Name _____ Date _____

1. Follow the directions below to draw a figure in the box below. Use a straightedge.

   a. Draw 2 points, A and B.

   b. Draw $\overleftrightarrow{AB}$.

   c. Draw point D that is not on $\overleftrightarrow{AB}$.

   d. Draw $\overrightarrow{BD}$.

   e. Draw $\overline{AD}$.

   f. Name an acute angle.

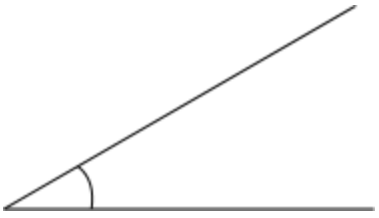
   _____

   g. Name an obtuse angle. You may have to draw and label another point.

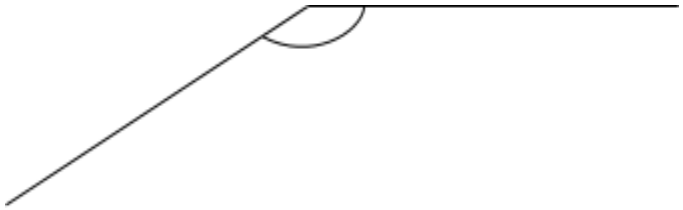
   _____

2. Use your protractor to measure the angle indicated by the arc. Classify each angle as right, acute, or obtuse. Explain how you know each angle's classification.

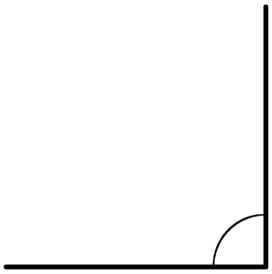
   a.



b.



c.

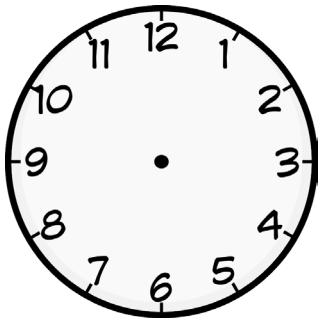


3. Use the following instructions to draw a figure in the box below.

- Using a straightedge, draw a line. Label it $\overleftrightarrow{KL}$.
- Label a point A on $\overleftrightarrow{KL}$.
- Using your protractor and ruler, draw a line perpendicular to $\overleftrightarrow{KL}$ through point A.
- Label the perpendicular line $\overleftrightarrow{PQ}$.
- Label a point B on $\overleftrightarrow{PQ}$, other than point A.
- Using your protractor and straightedge, draw a line, $\overleftrightarrow{ST}$, perpendicular to $\overleftrightarrow{PQ}$ through point B.

Which lines are parallel in your drawing? Explain why.

4. Use the clock to answer the following:



   a. Use a straightedge to draw the hands as they would appear at 3:00.

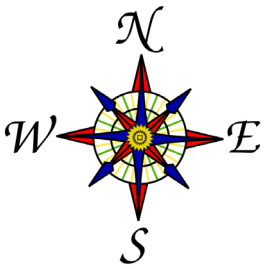
   b. What kind of angle is formed by the clock hands at 3:00?

   c. What time will it be when the minute hand has turned 180°?

   d. How many 90° turns will the minute hand make between 3:00 and 4:00?

---

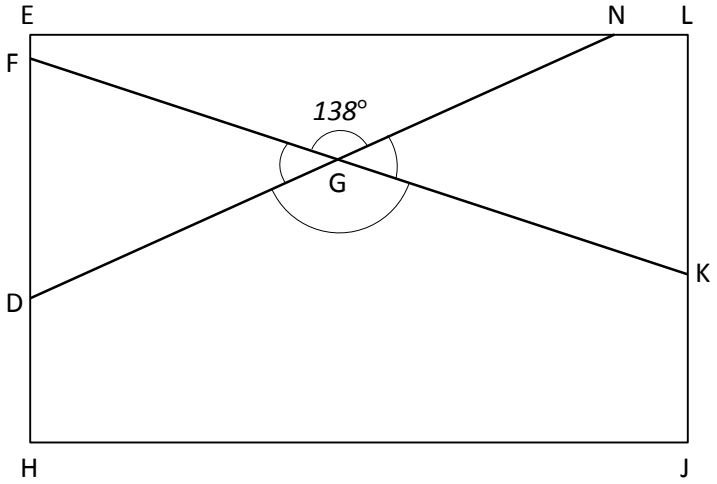
5. Use the compass rose to answer the following:



   a. Maddy faced East. She turned to her right until she was facing North. How many degrees did she turn?

   b. Quanisha was facing North. She turned toward her right until she faced East. Alisha was facing South. She turned toward her right until she faced West. What fraction of a full turn did each girl complete? Through how many degrees did each girl turn?

6. The town of Seaford has a large rectangular park with a biking path around its perimeter and two straight-line biking paths that cut across it as shown in the diagram below.



a. Find the measure of the following angles using a protractor.

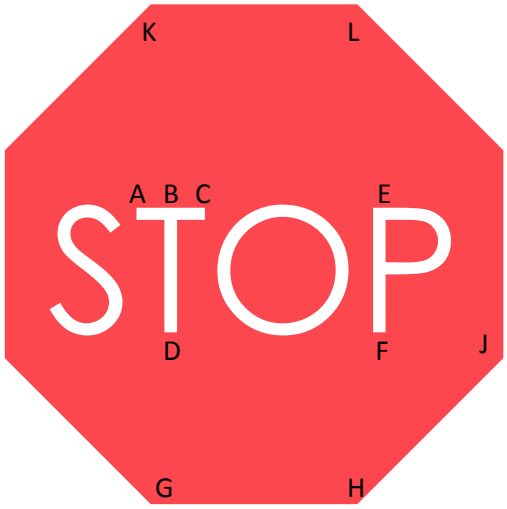
∠FGD:

∠DGK:

∠KGN:

b. In the space below, use a protractor to draw an angle with the same measure as *∠DGK*.

c. Below is a sign that bikers may encounter while riding in the park. Using the points in the figure below, identify a line segment, a right angle, an obtuse angle, a set of parallel lines, and a set of perpendicular lines. Write them in the table below.



Line Segment	
Right Angle	
Obtuse Angle	
Parallel Lines	
Perpendicular Lines	

Mid-Module Assessment Task Standards Addressed	Topics A–B

Geometric measurement: understand concepts of angle and measure angles.

4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.

b. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.

4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

Evaluating Student Learning Outcomes

A Progression Toward Mastery is provided to describe steps that illuminate the gradually increasing understandings that students develop on their way to proficiency. In this chart, this progress is presented from left (Step 1) to right (Step 4). The learning goal for students is to achieve Step 4 mastery. These steps are meant to help teachers and students identify and celebrate what the students CAN do now and what they need to work on next.

A Progression Toward Mastery				
Assessment Task Item and Standards Assessed	**STEP 1 Little evidence of reasoning without a correct answer.** **(1 Point)**	**STEP 2 Evidence of some reasoning without a correct answer.** **(2 Points)**	**STEP 3 Evidence of some reasoning with a correct answer or evidence of solid reasoning with an incorrect answer.** **(3 Points)**	**STEP 4 Evidence of solid reasoning with a correct answer.** **(4 Points)**
1 **4.G.1**	The student attempts to draw some points, lines, and rays for the figure, but does so incorrectly and without correctly identifying an obtuse or acute angle.	The student correctly draws the figure but is unable to identify an obtuse or acute angle.	The student correctly draws the figure to match directions but correctly identifies only one of the two angles. OR The student follows directions to complete the figure incorrectly but correctly identifies an acute and obtuse angle.	The student correctly draws all lines, line segments, and rays as stated. The student correctly identifies an acute and obtuse angle based on the figure drawn. (Note: Drawings and angles may differ for each student.)
2 **4.MD.6** **4.G.1**	The student correctly measures and classifies fewer than two of the three angles.	The student correctly measures and classifies at least two of the three angles, providing some reasoning.	The student correctly measures at least two of the three angles and classifies them all correctly. OR The student correctly measures all three angles but does not provide solid reasoning for classifying angles.	The student correctly measures and classifies all angles and correctly explains the classifications: a. 30°; acute; the angle measures less than 90°. b. 147°; obtuse; the angle measures greater than 90°. c. 90°; right; the angle measures exactly 90°.

A Progression Toward Mastery				
3 **4.MD.6** **4.G.1**	The student attempts to draw and identify lines but does so incorrectly.	The student attempts to draw the diagram according to given directions but is only able to create one set of perpendicular lines. There are no sets of parallel lines created and little reasoning about parallel lines.	The student correctly completes the drawing according to directions, identifying the parallel lines, but is unable to provide solid reasoning about why the lines are parallel. OR The student correctly identifies parallel lines and provides solid reasoning as to why specific lines are parallel but does not draw the figure as directed.	The student correctly draws and labels all points and lines, as well as identifies $\overleftrightarrow{ST}$ as parallel to $\overleftrightarrow{KL}$. The student correctly reasons that the lines are parallel because they are perpendicular to $\overleftrightarrow{PQ}$ or because they are an equal distance apart from each other. (Drawings will vary but must contain all required elements to be considered correct.)
4 **4.MD.5**	The student is unable to complete any part or is able to complete only one part of the problem.	The student correctly completes Part (b) and one of the three remaining parts.	The student correctly completes Part (b) and two of the three remaining parts.	The student correctly completes all four parts: a. Clock hands depict 3:00. b. Possible correct responses include 90° angle, right angle, or 270° angle c. 3:30. d. Four turns.
5 **4.MD.5**	The student is unable to complete either of the two parts.	The student correctly completes one of the two parts.	The student correctly answers Part (a) but only answers one question from Part (b) correctly.	The student correctly completes both parts of the problem: a. 270°. b. Each girl turned 90°. Each turned $\frac{1}{4}$ of a full turn.

A Progression Toward Mastery				
6 **4.MD.5** **4.MD.6** **4.G.1**	The student correctly completes four or fewer of the nine components.	The student correctly completes five or six of the nine components.	The student correctly completes seven or eight of the nine components.	The student correctly completes all nine components: a. $\angle FGD = 42°$ $\angle DGK = 138°$ $\angle KGN = 42°$ (The measurements above are accurate; however, allow ± 1 degree variance for student responses.) b. Sketch of a 138° angle, labeled with an arc and points. c. The student must include one of the following choices per part: Segment: $\overline{AB}$, $\overline{AC}$, $\overline{BC}$, $\overline{BD}$, $\overline{EF}$, $\overline{GH}$, $\overline{HJ}$, $\overline{KL}$. Right angle: $\angle ABD$, $\angle CBD$. Obtuse angle: $\angle GHJ$. Parallel lines: $\overline{KL} \parallel \overline{GH}$, $\overline{BD} \parallel \overline{EF}$. Perpendicular lines: $\overline{AC} \perp \overline{BD}$, $\overline{AB} \perp \overline{BD}$, $\overline{BC} \perp \overline{BD}$.

Name Jack Date _____

1. Follow the directions below to draw a figure in the box below. Use a straightedge.

   a. Draw 2 points, *A* and *B*.

   b. Draw $\overleftrightarrow{AB}$.

   c. Draw point *D* that is not on $\overleftrightarrow{AB}$.

   d. Draw $\overrightarrow{BD}$.

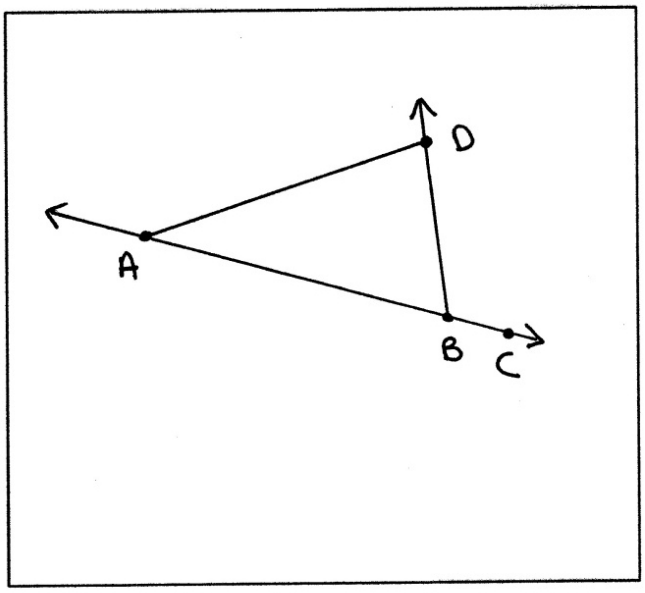
   e. Draw $\overline{AD}$.

   f. Name an acute angle.

   ∠BAD

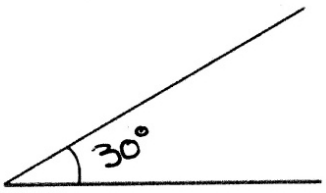
   g. Name an obtuse angle. You may have to draw and label another point.

   ∠DBC



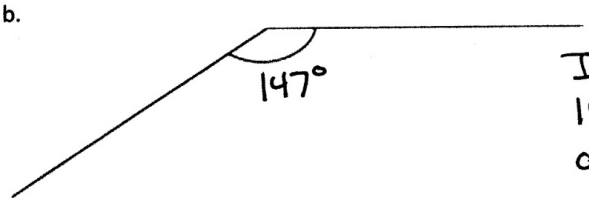
2. Use your protractor to measure the angle indicated by the arc. Classify each angle as right, acute, or obtuse. Explain how you know each angle's classification.

   a.



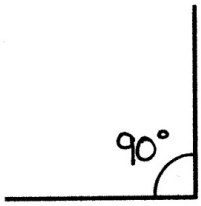
This is an acute angle. I know because it measures 30° which is less than a right angle.

b.



This is an obtuse angle. I know because it measures 147° which is greater than a right angle and less than 180°.

c.

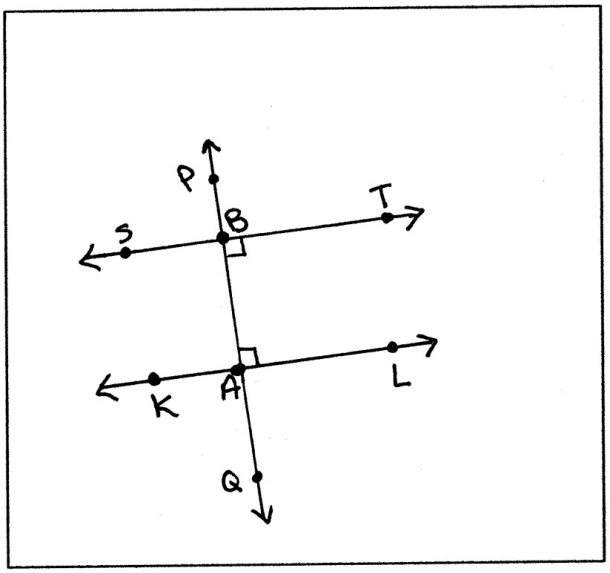


This is a right angle. It measures exactly 90°.

---

3. Use the following instructions to draw a figure in the box below.

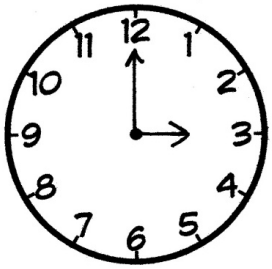
- Using a straightedge, draw a line. Label it $\overleftrightarrow{KL}$.
- Label a point *A* on $\overleftrightarrow{KL}$.
- Using your protractor and ruler, draw a line perpendicular to $\overleftrightarrow{KL}$ through point *A*.
- Label the perpendicular line $\overleftrightarrow{PQ}$.
- Label a point *B* on $\overleftrightarrow{PQ}$, other than point *A*.
- Using your protractor and straightedge, draw a line, $\overleftrightarrow{ST}$, perpendicular to $\overleftrightarrow{PQ}$ through point *B*.



Which lines are parallel in your drawing? Explain why.

$\overleftrightarrow{ST} \parallel \overleftrightarrow{KL}$ $\overleftrightarrow{ST}$ is parallel to $\overleftrightarrow{KL}$ because both of them are perpendicular to $\overleftrightarrow{PQ}$. It reminds me of the sides of a rectangle.

4. Use the clock to answer the following:



a. Use a straightedge to draw the hands as they would appear at 3:00.

b. What kind of angle is formed by the clock hands at 3:00?

A right angle

c. What time will it be when the minute hand has turned 180°?

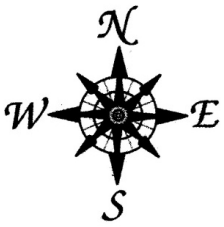
It will be 3:30.

d. How many 90° turns will the minute hand make between 3:00 and 4:00?

The minute hand will make four 90° turns between 3:00 and 4:00.

---

5. Use the compass rose to answer the following:



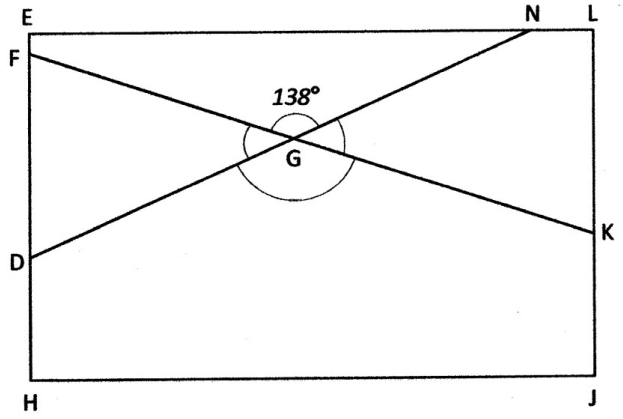
a. Maddy faced East. She turned to her right until she was facing North. How many degrees did she turn?

Maddy turned 270°.

b. Quanisha was facing North. She turned toward her right until she faced East. Alisha was facing South. She turned toward her right until she faced West. What fraction of a full turn did each girl complete? Through how many degrees did each girl turn?

Each girl completed $\frac{1}{4}$ of a full turn.
Each girl turned 90°.

6. The town of Seaford has a large rectangular park with a biking path around its perimeter and two straight-line biking paths that cut across it as shown in the diagram below.



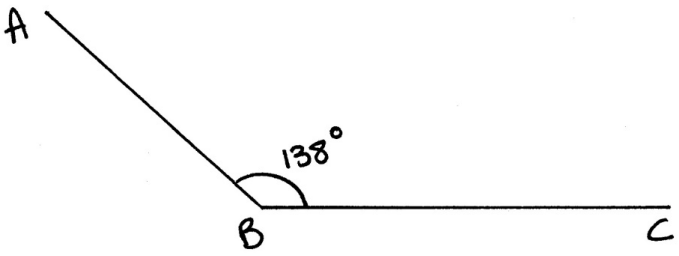
a. Find the measure of the following angles using a protractor.

∠FGD: 42°

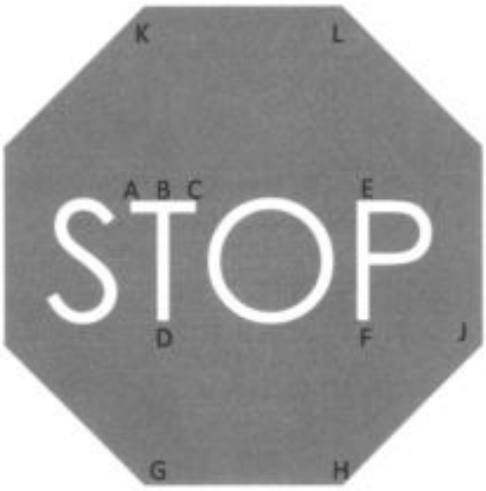
∠DGK: 138°

∠KGN: 42°

b. In the space below, use a protractor to draw an angle with the same measure as ∠DGK.



c. Below is a sign that bikers may encounter while riding in the park. Using the points in the figure below, identify a line segment, a right angle, an obtuse angle, a set of parallel lines, and a set of perpendicular lines. Write them in the table below.

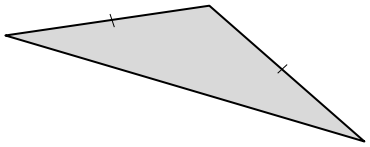


Line Segment	$\overline{EF}$
Right Angle	$\angle ABD$
Obtuse Angle	$\angle GHJ$
Parallel Lines	$\overline{KL} \parallel \overline{GH}$
Perpendicular Lines	$\overline{AC} \perp \overline{BD}$

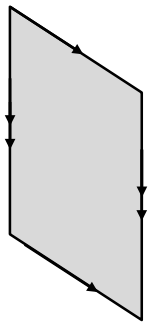
Name _____ Date _____

1. Find and draw all lines of symmetry in the following figures. If there are none, write "none."

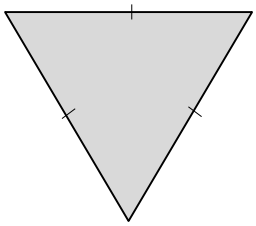
a.



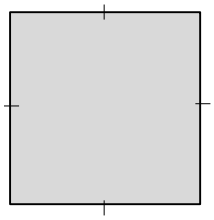
b.



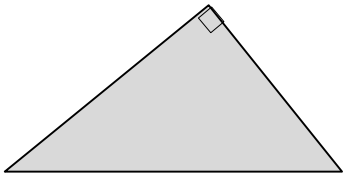
c.



d.



e.



f.

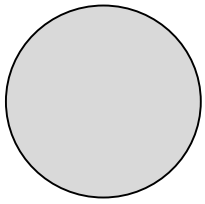
g. For each triangle listed below, state whether it is acute, obtuse, or right and whether it is isosceles, equilateral, or scalene.

Triangle a: _____ _____

Triangle c: _____ _____

Triangle e: _____ _____

h. How many lines of symmetry does a circle have? What point do all lines of symmetry for a given circle have in common?



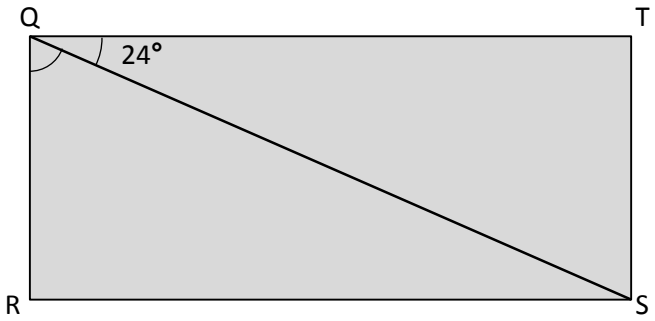
_____

_____

_____

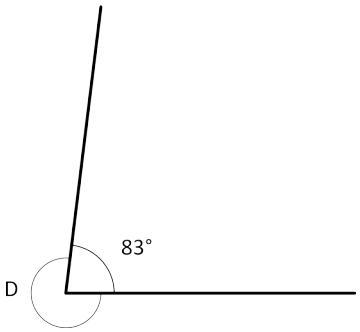
_____

2. In the following figure, QRST is a rectangle. Without using a protractor, determine the measure of ∠RQS. Write an equation that could be used to solve the problem.

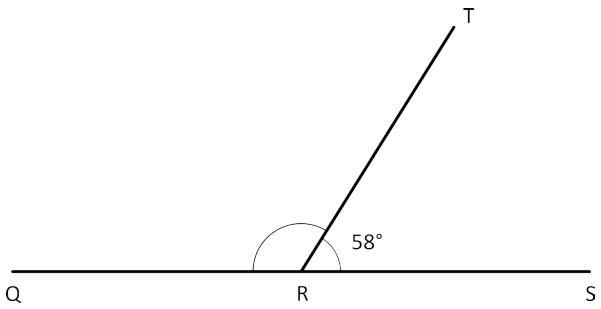


For each part below, explain how the measure of the unknown angle can be found without using a protractor.

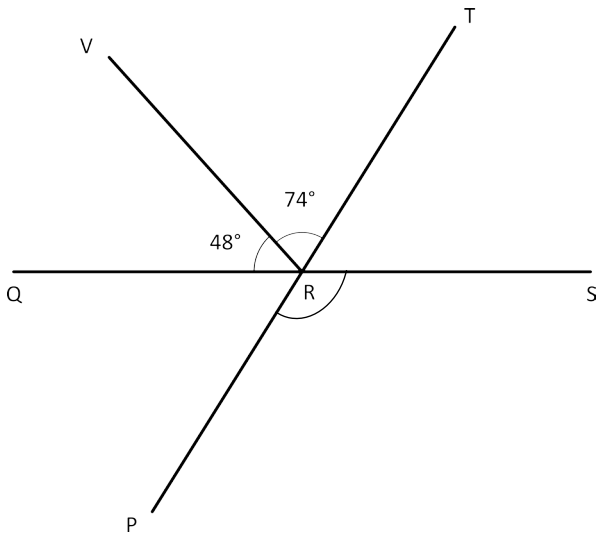
a. Find the measure of ∠D.



b. In this figure, Q, R, and S lie on a line. Find the measure of ∠*QRT*.



c. In this figure, Q, R, and S lie on a line, as do P, R, and T. Find the measure of ∠*PRS.*



3. Mike drew some two-dimensional figures.

Sketch the figures, and answer each part about the figures that Mike drew.

a. He drew a four-sided figure with four right angles. It is 4 cm long and 3 cm wide.

What type of quadrilateral did Mike draw?

How many lines of symmetry does it have?

b. He drew a quadrilateral with four equal sides and no right angles.

What type of quadrilateral did Mike draw?

How many lines of symmetry does it have?

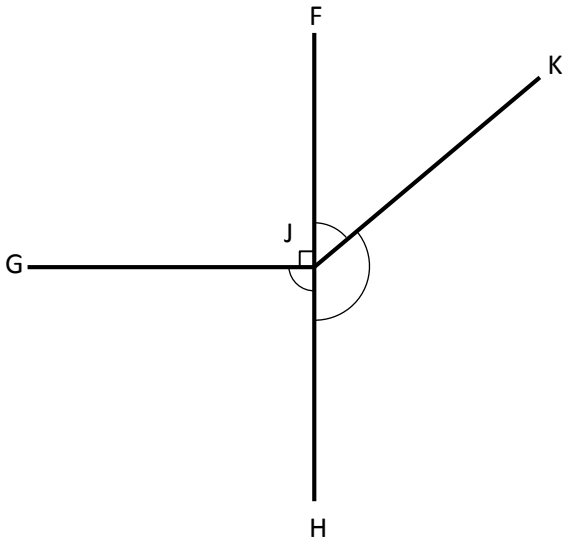
c. He drew a triangle with one right angle and sides that measure 6 cm, 8 cm, and 10 cm.

Classify the type of triangle Mike drew based on side length and angle measure.

How many lines of symmetry does it have?

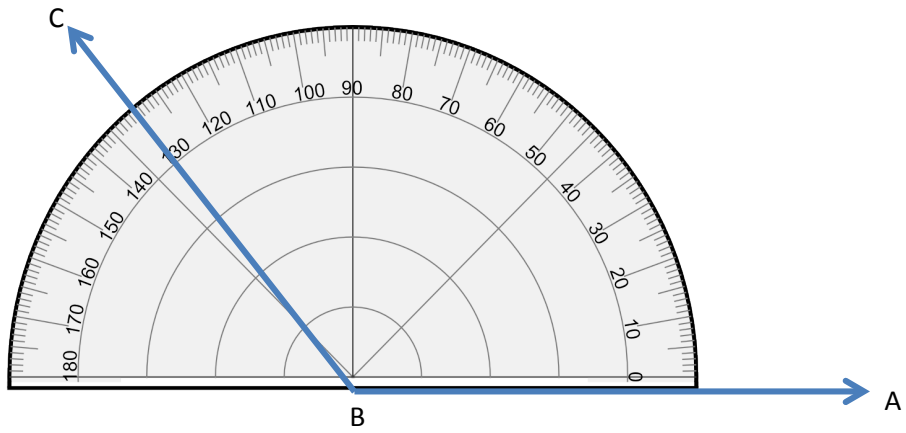
d. Using the dimensions given, draw the same shape that Mike drew in Part (c).

e. Mike drew this figure. Without using a protractor, find the sum of *∠FJK, ∠KJH, and ∠HJG.*

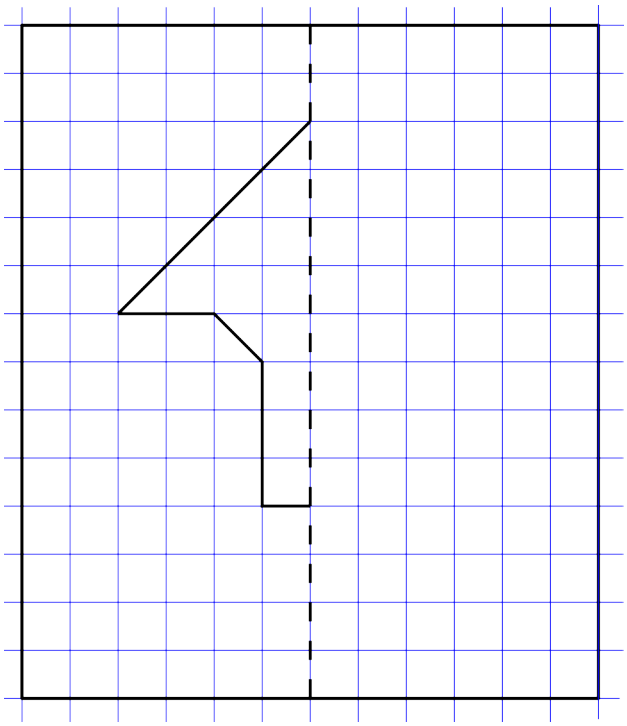


f. Points F, J, and H lie on a line. What is the measure of *∠KJH* if *∠FJK* measures 45°? Write an equation that could be used to determine the measure of *∠KJH.*

g. Mike used a protractor to measure ∠*ABC* as shown below and said the result was exactly 130°. Do you agree or disagree? Explain your thinking.



h. Below is half of a line-symmetric figure and its line of symmetry. Use a ruler to complete Mike's drawing.



End-of-Module Assessment Task Standards Addressed	Topics A–D

Geometric measurement: understand concepts of angle and measure angles.

4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.

b. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.

4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

4.MD.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

4.G.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right angles as a category, and identify right triangles.

4.G.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Evaluating Student Learning Outcomes

A Progression Toward Mastery is provided to describe steps that illuminate the gradually increasing understandings that students develop on their way to proficiency. In this chart, this progress is presented from left (Step 1) to right (Step 4). The learning goal for students is to achieve Step 4 mastery. These steps are meant to help teachers and students identify and celebrate what the students CAN do now and what they need to work on next.

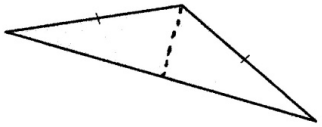
A Progression Toward Mastery				
Assessment Task Item and Standards Assessed	**STEP 1 Little evidence of reasoning without a correct answer. (1 Point)**	**STEP 2 Evidence of some reasoning without a correct answer. (2 Points)**	**STEP 3 Evidence of some reasoning with a correct answer or evidence of solid reasoning with an incorrect answer. (3 Points)**	**STEP 4 Evidence of solid reasoning with a correct answer. (4 Points)**
1 **4.G.2** **4.G.3**	The student correctly answers fewer than five of the eight parts and shows little to no reasoning.	The student correctly completes at least five of the parts but shows little evidence of reasoning in Part (h).	The student correctly completes six or seven of the eight parts, providing sufficient reasoning in Part (h). Or, the student answers all parts correctly but without solid reasoning in Part (h).	The student correctly draws all lines of symmetry, identifies figures with *none*, and answers Parts (g) and (h). a. 1 line. b. None. c. 3 lines. d. 4 lines. e. None. f. 2 lines. g. Triangle *a* is obtuse and isosceles. Triangle *c* is acute and equilateral. Triangle *e* is right and scalene. h. A circle has an infinite number of lines of symmetry. All lines of symmetry for a circle share the center point.

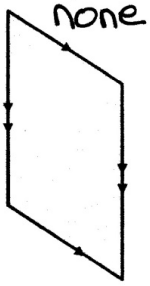
A Progression Toward Mastery				
2 **4.MD.7**	The student incorrectly determines the measure of ∠*RQS* and provides little to no reasoning.	The student shows some evidence of a correct equation or adequate reasoning but miscalculates the angle measure.	The student correctly identifies 66° with some evidence of a correct equation or adequate reasoning. Or, the student uses reasoning and an equation correctly but miscalculates the angle measure.	The student correctly identifies that ∠*RQS* and ∠*TQS* total 90°, so ∠*RQS* measures 66°, and includes an equation such as 24 + w = 90.
3 **4.MD.5** **4.MD.6** **4.MD.7**	The student correctly answers fewer than three parts, providing no reasoning.	The student correctly answers at least one of the three parts, providing little reasoning.	The student correctly finds the measures for two of the three parts, providing solid reasoning. Or, the student solves correctly all three parts but only provides some reasoning.	The student correctly answers all three parts with solid reasoning: a. ∠*D* = 277°. The number of degrees in a circle is 360, so ∠*D* is the difference between 83 and 360. b. ∠*QRT* = 122°. A line equals 180°, so ∠*QRT* must be equal to the difference between 180 and 58. c. ∠*PRS* = 122°. The measure of ∠*TRS* using $\overline{QRS}$ or ∠*QRP* using $\overline{PRT}$ is 58°, making ∠*PRS* equal to the difference between 180 and 58. The students may also determine that ∠*PRS* is equal to ∠*QRT* because of the two intersecting lines creating vertical angles. ∠*QRV* + ∠*VRT* = 122°. (Referencing vertical angles, although not necessary, is acceptable.)

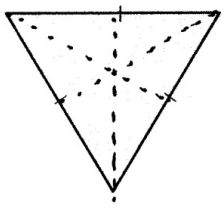
A Progression Toward Mastery				
4 **4.MD.5** **4.MD.6** **4.MD.7** **4.G.1** **4.G.2** **4.G.3**	The student correctly answers fewer than four of the eight parts.	The student correctly answers four or five of the eight parts.	The student correctly answers six or seven of the eight parts.	The student correctly answers all eight parts: a. Rectangle: 2 lines. b. Rhombus: 2 lines. c. Right, scalene triangle: No lines. d. Drawing depicts a right triangle with sides measuring 6 cm, 8 cm, and 10 cm. e. 270°. f. 135°: 45 + b = 180 or 180 – 45 = b. g. Mike lined the bottom ray up with the bottom edge of the protractor and not with the line that measures to zero. h. Drawing depicts a line-symmetric figure.

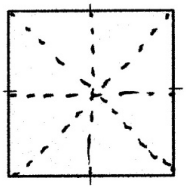
Name Jack Date _____

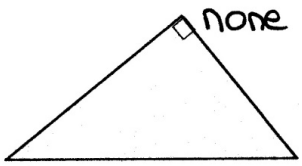
1. Find and draw all lines of symmetry in the following figures. If there are none, write "none."

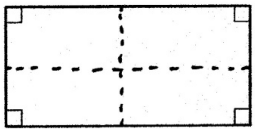
a. 

b. none 

c. 

d. 

e. none 

f. 

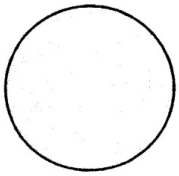
g. For each triangle listed below, state whether it is acute, obtuse, or right and whether it is isosceles, equilateral, or scalene.

Triangle a: obtuse isosceles

Triangle c: acute equilateral

Triangle e: right scalene

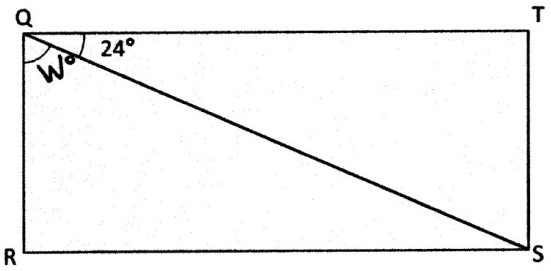
h. How many lines of symmetry does a circle have? What point do all lines of symmetry for a given circle have in common?



A circle has an infinite amount of lines of symmetry. All lines of symmetry for a circle pass through the center point.

2. In the following figure, QRST is a rectangle. Without using a protractor, determine the measure of ∠RQS.

   Write an equation that could be used to solve the problem.



$24° + W° = 90°$

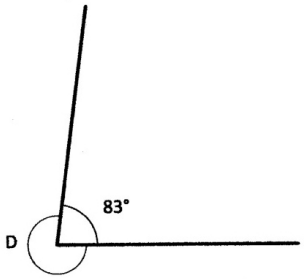
$\begin{array}{r} 8\,10 \\ 90 \\ -24 \\ \hline 66 \end{array}$

$W° = 66°$

$\angle RQS = 66°$

3. For each part below, explain how the measure of the unknown angle can be found without using a protractor.

   a. Find the measure of ∠D.



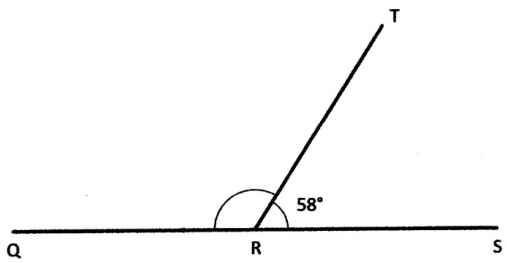
$\begin{array}{r} 15 \\ 2\,5\,10 \\ 3\,6\,\cancel{0} \\ -\ 83 \\ \hline 277 \end{array}$

$83° + \angle D = 360°$

$\angle D = 277°$

∠D is 277°. A circle measures 360°. If one angle is 83°, the other angle is the difference.

   b. In this figure, Q, R, and S lie on a line. Find the measure of ∠*QRT*.



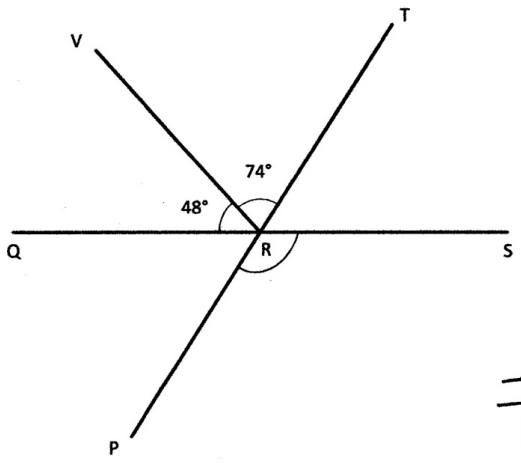
$58° + \angle QRT = 180°$

$\begin{array}{r} 7\,10 \\ 1\,\cancel{8}\,0 \\ -\ 58 \\ \hline 122 \end{array}$

$\angle QRT = 122°$

∠QRT is 122°. I know that because a line measures 180°, so ∠QRT and ∠TRS have to add to 180°.

c. In this figure, Q, R, and S lie on a line, as do P, R, and T. Find the measure of ∠*PRS*.



$48° + 74° + \angle TRS = 180°$

$48 + 74 = 122$

$180 - 122 = 58$

$\angle TRS = 58°$

$\angle TRS + \angle PRS = 180°$

$58° + \angle PRS = 180°$

$180 - 58 = 122$

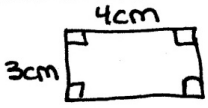
$\angle PRS = 122°$

Since Q, R, and S lie on a line, I know $48° + 74° + \angle TRS = 180°$. That means $\angle TRS = 58°$. Since P, R, and T lie on a line, I know $\angle TRS + \angle PRS = 180°$. That means $\angle PRS = 122°$.

4. Mike drew some two-dimensional figures.

Sketch the figures and answer each part about the figures that Mike drew.

a. He drew a four-sided figure with four right angles. It is 4 cm long and 3 cm wide.



What type of quadrilateral did Mike draw? rectangle

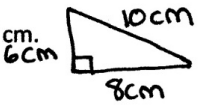
How many lines of symmetry does it have? 2 lines of symmetry

b. He drew a quadrilateral with four equal sides and no right angles.

What type of quadrilateral did Mike draw? rhombus

How many lines of symmetry does it have? 2 lines of symmetry

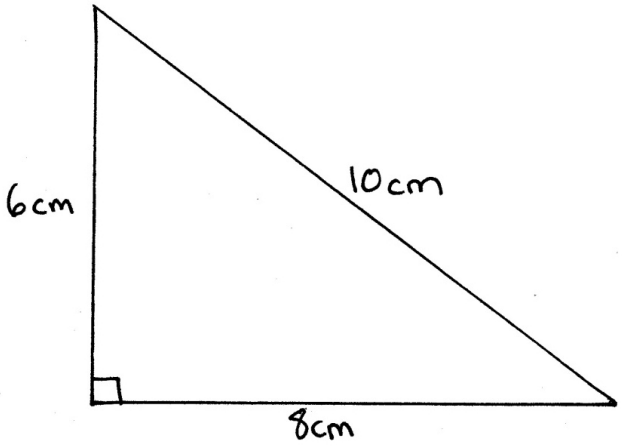
c. He drew a triangle with one right angle and sides that measure 6 cm, 8 cm, and 10 cm.



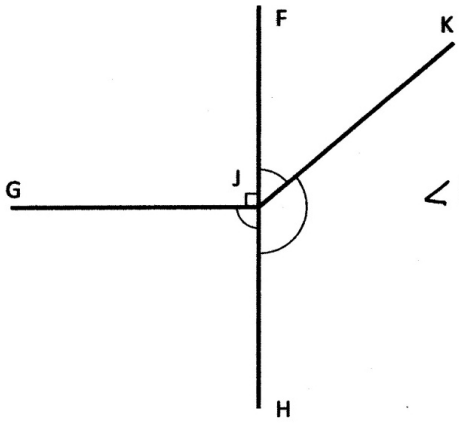
Classify the type of triangle Mike drew based on side length and angle measure. right triangle, scalene triangle

How many lines of symmetry does it have? no lines of symmetry

d. Using the dimensions given, draw the same shape Mike that drew in Part (c).



e. Mike drew this figure. Without using a protractor, find the sum of ∠*FJK*, ∠*KJH*, *and* ∠*HJG*.



$360° - 90° = 270°$

$\angle FJK + \angle KJH + \angle HJG = 270°$

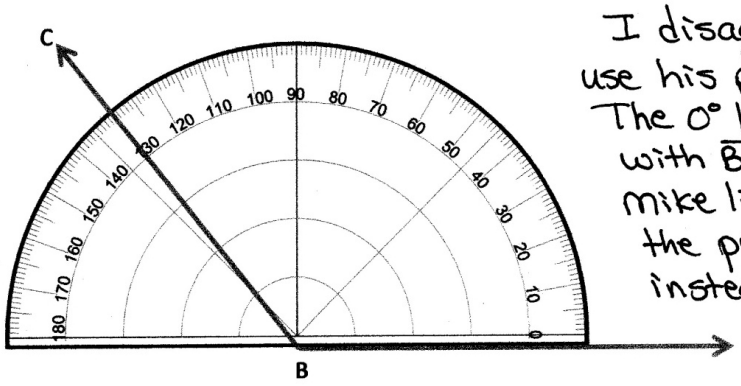
f. Points F, J, and H lie on a line. What is the measure of ∠*KJH* if ∠*FJK* measures 45°? Write an equation that could be used to determine the measure of ∠*KJH*.

$45° + \angle KJH = 180°$

$$\begin{array}{r} {}^{7}{}^{10} \\ 1\not{8}0 \\ -\ 45 \\ \hline 135 \end{array}$$

$\angle KJH = 135°$

g. Mike used a protractor to measure ∠*ABC* as shown below and said the result was exactly 130°. Do you agree or disagree? Explain your thinking.



I disagree. Mike didn't use his protractor correctly. The 0° line should match up with $\overline{BA}$, but it doesn't. Mike lined up the bottom of the protractor with $\overline{BA}$ instead.

h. Below is half of a line-symmetric figure and its line of symmetry. Use a ruler to complete Mike's drawing.