Graphing Similar Rectangles Problem

- Create four similar rectangles. List the dimensions for each rectangle.

- Plot the dimensions on a coordinate graph.

Brian and Macy Transcript

1 Teacher: This group did not start with numbers. They did not create them. They didn't decide on dimensions first. Ok. What did you do first ,then, Brian? What did your group do?
2 Brian: This. This went up by one thing each time. And, yeah.
3 Teacher: So you just created the rectangles?
4 Brian: Yeah.
5 Teacher: On the graph. So what did your dimensions end up being then?
6 Brian: Um. 2,3. 3,4. 4,5. And 5-6.
7 Teacher: Huh. Ok. So what do you guys think about that one? 2 by 3. 3 by 4. 4 by 5. And 5 by 6.
8 Students: Woah. What happened?
9 Teacher: What do you mean what happened? What do you mean woah?
10 Students: No. Just the screen. The screen.
11 Teacher: Oh ok.
12 Student: It went out of focus.
13 Teacher: So what do you think about those dimensions? 2 by 3. 3 by 4. 4 by 5. 5 by 6. Yeah. What are you thinking? Jim?
14 Jim: Well, our group did squares. And if we look at it compared to his, actually the line goes up at the same rate.
15 Teacher: What do you mean the line goes up at the same rate? Go show us what you mean. What do you mean the line goes up at the same rate? You might have to zoom out.
16 Jim: How do we do that?
17 Teacher: Wide. The button that says wide. Ok, so tell us about that. Go ahead.
18 Jim: You can't really see it.
19 Teacher: Yeah, you can see it. Go ahead.
20 Jim: But then, like…
21 Teacher: Wait, excuse me. We don't have everybody paying attention. And we need to. Ok. Go ahead.
22 Jim: The line goes up at the same rate because it's increasing the lengths of the side by the same rate.
23 Teacher: Ok. So where are you looking when you say that? Just kind of point to us. What are you looking at when you say the line goes up at the same rate?
24 Jim: This line.
25 Teacher: That line. Ok. So it's straight. And it keeps going up at the same rate. And so, what… how did that help you look at the other one? Let's look at Brian's now. Or not just Brian's, his group's. So let's look at that one. How does that help you look at that?
26 Jim: Um, if you draw a line through it, it would go, oh, it would go up at the same rate.
27 Student: Yeah.
28 Teacher: It would go up at the same rate?
29 Jim: But, then, it starts at a different point.
30 Teacher: What do you mean it starts at a different point?
31 Jim: This one, it would start at one. And this one would start at zero. Because this is a rectangle. Rectangles, that they were doing. And this one is a square.
32 Teacher: So you're thinking that because it's a rectangle, it's different.
33 Jim: Yeah.
34 Teacher: Let's see about some other people who had rectangles then. Did anyone else have a rectangle? Who? Yeah, go ahead.

35 Brian: You have to go up. The way you do Jim's one, with the rectangle, is you go up from here to there. Instead of from down to there.

36 Teacher: Right. But yours doesn't go from the place you started counting.

37 Brian: No, it doesn't.

38 Teacher: Well, I'm wondering, is that not possible with rectangles?

39 Brian: It's not.

40 Teacher: But you have one that does. Come show us yours. Let's look. So Macy, yeah, zoom out. And then tell us about yours. Go ahead. This was the one, remember, it was 3 and 5. And then 6 and 10. And then, what was your next one?

41 Student: 9 and 15

42 Teacher: 9 and… Ok. So tell us about it. So, they're rectangles. And that one goes up and goes through the 0,0. It goes through the origin. Anyone else have a set of rectangles where it goes through the origin?

43 Student: Yeah.

44 Teacher: Yours does too?

45 Jackie: Yeah.

46 Teacher: Ok. So yours goes through the… oh, Jackie drew it. May I borrow this? Ok, so here's Jackie's. They have a different rectangle than Macy's. But theirs goes through the origin, too. So I'm wondering what's the difference, then? Megan, what do you think?

47 Megan: Macy's and Jackie's goes up by two. And Brian's group only went up by one.

48 Teacher: So, what do we think about that?

49 Megan: Like they multiplied it by two. But Brian's group just went up and out a square.

50 Teacher: Ah, so Brian added one to each.

51 Megan: Yeah.

52 Teacher: And the difference was, that in group two's and group five, what did they do instead of adding?

53 Megan: They multiplied.

54 Teacher: They multiplied. So I'm wondering if those are… do you think those are similar rectangles then? If you just add on.

55 Megan: No. Maybe.

56 Teacher: Hm. Maybe not. All right.

57 Macy: Cause, for the check, they didn't have to go from the…

58 Teacher: Say again? Talk to them.

59 Macy: Randy's check thing. They didn't have to start over here and go through all the corners to be similar.

60 Teacher: Oh, if we used Randy's method. That's right. Are you hearing this? Tell it again, Macy, how that helped you decide whether group three's were similar or not. Go ahead.

61 Macy: Because for Randy's check thing, you have to start over here. And for it to be similar, you have to go through all the corners.

62 Teacher: So it has to be able to go through that place you start counting. What is the origin acting like there?

63 Macy: The center of dilation.

64 Teacher: Yeah. It's kind of acting like the center of dilation. So, group three, you need to check yours. If yours doesn't act like a center of dilation, there, Brian, that's not going to help. Ok. If it's not acting like a center of dilation, we may need to check again. Because, yeah, Randy's method of checking for similarity that way.

Similar Triangles Problem

Task:
Plot the following points on a coordinate graph: (-11, -4), (-5, -1), and (3,3)

- Draw the line that passes through all three points and mark the point where the line intersects the *x*-axis.
- Draw a perpendicular line segment from each of the plotted points to the *x*-axis. You should have created three triangles.
- Find at least two ways to justify that the three triangles are similar.