MATH NEWS

Grade 5, Module 6, Topic C

5th Grade Math

Module 6: Problem Solving with the Coordinate Plane

Math Parent Letter

This document is created to give parents and students an understanding of the math concepts found in Eureka Math (© 2013 Common Core, Inc.) that is also posted as the Engage New York material which is taught in the classroom. Grade 5 Module 6 of Eureka Math (Engage New York) covers Problem Solving with the Coordinate Plane. This newsletter will discuss Module 6, Topic C. In this topic students will draw figures in the coordinate plane by plotting points to create parallel, perpendicular, and intersecting lines.

Topic C: Draw Symmetric Figures on the Coordinate Plane

Words to Know:

- parallel (∥)
- line segment
- coordinate plane
- coordinate pair or ordered pair
- perpendicular (⊥)
- angle
- line of symmetry
- line segment

Things to Remember!

Parallel - Two lines on a plane that never meet. They are always the same distance apart. **Symbol for parallel - ∥**

Perpendicular - Lines that are at right angles (90°) to each other **Symbol for perpendicular - ⊥**

Coordinate Plane – The plane determined by a horizontal number line, called the x-axis, and vertical number line, called the y-axis, intersecting at a point called the origin. Each point in the coordinate plane can be specified by an ordered pair or coordinate pair of numbers.

Coordinate Pair or Ordered Pair – Two numbers that are used to identify a point on a plane; written *(x, y)* where *x* represents a distance from 0 on the *x*-axis and *y* represents a distance from 0 on the *y*-axis

Line of Symmetry – A line of symmetry divides a figure into 2 congruent parts.

OBJECTIVES OF TOPIC C

- Construct parallel line segments on a rectangular grid.
- Construct parallel line segments, and analyze relationships of the coordinate pairs.
- Construct perpendicular line segments on a rectangular grid.
- Construct perpendicular line segments, and analyze relationships of the coordinate pairs.
- Draw symmetric figures using distance and angle measure from the line of symmetry.

Focus Area– Topic C

Module 6: Problem Solving with the Coordinate Plane

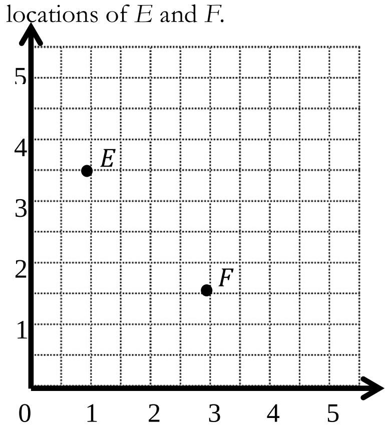
Construct parallel line segments in a coordinate plane

a. Identify the locations of *E* and *F*.

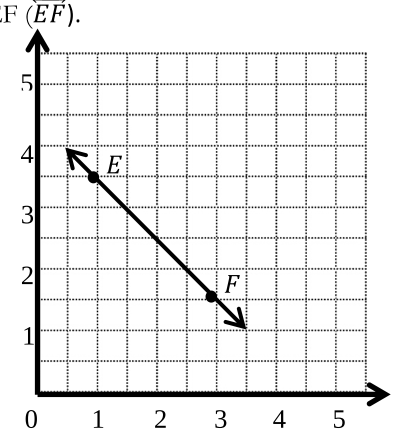
Locations

E: $(1, 3\frac{1}{2})$

F: $(3, 1\frac{1}{2})$



b. Draw line EF ($\overleftrightarrow{EF}$).

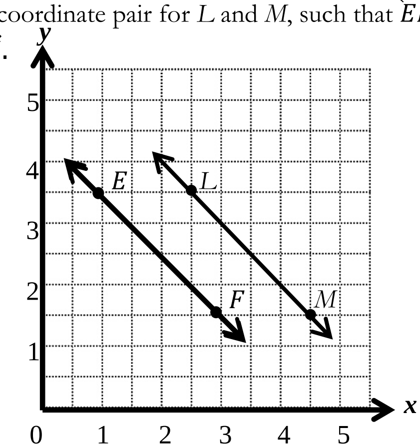


c. Determine coordinate pair for *L* and *M*, such that $\overleftrightarrow{EF} \parallel \overleftrightarrow{LM}$ and then draw $\overleftrightarrow{LM}$.

Coordinate Pairs:

L: $(2\frac{1}{2}, 3\frac{1}{2})$

M: $(4\frac{1}{2}, 1\frac{1}{2})$



d. Explain the pattern you used when determining coordinate pairs for *L* and *M*.

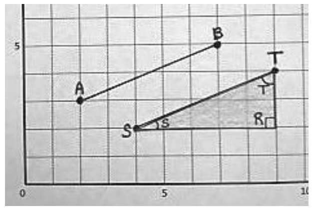
I shifted x-coordinates three ½ units to the right, but I kept the y-coordinates the same. I did not shift up or down.

NOTE: In creating $\overleftrightarrow{LM} \parallel \overleftrightarrow{EF}$, the student could have shifted 1, 2, 4, etc. units to the left or right.

Problem: $\overline{AB}$ and $\overline{ST}$ are parallel. Compare the coordinates of points *S* and *T* to the coordinates of points *A* and *B*.

Point	(x, y)
S	(4, 2)
T	(9, 4)

Point	(x, y)
A	(2, 3)
B	(7, 5)

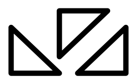


a. Why is each *x*-coordinate in points in *A* and *B* 2 less than the *x*-coordinates in points *S* and *T*?
The x-coordinates for points *S* and *T* shifted 2 units to the left.

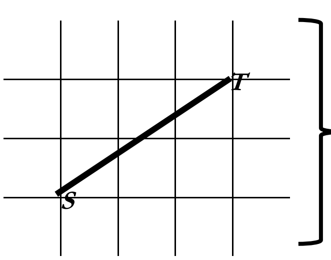
b. Why is each *y*-coordinate in points in *A* and *B* 1 more than the *y*-coordinates in points *S* and *T*?
The y-coordinates for points *S* and *T* shifted 1 unit up.

Constructing Perpendicular Segments

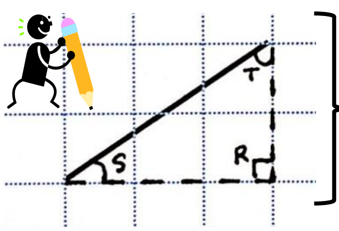
Things to remember:
A triangle that has one 90° angle is called a ***right triangle***.



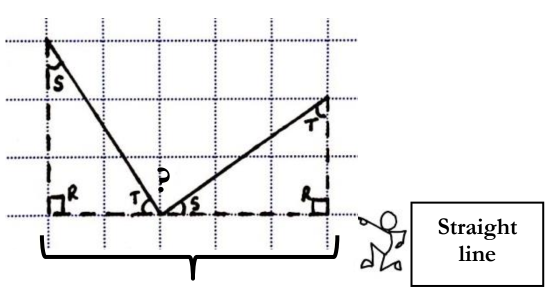
The sum of the three angles of a triangle is equal to 180°. Therefore the sum of the other two angles in a right triangle is equal to 90°, since 90 + 90 = 180. These two angles each measure ***less than 90°,*** so they are called ***acute angles***.



Step 1: Draw a right triangle that has $\overline{ST}$ as it longest side.



Step 2: The right triangle has a height of 2 units and a base of 3 units. Dashed lines show the height and base. $\angle T$ and $\angle S$ are acute angles whose sum is 90 °. Angle *R* is a right angle whose measure is 90°.



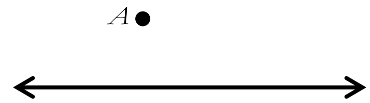
Step 3: Triangle *RST* is used to draw a segment perpendicular to $\overline{ST}$ by visualizing sliding triangle *RST* and rotate it so it appears standing up. It now has a base of 2 units and a height of 3 units. Sketch another triangle the same as *RST*. Use dashed lines to sketch $\overline{RT}$ and $\overline{RS}$ and a solid line to sketch the longest side, $\overline{ST}$.

A straight angle has a measure of 180°. $\angle T$ and $\angle S$ add up to 90°, so the angle formed by the two solid segments must have a measure of 90°. 90 + 90 = 180. Since the two longest sides of these triangles form a right angle, we can say that we have constructed perpendicular segments.

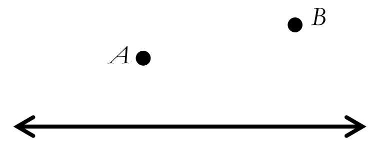
Draw Symmetric Figures from the Line of Symmetry

Step 1: Draw a line of symmetry. This line will be used to draw symmetrical points, line segments, and/or figures.

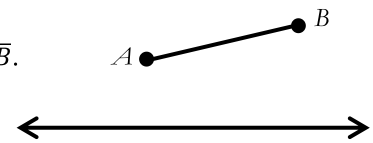
Step 2: Draw a point, *A*, above the line.



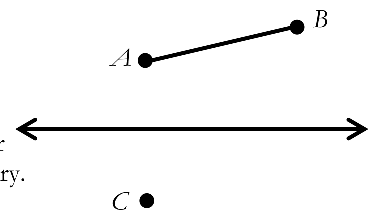
Step 3: Draw a second point, *B*, on the same side of the line as *A*.



Step 4: Draw $\overline{AB}$.

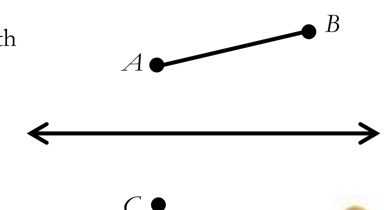


Step 5: Measure the distance from point *A* to the line of symmetry. Measure the same distance on the opposite side of the line of symmetry. Make certain that the edge of the ruler is perpendicular to the line of symmetry. Draw a point and name it *C*.



Since point C was drawn using the ruler that was placed perpendicular to the line of symmetry and it is the same distance from the line of symmetry as point A, we can say that point C is symmetric to point A or point A is symmetric to point C.

Step 6: Repeat step 5 with point *B*.



Step 7: Draw $\overline{CD}$.