MATH NEWS

Grade 6, Module 5, Topic B

LAFAYETTE PARISH SCHOOL SYSTEM

6th Grade Math

Module 5: Polygons on the Coordinate Plane

Math Parent Letter

This document is created to give parents and students a better understanding of the math concepts found in Eureka Math (© 2013 Common Core, Inc.) and is also posted as the Engage New York material being taught in the classroom. In Module 5 of Eureka Math (Engage New York), students utilize their previous experiences in shape composition and decomposition in order to understand and develop formulas for area, volume, and surface area.

Focus Area Topic B:

Polygons on the Coordinate Plane

Words to Know:

Absolute Value – the distance between a number and zero. The absolute value of 5 is 5 and the absolute value of -5 is 5. The distance from zero for both numbers is 5.

Coordinate - A set of numbers, or a single number, that locates a point on a line, or on a plane or in space.

Coordinate plane - formed by a horizontal number line called the *x*-axis and a vertical number line called the *y*-axis

***x*-axis** - The horizontal number line, that together with the *y*-axis (vertical number line) forms the coordinate plane.

***y*-axis** – The vertical number line, that together with the x-axis (horizontal number line) forms the coordinate plane.

***x*-coordinate** - the first number in an ordered pair
It tells the number of horizontal units a point is from 0.

***y*-coordinate** - the second number in an ordered pair
It tells the number of vertical units a point is from 0.

Vertex – The vertex of an angle is the point of intersection of tow sides of an angle or figure. Plural of vertex is vertices.

Polygon - a closed figure formed by three or more line segments that do not cross

Parallel lines – Lines are parallel if they are always the same distance apart (called "equidistant"), and will never meet.

Parallelogram – a quadrilateral with both pairs of opposite sides parallel

Focus Area Topic B:

Polygons on the Coordinate Plane

In Topic B, students apply prior knowledge from Module 3 by using absolute value to determine the distance between integers on the coordinate plane in order to find side length of polygons. Then they draw polygons in the coordinate plane when given coordinates for vertices. They find the area enclosed by a polygon by composing and decomposing, using polygons with known area formulas.

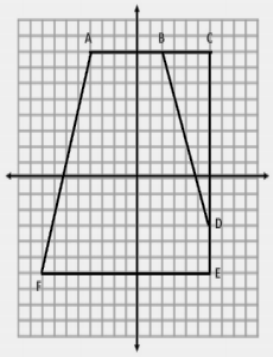
Distance on the Coordinate Plane

Students use absolute value to determine distance between integers on the coordinate plane in order to find side length of polygons.

Problems and Solutions

1.

Use absolute value to show the lengths of $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, $\overline{DE}$, and $\overline{EF}$.



Line Segment	Point	Point	Distance	Proof
$\overline{AB}$	(−4, 8)	(2, 8)	6	$\lvert -4\rvert + \lvert 2\rvert$
$\overline{BC}$	(2, 8)	(6, 8)	4	$\lvert 6\rvert - \lvert 2\rvert$
$\overline{CD}$	(6, 8)	(6, −3)	11	$\lvert 8\rvert + \lvert -3\rvert$
$\overline{DE}$	(6, −3)	(6, −6)	3	$\lvert -6\rvert - \lvert -3\rvert$
$\overline{EF}$	(6, −6)	(−8, −6)	14	$\lvert 6\rvert + \lvert -8\rvert$

To determine the distance from A to B, add the distance from A to the y-axis and the distance from B to the y-axis. We add the distances together because they are on opposite sides of the y-axis. When determining the distance from B to C, we are taking the distance from B to the y-axis and C to the y-axis and finding the difference because they are on the same side of the y-axis.

2. Write the coordinates for two points that are 5 units apart, and which is a vertical line segment.

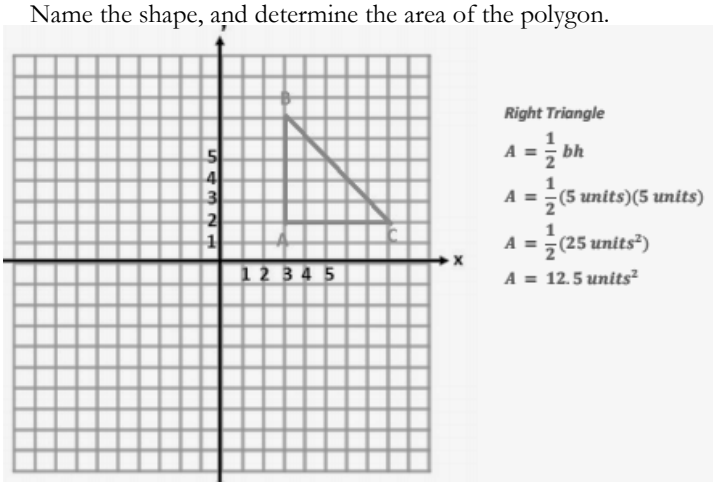
Answers may vary: *One solution is (2, 1) and 2, 6)*
It may be beneficial to give students grid paper and have them graph the two points until they are comfortable doing this without the grid.

Focus Area Topic B
Polygons on the Coordinate Plane

Drawing Polygons on the Coordinate Plane

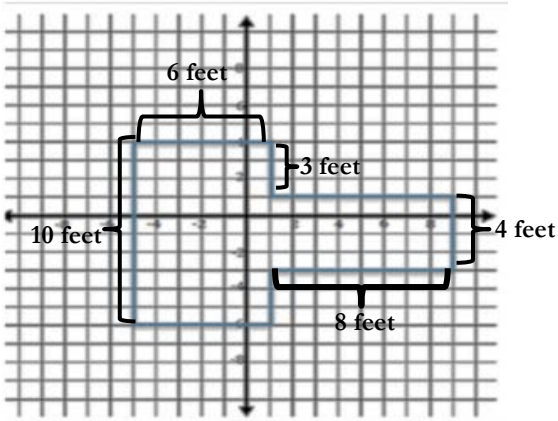
Given coordinates for the vertices, students draw polygons in the coordinate plane. Students find the area enclosed by a polygon by composing or decomposing using polygons with known area formulas.

Problems and Solutions:
Plot and connect the points A (3, 2), B (3, 7), and C (8, 2). Name the shape, and determine the area of the polygon.



Distance, Perimeter, and Area in the Real World

Problems and Solutions:
1. The local school is building a new playground. This plan shows the part of the playground that needs to be framed with wood for the swing set. The unit of measure is feet. Determine the number of feet of wood that will be needed to frame the area.



Perimeter: 10 ft + 6 ft + 6 ft + 3 ft + 3 ft + 8 ft + 8 ft + 4 ft = 48 ft

The school will fill the area with wood mulch for safety. Determine the number of square feet that need to be covered by the mulch.

Area = bh
A = 6 ft x 10 ft = 60 ft²
A = 8 ft x 4 ft = 32 ft²
A = 60 ft² + 32 ft²
A = 92 ft²
The number of square feet that is needed to be covered by mulch is 92.

Focus Area Topic B:
Polygons on the Coordinate Plane

2. A homeowner called in a painter to paint the walls and ceiling of one bedroom. His bedroom is 18 ft long, 12 ft wide, and 8 ft high. The room has two doors, each 3 ft by 7 ft and three windows each 3 ft by 5 ft. The doors and windows do not have to be painted. A gallon of paint can cover 300 ft². A hired painter claims he will need 4 gallons. Show that his estimate is too high.

Area of 2 long walls: 2(18 ft x 8 ft) = 288 ft²

Area of 2 short walls: 2(12 ft x 8 ft) = 192 ft²

Area of ceiling: 18 ft x 12 ft = 216 ft²

Area of 2 doors: 2(3 ft x 7 ft) = 42 ft²

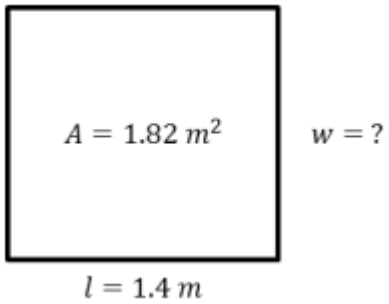
Area of 3 windows: 3(3 ft x 5 ft) = 45 ft²

Area to be painted:
(288 ft² + 192 ft² + 216 ft²) – (42 ft² + 45 ft²) = 609 ft²

Gallons of paint needed:
609 ft² ÷ 300 ft² per gallon of paint = 2.03 gallons

The painter will need a little more than 2 gallons. The painter's estimate of 4 gallons was too high.

3. Write and then solve the equation to find the missing value below.



A = lw
1.82 m² = 1.4 m(w)
1.82 ÷ 1.4 = 1.4(w) ÷ 1.4
1.3 m = w