Chapter 3 Triangles

3.4 Basic Constructions Justified

Basic Constructions Justified

In this section, we justify the construction methods and apply them in further constructions.

The justification of the method is a “proof” that demonstrates that the construction accomplished its purpose.

Example 1

Justify the method for constructing an angle congruent to a given angle.

Given: $\angle ABC$

$\overline{BD} \cong \overline{BE} \cong \overline{ST} \cong \overline{SR}$ (by construction)

$\overline{DE} \cong \overline{TR}$ (by construction)

Prove:

$\angle B \cong \angle S$

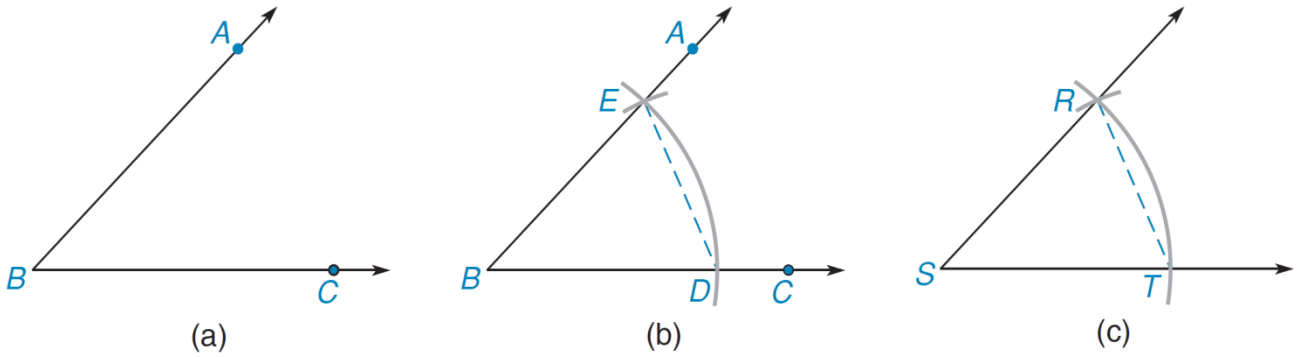

Figure 3.38

Example 1

cont'd

Proof:

	Statements	Reasons
1.	$\angle ABC; \overline{BD} \cong \overline{BE} \cong \overline{ST} \cong \overline{SR}$	1. Given
2.	$\overline{DE} \cong \overline{TR}$	2. Given
3.	$\triangle EBD \cong \triangle RST$	3. SSS
4.	$\angle B \cong \angle S$	4. CPCTC

Basic Constructions Justified

The angle bisector method can be used to construct angles of certain measures.

For instance, if a right angle has been constructed, then an angle of measure 45° can be constructed by bisecting the 90° angle.

To construct a regular polygon with n sides:

1. Each interior angle must measure $I = \frac{(n - 2)180}{n}$ degrees; alternatively, each exterior angle must measure $E = \frac{360}{n}$ degrees.
2. All sides must be congruent.