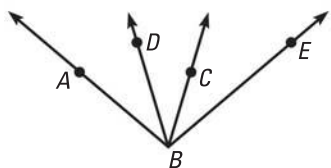## Lessons 2.5–2.7

1. **MULTI-STEP PROBLEM** In the diagram below, $\overrightarrow{BD}$ bisects $\angle ABC$ and $\overrightarrow{BC}$ bisects $\angle DBE$.

   a. Prove $m\angle ABD = m\angle CBE$.

   b. If $m\angle ABE = 99°$, what is $m\angle DBC$? *Explain*.

2. **SHORT RESPONSE** You are cutting a rectangular piece of fabric into strips that you will weave together to make a placemat. As shown, you cut the fabric in half lengthwise to create two congruent pieces. You then cut each of these pieces in half lengthwise. Do all of the strips have the same width? *Explain* your reasoning.
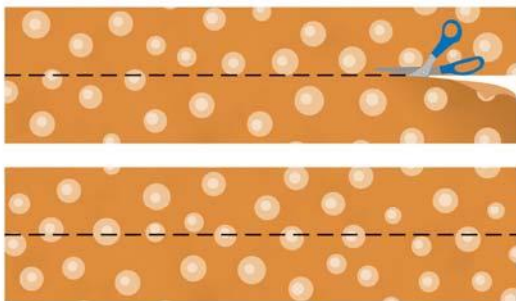
3. **GRIDDED ANSWER** The cross section of a concrete retaining wall is shown below. Use the given information to find the measure of $\angle 1$ in degrees.
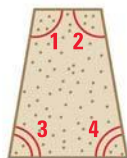
   $m\angle 1 = m\angle 2$

   $m\angle 3 = m\angle 4$

   $m\angle 3 = 80°$

   $m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 = 360°$

4. **EXTENDED RESPONSE** *Explain* how the Congruent Supplements Theorem and the Transitive Property of Angle Congruence can both be used to show how angles that are supplementary to the same angle are congruent.

5. **EXTENDED RESPONSE** A formula you can use to calculate the total cost of an item including sales tax is $T = c(1 + s)$, where T is the total cost including sales tax, c is the cost not including sales tax, and s is the sales tax rate written as a decimal.

   a. Solve the formula for s. Give a reason for each step.

   b. Use your formula to find the sales tax rate on a purchase that was $26.75 with tax and $25 without tax.

   c. Look back at the steps you used to solve the formula for s. Could you have solved for s in a different way? *Explain*.

6. **OPEN-ENDED** In the diagram below, $m\angle GAB = 36°$. What additional information do you need to find $m\angle BAC$ and $m\angle CAD$? *Explain* your reasoning.
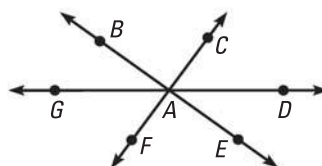
7. **SHORT RESPONSE** Two lines intersect to form $\angle 1$, $\angle 2$, $\angle 3$, and $\angle 4$. The measure of $\angle 3$ is three times the measure of $\angle 1$ and $m\angle 1 = m\angle 2$. Find all four angle measures. *Explain* your reasoning.

8. **SHORT RESPONSE** Part of a spider web is shown below. If you know that $\angle CAD$ and $\angle DAE$ are complements and that $\overrightarrow{AB}$ and $\overrightarrow{AF}$ are opposite rays, what can you conclude about $\angle BAC$ and $\angle EAF$? *Explain* your reasoning.