## Unit 6 Lesson 10: Parallel Lines in the Plane

### 1 Translating Lines (Warm up)

#### Student Task Statement

1. Draw any non-vertical line in the plane. Draw 2 possible translations of the line.
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1. Find the slope of your original line and the slopes of the images.

### 2 Priya’s Proof

#### Images for Launch



#### Student Task Statement

Priya writes a proof saying:

Consider any 2 parallel lines. Assume they are not horizontal or vertical. Therefore they must pass through the $x$-axis as well as the $y$-axis. This forms 2 right triangles with a second congruent angle. Call the angle $θ$. The tangent of $θ$ is equal for both triangles. Therefore the lines have the same slope.



1. How does Priya know the right triangles have a second congruent angle?
2. Show or explain what it means that the tangent of $θ$ is equal for both triangles.
3. How does this prove the slopes of parallel lines are equal?

#### Activity Synthesis



### 3 Prove Your Parallelogram

#### Student Task Statement

1. Write the equation of a line parallel to $y=2x+3$, passing through $\left(-4,1\right)$.
2. Graph both lines described in the previous question.
3. Draw a parallelogram using the 2 lines you graphed and using $\left(-4,1\right)$ as one of the vertices.
4. Prove that your figure is a parallelogram.

#### Images for Activity Synthesis





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