Tuesday Closure

Part A:

CATHY HUMPHREYS: So okay, um, you've made a lot of progress and some people have already moved ahead to the proving, explaining part. So I thought what I would want to do is to clarify for you the next stage of this investigation and that is – this is crooked – that is the um, that is this stage. So I...from walking around I am seeing that a lot of you have convinced yourselves that you are pretty sure that you can make any kind of shape of a quadrilateral. You could describe what diagonals were needed in what position to make a quadrilateral. And how would you convince – so how did you convince yourself and how would you convince a friend? For example, if you went to another group, could you convince a friend? How would you do that? Because in a way we are all sort of mathematical friends. But the last step would be, how could you actually, formally prove this to a skeptic? Prove your conjecture. And here is where you are going to need to draw upon all your proving skills that you know about, that you've been learning all year. So this is going to be actually the group product of your investigation. How would you prove it to a skeptic?

Now um, let's see, I didn't decide if I wanted you to write this down. Would you talk yourselves through this and then when you're ready, when your groups are at that stage, not everyone is at the same stage yet, but talk yourselves through this; and you know I have to confess that you've made such tremendous progress on this that I was expecting that this part wouldn't come until Thursday. So I was um, hadn't really decided what kind of product to have you do but this is where we are going with this, so that you could actually prove. I wanted to compliment Sage because one of the things he said was that you can't assume any of these lines are parallel; you can't assume anything because it's just how it looks. And thank you for that. And we cannot assume and Javier said the same thing. So what we want to do is...okay, we have a pretty good conjecture, now can we prove it? Can we prove it? It looks like it is; can we prove that that's your configuration of diagonals? We can guarantee that we're going to get that quadrilateral and we can prove it. Alright? So let's work for maybe another oh, ten minutes and then we'll clean up.

STUDENT: ...the diagonals. And they are not in the midpoint, so maybe...

STUDENT: We still need to prove how to make a regular trapezoid.

STUDENT: I think that they do have to be different sizes...

STUDENT: In this case they form two isosceles triangles but otherwise they shouldn't in a normal…

STUDENT: Everything is not the same.

STUDENT: It's just like a special trapezium. It's just some random shape, except the only thing is the two of them are parallel.

STUDENT: Yeah, a little bit.

STUDENT: Because on an isosceles triangle the two base angles are the same. Because the vertical angles are always congruent to each other, these two vertical angles are the same…

STUDENT: Did we already make a rule to making a consistent trapezium?

STUDENT: Yeah.

STUDENT: Would it be the same?

STUDENT: It's so odd that somewhere in between trapezoid and trapezium we get stuck.

STUDENT: I would have thought we'd get stuck on trapezium.

STUDENT: You'd think there would be more rules.

STUDENT: Maybe it's just the same rules as trapezium except that you just have to have parallel sides.

STUDENT: Yeah.

STUDENT: Why is it so hard to make it with these? We try making it and instead we got non trapezoids.

STUDENT: That could be a parallelogram.

STUDENT: But how do we assume that these are not parallel lines?

STUDENT: What?

STUDENT: Why can't these two segments not be parallel?

STUDENT: They look like they are going to intersect someday.

STUDENT: To prove that they are parallel you have to measure the alternate interior. You don't poke it!

STUDENT: Oh, this is an isosceles trapezoid.

STUDENT: You have to measure the alternate interior angles.

STUDENT: Are you going to write your conjecture inside the shape?

STUDENT: I don't know.

STUDENT: Look at the little sand thing on the paper.

STUDENT: I am going to ask her if we figured it out; if we figured it out why they are parallel – you measure the alternate interior with this.

CATHY HUMPHREYS: You measured it?

STUDENT: Because you gave us these so we assumed that we could.

STUDENT: We did assume.

CATHY HUMPHREYS: Oh, okay. So it works for this particular case.

STUDENT: Well, we can do all the shapes if you want.

CATHY HUMPHREYS: Do you think that you could do it so the “It”...oh, I am using that word.

STUDENT: Yes.

CATHY HUMPHREYS: So you measured and found that they were true? So you are convinced at that stage that you are here?

STUDENT: Yes.

STUDENT: Oh darn, I really thought I convinced you.

CATHY HUMPHREYS: So you convinced me that this particular one but what about any trapezoid?

STUDENT: So if we draw all the shapes, can we convince you?

CATHY HUMPHREYS: Well, you...what your job is to do is to put that down on paper. So you could convince - like an iron clad explanation. Alright?

STUDENT: So what if we don’t or aren’t mathematical friends…what if we don’t get, mathematically get along? How could we explain that?

CATHY HUMPHREYS: Alright, so maybe what depends on a mathematical friends is if he came up with the same conclusion as you did then you are mathematical friends. If he thinks or has a different idea then you're not mathematical.

STUDENT: She always has a different idea than me. We are always arguing.

CATHY HUMPHREYS: Really? Oh good. I’m going to ask you to stop in one minute.

STUDENT: Anyway, do you want to know what other conjecture I made?

STUDENT: What?

STUDENT: If you go like that. (tapping on the table making a joke)

STUDENT: So now we have to see if it works with other ones too.

STUDENT: I think it will because we have the diagonals.

STUDENT: Alright then, prove it. So I’m going to make a square.

STUDENT: Good for you.

STUDENT: I want to try it with a short one and a long one because that one looks kind of weird to me. I think we should have music on while we do this.

CATHY HUMPHREYS: Resource managers I need to talk to you.

STUDENT: Ha ha, that's not me.

STUDENT: Yeah, I think the square was the easiest one to prove because (inaudible).

STUDENT: We have to put these back together and staple all this.

STUDENT: But okay, so we can measure it like this. Which ones are parallel? Oh! I drew the one that's not parallel. Oh my gosh! I wasted paper. This one is just a kite and no parallel lines. And we know it's a kite because it's got um – how do we know that these are the same lengths?

STUDENT: You can use a ruler.

STUDENT: Because these two are the same ones.

STUDENT: How do we know that? Let's measure it out with this lovely thing.

STUDENT: Because it has the circles and everything.

STUDENT: The circles!

STUDENT: Because the stick told me they were.

STUDENT: So let's just say it's six and this is perfectly on three.

STUDENT: So a square is a rhombus but a rhombus is not a square. How do we know these are parallel? Because that's a ninety degree angle and it's bisected into two forty five degree angles.

STUDENT: So we need to find a way.

STUDENT: They look the same. Bada bing, bada boom.

STUDENT: Yeah, but that's how we're supposed to prove it.

STUDENT: Go get a protractor over there.

STUDENT: Yeah, but are we supposed to measure it?

STUDENT: She gave us protractors didn't she?

STUDENT: And then yes!

STUDENT: So anyway.

STUDENT: Is there any other way of measuring it?

STUDENT: Want to see another way?

STUDENT: Yeah, she gave us protractors so we're supposed to measure it. Because that's how we roll, you know? Okay, so we put – this is a really gross shape.