just the X, or just the Y's.

01:40 I feel kind of left out.

01:49 There's one that starts at negative four maybe you compare those.

02:04 If they're the same but going separate ways it's a parallelogram.

02:21 Yeah. Yeah. Because this is like positive four and this is negative four.

02:27 So we are trying to make as many groups as we can, right?

02:41 Very good things.

02:44 Before he goes off, I've just got to say I'm so impressed both with the quality of the students but the hair. (laughter)

02:51 Thank you.

02:54 I heard it was crazy hair day too.

02:58 You caught us on our best day.

02:59 You should see us tomorrow.

03:00 What's tomorrow?

03:08 The whole shebang? No holds barred?

03:16 So here's what we want to do. What we'd like to do is hear some of what you guys noticed, what you thought was…what stood out about these graphs.

03:30 What are the things that you noticed? And I have these slightly larger copies and we will sort of get a sense so the whole class can see what different things you paid attention to.

03:37 So do you want to start over here?

03:39 Ah yeah. So for Jeff, we made a group of linear equation graphs.

03:45 O.K.

03:46 And for Sarah we had positive graphs.

03:50 So hold on one sec. So let me…and how did you determine linear? Let's call it linear. Give me some of the ones that are in linear.

04:00 So we have a Y equals minus X.

04:04 Just give me the graph numbers.

04:06 G9. G5. G12.

04:20 and G11

04:25 So G9, G7, G5, G12

04:30 No not seven.

04:31 Oh. O.K. and what did you give this name?

04:33 Linear equation graphs.

04:34 Linear equation graphs. O.K. Great. And why did you call them that?

04:38 We did you call them that?

04:39 Well, we call these…basically equation graphs…well linear equation graphs because you find the points by an equation

04:47 so say for G9 you have the equation Y=-X squared. So you could use X and find the points on a graph.

04:59 What do you guys think? Good? So we are talking about equations. Do you guys…So he used this word linear, how many people know what linear means?

05:10 Well, sort of.

05:11 So what does it mean? We call things linear equations or linear graphs. Yeah.

05:16 I think it has to do with order and being in order.

05:20 Tell me more.

05:22 Just so if you have Y=X squared or negative X squared then you would plug in one for X, two for X, three for X…

05:32 O.K. so I'll go to what you said Y=X squared. You'd plug in values. Do you have a way of organizing that?

05:38 Yes, so you would put Y=1 squared. One squared equals one.

05:44 And I heard somebody say T-chart, is T-chart familiar? Yes.

05:47 So a table or a T-chart you have something like this. You'd say X=1 so Y=1.

05:55 X equals 2, Y equals 4 excetera. And so on and so on.

06:02 I see the equation and I see the relationship between X and Y but I want to go back to this because you called it linear. Yeah.

06:08 So linear basically means lines, right?

06:10 So does everybody…would that make sense? That linear would mean lines? Why?

06:16 Because it has the word line in it?

06:20 Yeah. Because it has got the word line in there. Line. And what's the opposite of linear?

06:26 Non-linear?

06:27 Say it. Loud.

06:28 Non-linear?

06:29 Which would mean non…so what's something that's not a line?

06:35 A parabola?

06:36 A parabola. A curve. So what do we have up here?

06:39 Parabolas.

06:40 So these are actually…

06:43 Parabolas.

06:44 Parabolas, which are non-linear. O.K. So we made a mistake. Here let's put this.

06:54 Alright so…and they can be formed by using equations and tables etcetera. Great.

07:00 Do we have an eraser?

07:05 Yep.

07:08 Can I hear from a different group about a different grouping? Ah so let's go to Sam. What did you guys pull out?

07:16 We had undefined in a pile.

07:21 And tell me what you mean by…or tell me which ones first of all so we can get them up…

07:24 G1.

07:28 G1. Only one, O.K. G1 and G1 looked like that and you called it what?

07:32 Undefined.

07:33 Undefined. So tell me about undefined.

07:36 Because it has no rise or runs so it doesn't move.

07:43 So no rise and runs. What do people think of that idea of undefined? No rise and run. Somehow different than… we actually don't have the linear ones up

07:53 But I assume that, Dylan, that if you pulled out non-linear than the other were linear.

07:57 And does this fit? Where does this fit? This G1.

08:00 It fits with the undefined…well it's a line so it would be in the linear group.

08:04 O.K. O.K. So…

08:09 So what's undefined? The whole line is undefined? Or… Yeah.

08:17 The slope is undefined.

08:18 Yeah. There's no slope.

08:19 Because you talked about rise and run or something.

08:20 Yeah.

08:24 So can I write slope undefined?

08:27 Yeah.

08:31 Great. And did anybody else find another one that fit that same category? Slope undefined? So the G1 was the only one with slope undefined?

08:38 G4

08:39 G4

08:43 That's zero.

08:43 I think everybody agrees with you.

08:46 Opposite day!

08:48 Opposite day! So is G4 undefined?

08:52 No.

08:53 Why?

08:58 So, it does have a run, so to speak, it goes across but I don't have to go up at all. And this has a rise but I don't go over,

09:07 So yeah that idea of why this is defined, and this isn't defined, is kind of an interesting thing to think about. Maybe we will come back to that.

09:16 So let's hold that out because that doesn't…we are going to say that doesn't fit there.

09:19 Any other categories that people came up with? Yes.

09:22 Linear equations.

09:23 Linear equations. And give me a couple that fit with…

09:29 G8, G3, G10, G6, G2, and G7. Yeah just the only ones that were left.

09:50 So, we've got some linear equations and again, linear means…line.

09:56 So, have we put them all up? The twelve? Now that doesn't mean that is the only way you could have sorted them, right?

10:03 Did people come up with other categories besides the three that we have? Slope undefined, non-linear, linear. Neil?

10:10 We came up with a positive linear, like, positive and negative graphs.

10:17 O.K. Do you have a linear? Cool. We are running out of magnets but that's O.K.

10:24 And then within here you had positive and negative as ways to, sort of, separate. O.K.? Any other sub-categories? Yeah.

10:39 The same Y intercept?

10:41 Same Y intercept. Tell me about that.

10:44 I have three groups here of Y-intercepts. In this one I have two on negative four and one on positive four.

10:53 O.K. Give me…

10:56 G2, G8 and G7.

10:57 O.K. so G2 has a Y intercept of positive four.

11:04 Positive four. And you saw other ones that had a Y intercept of positive four?

11:09 Negative four. Both the other ones, negative four.

11:11 Ah, got it. So you had positive four and negative four and…

11:14 Negative four.

11:16 O.K. Alright. Got it.

11:21 So we can divide those into different Y-intercepts. Alright?

11:25 And then this one, the Y-intercepts are all on zero.

11:29 Got it. So we have ones like this one and this one and this one, G6, which have Y-intercepts of zero.

11:35 Yeah. G6, G3 and G10.

11:36 O.K. Great. Any other things people noticed to help sort or to group these? We've got, sort of, Y-intercept, positive slope, negative slope, linear, non-linear, slope undefined.

11:49 Yeah.

11:50 Zero. A zero slope.

11:54 And a zero slope so among the linear there is positive slope, negative slope and zero slope.

11:59 Excellent. Which doesn't fit either positive or negative.

12:05 Yeah.

12:06 O.K. Alright. Good.

12:09 You guys are so impressive. I wish I had you for my class.