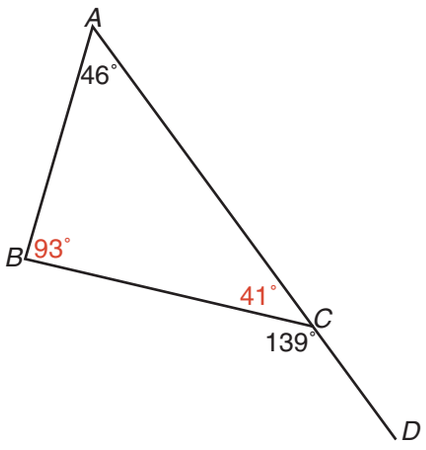
Unit 4: Geometry Lesson 4.2

Coach's Corner – III

1 Determine all the unknown angles in the following diagrams. Explain your reasoning.

a.



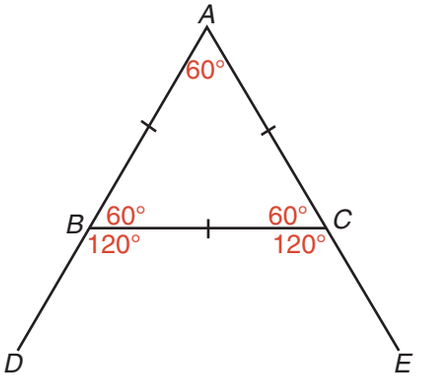
$\angle BCD$ and $\angle ACB$ are supplementary so $\angle BCD + \angle ACB = 180^\circ$.

$$\angle BCD + \angle ACB = 180^\circ$$
$$139^\circ + \angle ACB = 180^\circ$$
$$\angle ACB = 41^\circ$$

$\angle A$, $\angle B$, and $\angle ACB$ form a triangle so $\angle A + \angle B + \angle ACB = 180^\circ$.

$$\angle A + \angle B + \angle ACB = 180^\circ$$
$$46^\circ + \angle B + 41^\circ = 180^\circ$$
$$\angle B = 93^\circ$$

b.



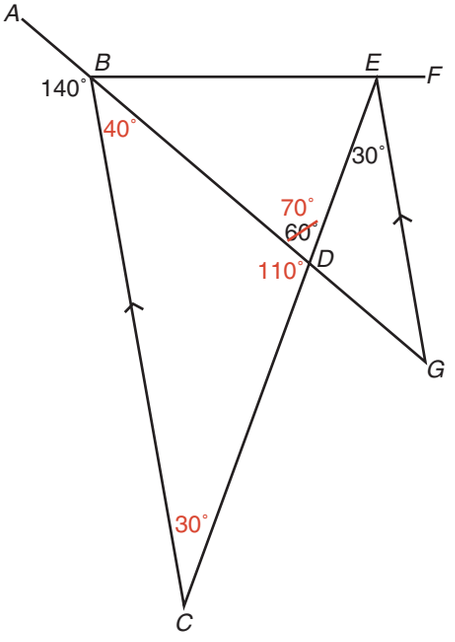
ΔABC is equilateral so it has three equal interior angles. These angles must sum to 180° so each angle must be 60°.

$\angle ABC$ and $\angle CBD$ are supplementary so $\angle ABC + \angle CBD = 180^\circ$.

$$\angle ABC + \angle CBD = 180^\circ$$
$$60^\circ + \angle CBD = 180^\circ$$
$$\angle CBD = 120^\circ$$

Similarly, $\angle BCE = 120^\circ$.

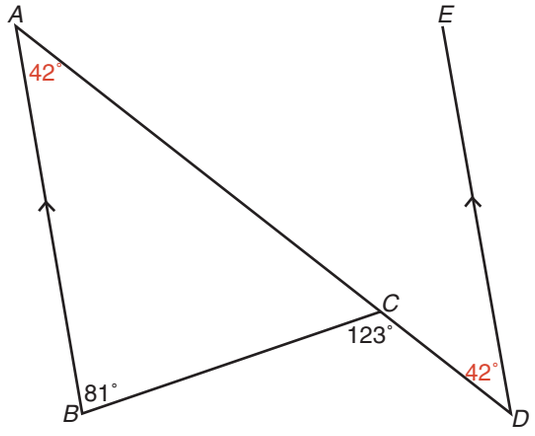
2. Jane drew the following diagram. Explain whether or not Jane's diagram is reasonable.



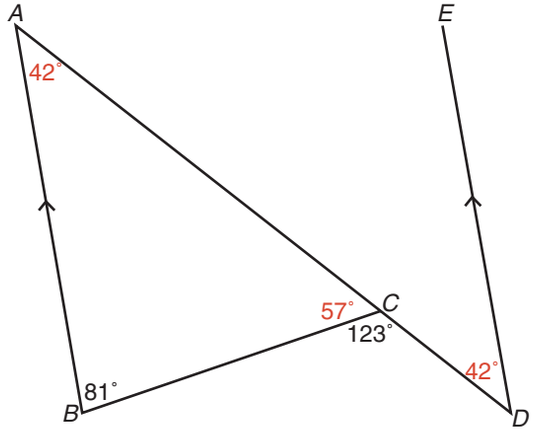
Jane's diagram is not reasonable. Determining other angles will show that there is a contradiction in the angles given. A sample set of angles is shown. Note that different contradictions may be observed by starting to work with different angles.

3. Using the diagram below, prove that $\angle D = 42°$.

Proofs may vary, two samples are shown.



Statement	Justification
$\angle A = 42°$	An external angle is equal to the sum of the non-adjacent interior angles of a triangle so $\angle DCB = \angle A + \angle B$
$\angle D = 42°$	Alternate interior angles



Statement	Justification
$\angle ACB = 57°$	It is supplementary to $\angle BCD$
$\angle A = 42°$	Triangle interior angles sum to 180°
$\angle D = 42°$	Alternate interior angles

Please return to *Unit 4: Geometry Lesson 4.2* and continue your training.