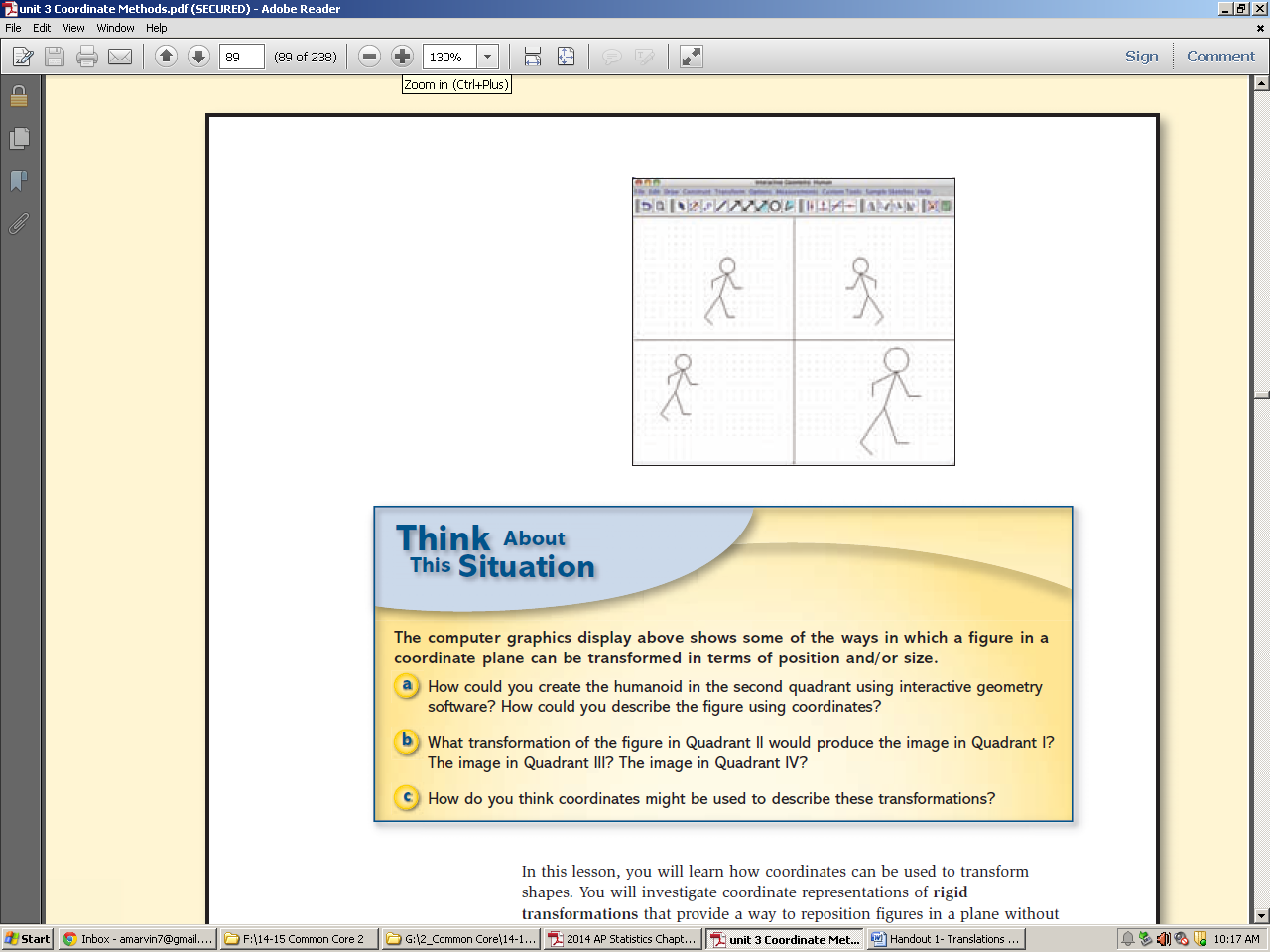
**Unit 2: Translations Name:**

**Handout 1**

**THINK ABOUT IT!!!!!**

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**Use the image of the humanoid (stick figure) above to answer the following questions.**

1. **How has the humanoid moved from quadrant II to quadrant III?**
2. **How has the humanoid moved from quadrant I to quadrant II?**
3. **How has the humanoid changed from quadrant II to quadrant IV?**

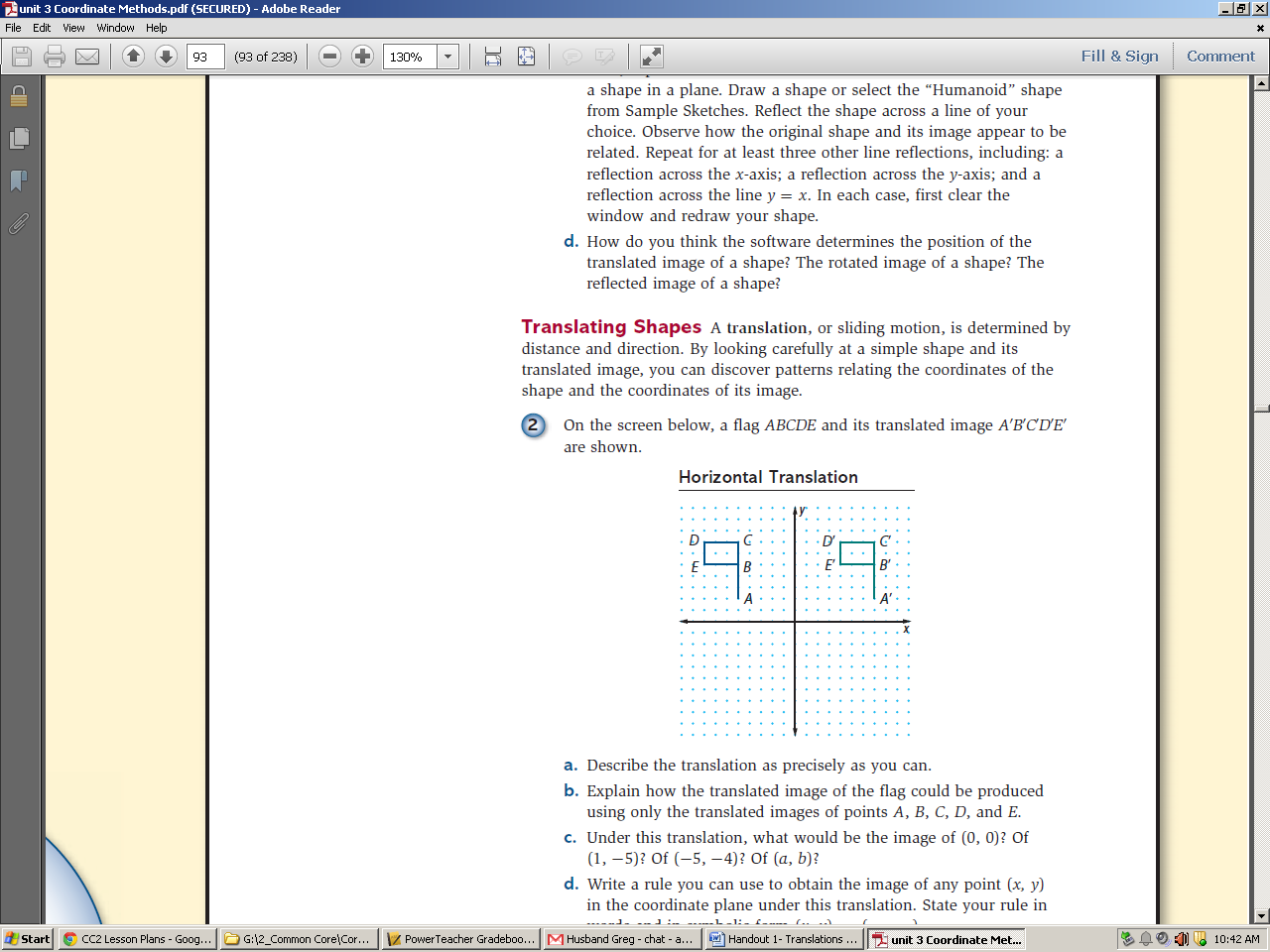
**Investigation 1:**

In this lesson, you will learn how coordinates can be used to transform shapes. You will investigate coordinate representations of **rigid transformations** that provide a way to reposition figuresin a plane without changing the shape or size of the figures. You will also investigate coordinate representations of **similarity transformations** that can be used to resize figures while maintaining their shapes.

Question to think about: How can coordinates be used to describe a sliding motion or translation?

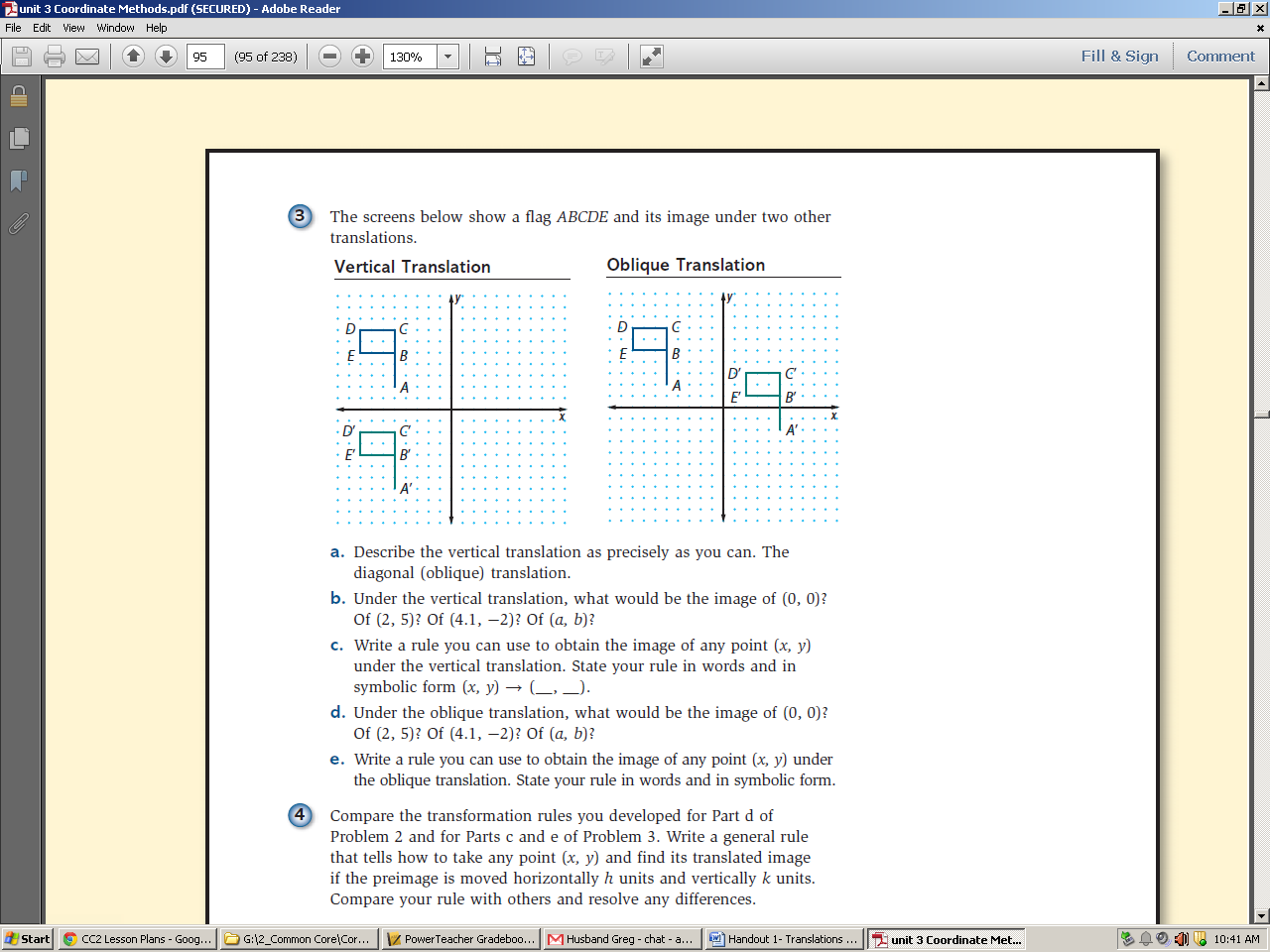
**Translations:** A translation, or sliding motion, is determined by distance and direction. By carefully looking at a simple shape and its translated image, you can discover patterns relating the coordinates of its shape and coordinates of the image.

**Problem 1:** In the picture below, a flag *ABCDE* and its translated image *A’B’C’D’E’* are shown.



1. Describe the translation as precisely as you can.
2. Explain how the translated image of the flag could be produced using only the points *A, B, C, D,* and *E.*
3. Under this translation, what would the image of the following points be?
   1. (0, 0)?
   2. (1, -5)?
   3. (-5, -4)?
   4. (a, b)?
4. Write a rule you can use to obtain the image of any point (x, y) in the coordinate plane under this translation. State your rule in words and symbolic form .

**Problem 2:** In the picture below, a flag and its translated image under two other translations are shown.



1. Describe the vertical translation as precisely as you can. Also describe the oblique translation.
2. Under the vertical translation, what would the image of the following points be?
   1. (0, 0)?
   2. (2, 5)?
   3. (4.1, -2)?
   4. (a, b)?
3. Write a rule you can use to obtain the image of any point (x, y) in the coordinate plane under the vertical translation. State your rule in words and symbolic form .
4. Under the oblique translation, what would the image of the following points be?
   1. (0, 0)?
   2. (2, 5)?
   3. (4.1, -2)?
   4. (a, b)?
5. Write a rule you can use to obtain the image of any point (x, y) in the coordinate plane under the oblique translation. State your rule in words and symbolic form .

**Problem 3:** Compare the transformation rules you developed in parts *d* of problem 1 and parts *c* and *e* of problem 2. Write a general rule that tells how to take any point (*x, y*) and find its translated image if the preimage is moved horizontally *h* units and vertically *k* units.

