1. Draw a line segment to connect the word to its picture.

```
ray
line
line segment
point
angle
```

2. How is a line different from a line segment?

A line segment is part of a line and has two endpoints while a line continues on in both directions without endpoints.
1. Fill in the blanks to make true statements using one of the following words: acute, obtuse, right, straight.
   a. In class we made an \textbf{right} angle when we folded paper twice.
   b. An \textbf{acute} angle is smaller than a right angle.
   c. An \textbf{obtuse} angle is larger than a right angle but smaller than a straight angle.

2. Look at the following angles.

   \[ \text{A} \quad \text{B} \quad \text{C} \quad \text{D} \quad \text{E} \quad \text{F} \quad \text{G} \quad \text{H} \]

   a. Which angles are right angles? \textbf{C and G}
   b. Which angles are obtuse angles? \textbf{B and E}
   c. Which angles are acute angles? \textbf{A and D}
   d. Which angles are straight angles? \textbf{F and H}
Find all of the pairs of perpendicular lines in each figure. Mark with the right angle symbol then name them. Use your right angle template as a guide.

\[ \overline{BC} \perp \overline{CD} \]
\[ \overline{ED} \perp \overline{CD} \]

\[ \overline{MN} \perp \overline{MP} \]
1. Look at the following pairs of lines. Identify if they are parallel, perpendicular, or intersecting.

   a. parallel
   b. perpendicular
   c. intersecting
   d. intersecting
1. How many right angles make a full turn?
   Four right angles make one full turn.

2. What is the measurement of a right angle?
   The measurement of a right angle is 90 degrees.

3. What fraction of a full turn is 1 degree?
   One degree is \( \frac{1}{360} \) of a full turn.

4. Name at least four benchmark angle measurements.
   Four benchmark angle measurements are 90 degrees, 180 degrees, 270 degrees and 360 degrees.

Lesson 5: Use a circular protractor to understand a 1-degree angle as 1/360 of a turn. Explore benchmark angles using the protractor.
1. Use any protractor to measure the angles and then record the measurements in degrees.

   a. 
   b. 
   c. 
   d. 

   - 135° 
   - 153° 
   - 90°
1. Construct angles that measure the given number of degrees. Draw an arc to indicate the angle that was measured.

   a. $75^\circ$

   b. $105^\circ$

   c. $81^\circ$

   d. $99^\circ$
1. Marty was doing a handstand. Describe how many degrees his body will turn to be upright again.

Marty's body will turn 180 degrees to be upright again.

2. Jeffrey started riding his bike at the ★. He travelled north for 3 blocks, then turned 90° to the right and rode for 2 blocks. What direction was he headed? Sketch his route on the grid below. Each square unit represents 1 block.

Jeffrey was headed east.
1. Describe and sketch two combinations of the blue rhombus pattern block that create a straight angle.

\[ 60^\circ + 120^\circ = 180^\circ \]

2. Describe and sketch two combinations of the green triangle and yellow hexagon pattern block that create a straight angle.

\[ 60^\circ + 60^\circ + 60^\circ = 180^\circ \]

\[ 120^\circ + 60^\circ = 180^\circ \]
Write an equation and solve for $x$. $\angle TUV$ is a straight angle.

Equation: $53^\circ + x^\circ + 67^\circ = 180^\circ$

$x^\circ = 60^\circ$
Write equations using variables to represent the unknown angle measurements. Find the unknown angle measurements numerically.

1. \( x^\circ = \)

\[
\begin{align*}
  x^\circ + y^\circ &= 180^\circ \\
  x^\circ + 156^\circ &= 180^\circ \\
  x^\circ &= 24^\circ 
\end{align*}
\]

2. \( y^\circ = \)

\[
\begin{align*}
  y^\circ + z^\circ &= 180^\circ \\
  y^\circ + 24^\circ &= 180^\circ \\
  y^\circ &= 156^\circ 
\end{align*}
\]

3. \( z^\circ = \)

\[
\begin{align*}
  96^\circ + 66^\circ + z^\circ &= 180^\circ \\
  z^\circ &= 24^\circ 
\end{align*}
\]
1. Is the line drawn a line of symmetry? Circle your choice.

   ![Diagram with options: Yes or No]

2. Draw as many lines of symmetry as you can find in the figure below.

   ![Figure with lines of symmetry]
Use appropriate tools to solve the following problems.

1. The triangles below have been sorted by shared attributes (side length or angle type). Use the words acute, right, obtuse, scalene, isosceles, or equilateral to label the headings to identify the way the triangles have been sorted.

   - **Acute**
   - **Isosceles**
   - **Right**

2. Draw a line to identify each triangle according to angle type and side length.

3. Identify and draw any lines of symmetry in the triangles in Problem 2.
1. Draw an obtuse isosceles triangle, and then draw any lines of symmetry if they exist.

2. Draw a right scalene triangle, and then draw any lines of symmetry if they exist.

3. Every triangle has at least 2 acute angles.
1. In the space below, draw a parallelogram.

2. Explain why a rectangle is a special parallelogram.

A rectangle is a special parallelogram because all the angles are 90° angles. Although all rectangles are parallelograms (4-sided shapes where opposite sides are parallel) all parallelograms are not rectangles.
1. Construct a parallelogram that does not have any right angles on a rectangular grid.

2. Construct a rectangle on a triangular grid.
1. Follow the directions below to draw a figure in the box below. Use a straightedge.
   a. Draw 2 points. Label one point as A, the other point as B.
   b. Draw $\overline{AB}$.
   c. Draw point D that is not on $\overline{AB}$.
   d. Draw $\overline{BD}$.
   e. Draw $\overline{AD}$.
   f. Name an acute angle. 
      \[ \angle BAD \]
   g. Name an obtuse angle. You may have to draw and label another point.
      \[ \angle CBD \]

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.

c. This is a right angle because it measures exactly 90°.

3. In the box below, follow the instructions to draw a figure.

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

Which lines are parallel in your drawing? Explain why.

$\overline{ST} \parallel \overline{KL}$ Line $\overline{ST}$ and line $\overline{KL}$ are parallel because they will never touch. They will always be the same distance apart.

(intersect)
4. Use the clock to answer questions a, b, c and d below.
   a. Use your ruler 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 90°
   
   c. What time will it be when the minute hand has turned 180°?
      
      3:30
   
   d. How many 90° turns will the minute hand make between 3:00 and 4:00?
      
      4 turns

5. Use the compass rose to answer questions a and b below.

   a. Maddy faced East. She turned to her right until she was facing North. How many degrees did she turn?
      
      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 turned \( \frac{1}{4} \) of a full turn, or 90° each.
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.

![Diagram of the park with biking paths]

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

$\angle FGD: 42^\circ$

$\angle DGK: 138^\circ$

$\angle KGN: 42^\circ$

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

![Diagram to draw an angle]
c. Below is a sign that bikers may encounter while riding in the park. Using the points in the figure below, identify a segment, a right and obtuse angle, and a set of parallel and perpendicular lines in the table below.

```
<table>
<thead>
<tr>
<th>Segment</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Angle</td>
<td>(\angle ABD)</td>
</tr>
<tr>
<td>Obtuse Angle</td>
<td>(\angle GHJ)</td>
</tr>
<tr>
<td>Parallel Line</td>
<td>(KL \parallel GH)</td>
</tr>
<tr>
<td>Perpendicular Line</td>
<td>(AC \perp BD)</td>
</tr>
</tbody>
</table>
```
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 above, 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 \(\angle RQS\).

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

\[
24^\circ + Q = 90^\circ
\]

\[
\frac{8.10}{9.0}
\]

\[
\frac{-24}{6.6}
\]

\(Q = 66^\circ\)

\(\angle RQS\) is \(66^\circ\).

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

a. Find the measure of angle D.

\[
\begin{align*}
2.5 & \text{ \hspace{1cm} } 10 \\
8.0 & \hspace{1cm} 8.3 \\
\_ & \hspace{1cm} \_ \\
27.7 & \\
\end{align*}
\]

\(\angle D\) is \(277^\circ\) because a circle measures \(360^\circ\). If one angle is \(83^\circ\), the other angle is the difference.

\(83^\circ + \angle D = 360^\circ\)

\(\angle D = 277^\circ\)

b. In this figure, Q, R, and S lie on a line. Find the measure of \(\angle QRT\).

\[
\begin{align*}
58^\circ & \text{ \hspace{1cm} } \angle QRT = 180^\circ \\
\frac{7}{18.8} & \hspace{1cm} -58 \\
\_ & \hspace{1cm} \_ \\
122 & \\
\_ & \hspace{1cm} \_ \\
122 & \\
R & = 122
\end{align*}
\]

\(\angle QRT\) is \(122^\circ.\)

I know that because a line measures \(180^\circ\) so \(\angle QRT\) plus \(\angle TBS\) have to add up to \(180^\circ.\)
c. Q, R, and S lie on a line, as do P, R, and T. Find the measure of \( \angle PRS \).

\[
\begin{align*}
48^\circ + 74^\circ &= \angle PRS \\
48 + 74 &= 122 \\
\therefore \angle PRS &= 122^\circ
\end{align*}
\]

\( \angle PRS \) is 122°.

I know that because there are 2 straight lines, \( \angle QRT \) is equal to \( \angle PRS \).

So since \( \angle QRV + \angle VRT = 122^\circ \)

that means that \( \angle PRS \) is 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

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

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 scalene

How many lines of symmetry does it have? No lines of symmetry
d. Using a ruler and a protractor, draw the same shape Mike drew in part c.

![Diagram of a triangle with sides 6 cm, 8 cm, and 10 cm.]

e. Mike drew this diagram. Without using a protractor, find the sum of $\angle FJK$, $\angle KJH$, and $\angle HJG$.

![Diagram of a quadrilateral with points F, J, K, and H.]

$360° - 90° = 270°$

$\angle FJK$, $\angle KJH$ and $\angle HJG$

add up to $270°$.

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

$45° + J = 180°$

$\begin{align*}
45° & \quad \text{isolate } J \\
135° & \quad \text{subtract } 45° \\
\hline
J & \quad 90°
\end{align*}$

$\angle KJH$ is $135°$

$J = 90°$
g. Mike used a protractor to measure \(\angle ABC\) as shown below, and said the result was exactly 130°. What was Mike's mistake?

Mike's mistake was he lined up the bottom of his protractor to \(\overrightarrow{BA}\). He should have lined up \(\overrightarrow{BA}\) with the 0° or 180° line on the protractor.

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