5.8 Coordinate Plane Proofs

ACT Practice:
In the school cafeteria, students choose their lunch from 4 sandwiches, 2 soups, 2 salads, and 2 drinks. How many different lunches are possible for a student who chooses exactly 1 sandwich, 1 soup, 1 salad, and 1 drink?

F. 2  
G. 4  
H. 10  
J. 16  
K. 32

Placing a Figure in a Coordinate Plane
Place each figure in a coordinate plane in a way that is convenient for finding side lengths. Assign coordinates to each vertex.

a) a rectangle 

b) a scalene triangle
Practice:

a) scalene right triangle     b) isosceles trapezoid

Writing a Coordinate Proof

You buy a tall, three legged plant stand. When you place a plant on the stand, the stand appears to be unstable under the weight of the plant. The diagram at the right shows a coordinate plane superimposed on one pair of the plant stand’s legs. The legs are extended to form ΔOBC. Prove that ΔOBC is a scalene triangle.

Write a paragraph proof. Give work as statement and reason and then write a conclusion statement.

To prove ΔOBC is scalene, all sides must have different lengths. The distance formula determines side lengths.

\[ OB : \sqrt{(0-12)^2 + (0-48)^2} = \sqrt{144 + 2304} = \sqrt{2448} \]

\[ BC : \sqrt{(12-18)^2 + (48-0)^2} = \sqrt{36 + 2304} = \sqrt{2340} \]

\[ OC : \sqrt{(0-18)^2 + (0-0)^2} = \sqrt{324 + 0} = \sqrt{324} \]

Based on the side lengths from the distance formula, no side lengths are the same making ΔOBC scalene.
Practice:
Write a paragraph proof.
Given: Coordinates of vertices of $\triangle NPO$ and $\triangle NMO$

Prove: $\triangle NPO \cong \triangle NMO$

$\overline{OP} = \overline{OM}$ because they both equal $2h$.
$\overline{ON} \cong \overline{ON}$ because of Reflexive Property.
$m\overline{PM} = \frac{2h - 0}{0 - 2h} = \frac{2h}{-2h} = -1$.
$m\overline{ON} = \frac{0 - h}{0 - h} = -\frac{h}{h} = 1$.
$\therefore \overline{ON} \perp \overline{PM}$

$\triangle NPO \cong \triangle NMO$ by HL because the 1 seg. makes right angles.

HW: Pg. 287:
A: 17, 19, 23, 25, 28, 29
B: 5, 7, 11, 13, 15, 17, 19, 23, 28, 29
C: 1 - 19 (o), 28, 29