4 Lesson Practice Level B

LESSON 4.1

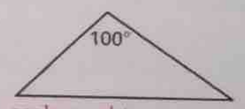
Practice B

For use with pages 216–224

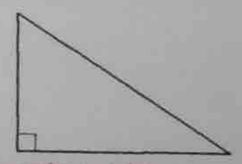
Complete the sentence with *always, sometimes,* or *never.*

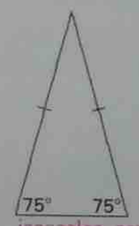
1. An isosceles triangle is __?__ a right triangle. sometimes
2. An obtuse triangle is __?__ a right triangle. never
3. A right triangle is __?__ an equilateral triangle. never
4. A right triangle is __?__ an isosceles triangle. sometimes

Classify the triangle by its sides and by its angles.

5. 

scalene, obtuse

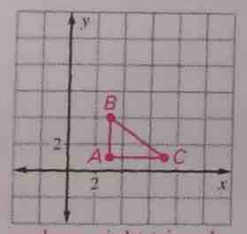
6. 
scalene, right

7. 

isosceles, acute

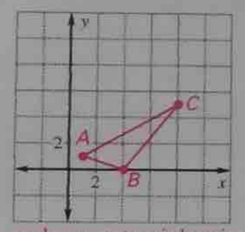
A triangle has the given vertices. Graph the triangle and classify it by its sides. Then determine if it is a right triangle.

8. $A(3, 1), B(3, 4), C(7, 1)$



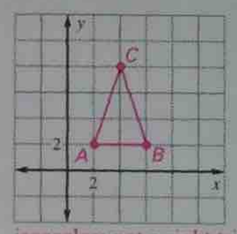
scalene; right triangle

9. $A(1, 1), B(4, 0), C(8, 5)$



scalene; not a right triangle

10. $A(2, 2), B(6, 2), C(4, 8)$

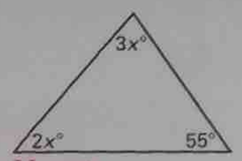


isosceles; not a right triangle

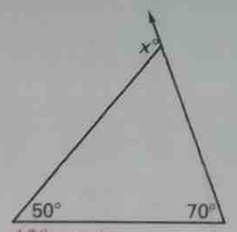
Find the value of *x*. Then classify the triangle by its angles.

11. 

30; right

12. 

25; acute

13. 

120; acute

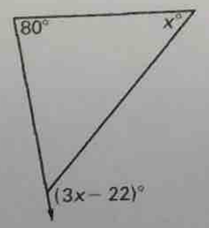
LESSON 4.1

LESSON 4.1

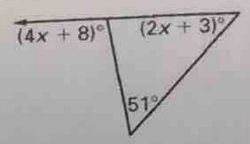
Practice B *continued*

For use with pages 216–224

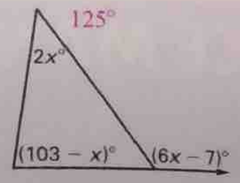
Find the measure of the exterior angle shown.

14. 

131°

15. 

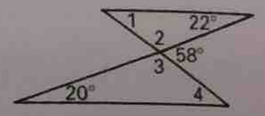
100°

16. 

125°

Find the measure of the numbered angle.

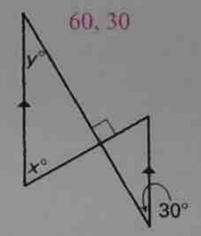
17. $\angle 1$ 36°
18. $\angle 2$ 122°
19. $\angle 3$ 122°
20. $\angle 4$ 38°



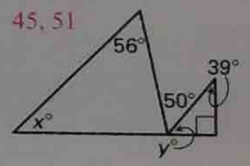
21. In $\triangle ABC$, $m\angle A = m\angle B + 30°$ and $m\angle C = m\angle B + 60°$. Find the measure of each angle. $m\angle A = 60°, m\angle B = 30°, m\angle C = 90°$

22. In $\triangle ABC$, $m\angle A = 2(m\angle B)$ and $m\angle C = 3(m\angle B)$. Find the measure of each angle. $m\angle A = 60°, m\angle B = 30°, m\angle C = 90°$

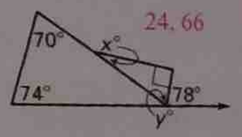
Find the values of *x* and *y*.

23. 

60, 30

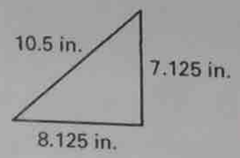
24. 

45, 51

25. 

24, 66

26. **Metal Brace** The diagram shows the dimensions of a metal brace used for strengthening a vertical and horizontal wooden junction. Classify the triangle formed by its sides. Then copy the triangle, measure the angles, and classify the triangle by its angles. scalene; right



LESSON 4.2

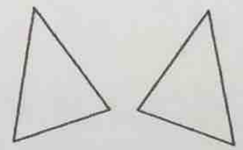
Practice B

LESSON 4.2

Practice B

For use with pages 225–231

1. Copy the congruent triangles shown at the right. Then label the vertices of your triangles so that $\triangle AMT \cong \triangle CDN$. Identify all pairs of congruent corresponding angles and corresponding sides.



Check student diagram; $\overline{AM} \cong \overline{CD}$; $\overline{AT} \cong \overline{CN}$; $\overline{MT} \cong \overline{DN}$; $\angle A \cong \angle C$; $\angle M \cong \angle D$; $\angle T \cong \angle N$

In the diagram, $\triangle TJM \cong \triangle PHS$. Complete the statement.

2. $\angle P \cong$? $\angle T$

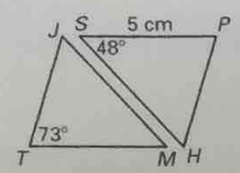
3. $\overline{JM} \cong$? $\overline{HS}$

4. $m\angle M =$? $48°$

5. $m\angle P =$? $73°$

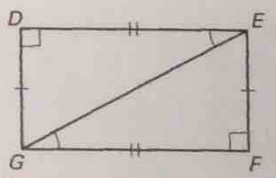
6. $MT =$? 5 cm

7. $\triangle HPS \cong$? $\triangle JTM$



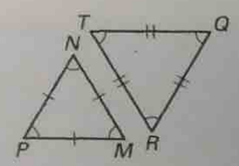
Write a congruence statement for any figures that can be proved congruent. *Explain* your reasoning.

8.



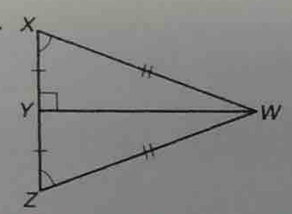
$\triangle DEG \cong \triangle FGE$; all corresponding sides and angles are congruent.

9.



none

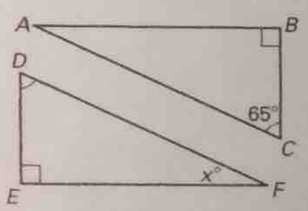
10.



$\triangle XWY \cong \triangle ZWY$; all corresponding sides and angles are congruent.

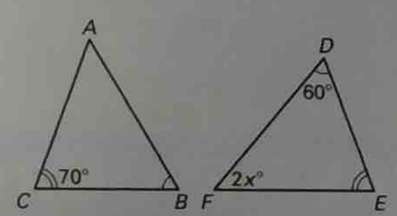
Find the value of *x*.

11.



25

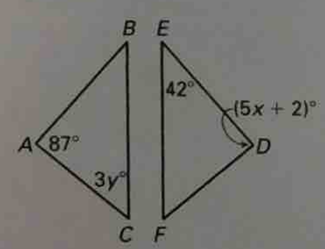
12.



25

In Exercises 13 and 14, use the given information to find the indicated values.

13. Given $\triangle ABC \cong \triangle DEF$, find the values of x and y. 17, 17



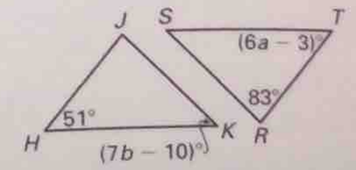
LESSON 4.2

LESSON 4.2

Practice B *continued*

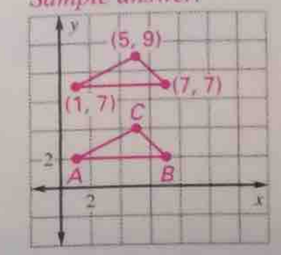
For use with pages 225–231

14. Given $\triangle HJK \cong \triangle TRS$, find the values of a and b. 9, 8



15. Graph the triangle with vertices $A(1, 2)$, $B(7, 2)$, and $C(5, 4)$. Then graph a triangle congruent to $\triangle ABC$.

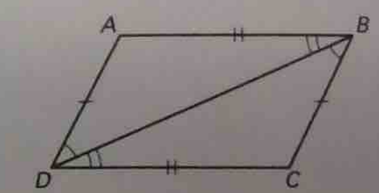
Sample answer:



16. Proof Complete the proof.

GIVEN: $\angle ABD \cong \angle CDB$, $\angle ADB \cong \angle CBD$, $\overline{AD} \cong \overline{BC}$, $\overline{AB} \cong \overline{DC}$

PROVE: $\triangle ABD \cong \triangle CDB$



Statements	Reasons
1. $\angle ABD \cong \angle CDB$, $\angle ADB \cong \angle CBD$, $\overline{AD} \cong \overline{BC}$, $\overline{AB} \cong \overline{DC}$	**1.** Given
2. $\overline{BD} \cong \overline{BD}$	**2.** ? Reflexive Property of Congruence
3. ? $\angle A \cong \angle C$	**3.** Third Angles Theorem
4. $\triangle ABD \cong \triangle CDB$	**4.** ? Definition of congruence

17. Carpet Designs A carpet is made of congruent triangles. One triangular shape is used to make all of the triangles in the design. Which property guarantees that all the triangles are congruent? Transitive Property of Congruent Triangles

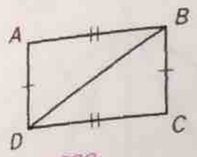
LESSON 4.3

Practice B

For use with pages 233–239

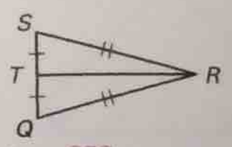
Decide whether the congruence statement is true. *Explain* your reasoning.

1. $\triangle ABD \cong \triangle CDB$



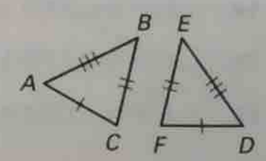
true; SSS

2. $\triangle RST \cong \triangle RQT$



true; SSS

3. $\triangle ABC \cong \triangle DEF$



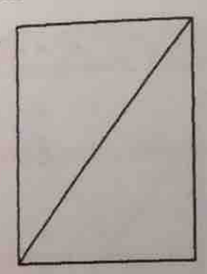
true; SSS

Use the given coordinates to determine if $\triangle ABC \cong \triangle DEF$.

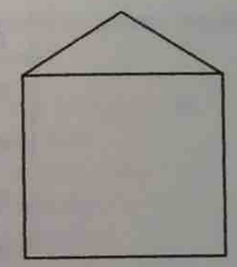
4. $A(1, 2), B(4, -3), C(2, 5), D(4, 7), E(7, 2), F(5, 10)$ congruent
5. $A(1, 1), B(4, 0), C(7, 5), D(4, -5), E(6, -6), F(9, -1)$ not congruent
6. $A(2, -2), B(5, 1), C(4, 8), D(7, 5), E(10, 8), F(9, 13)$ not congruent
7. $A(-3, 0), B(6, 2), C(-1, 9), D(4, -10), E(13, -8), F(6, -1)$ congruent

Decide whether the figure is stable. *Explain* your reasoning. See below.

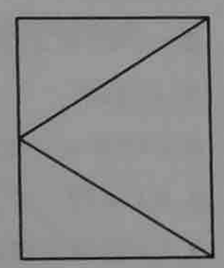
8.



9.

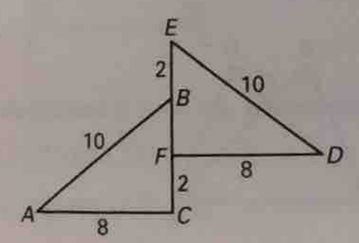


10.



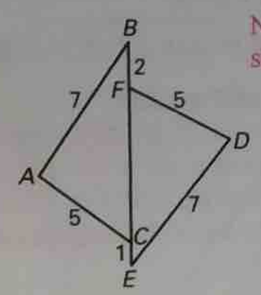
Determine whether $\triangle ABC \cong \triangle DEF$. *Explain* your reasoning.

11.



Yes; the corresponding sides are congruent.

12.



No; the corresponding sides are not congruent.

8. Stable; the figure forms triangles of fixed side lengths which cannot change shape by the SSS Congruence Postulate.

9. Not stable; there are many possible shapes for a four-sided figure with the given side lengths.

10. Stable; the figure forms triangles of fixed side lengths which cannot change shape by the SSS Congruence Postulate.

LESSON 4.3

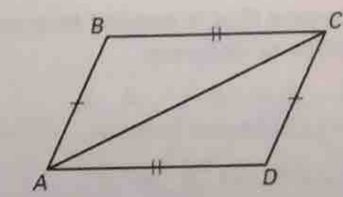
Practice B *continued*

For use with pages 233–239

13. **Proof** Complete the proof.

GIVEN: $\overline{AB} \cong \overline{CD}$, $\overline{BC} \cong \overline{AD}$

PROVE: $\triangle ABC \cong \triangle CDA$

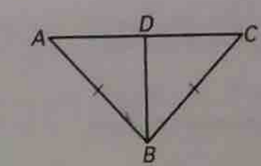


Statements	Reasons
1. $\overline{AB} \cong \overline{CD}$	1. ? Given
2. $\overline{BC} \cong \overline{AD}$	2. ? Given
3. $\overline{AC} \cong \overline{AC}$	3. ? Reflexive Property of Congruence
4. $\triangle ABC \cong \triangle CDA$	4. ? SSS Congruence Postulate

14. **Proof** Complete the proof.

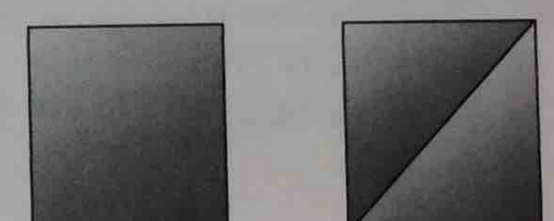
GIVEN: $\overline{AB} \cong \overline{CB}$, D is the midpoint of $\overline{AC}$

PROVE: $\triangle ABD \cong \triangle CBD$



Statements	Reasons
1. $\overline{AB} \cong \overline{CB}$	1. ? Given
2. D is the midpoint of $\overline{AC}$	2. ? Given
3. $\overline{AD} \cong \overline{CD}$	3. ? Definition of midpoint
4. $\overline{BD} \cong \overline{BD}$	4. ? Reflexive Property of Congruence
5. $\triangle ABD \cong \triangle CBD$	5. ? SSS Congruence Postulate

15. **Picture Frame** The backs of two different picture frames are shown below. Which picture frame is stable? *Explain* your reasoning.



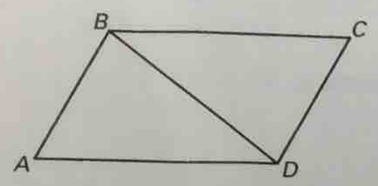
The second picture frame is stable because the brace and the sides form triangles of fixed side lengths which cannot change shape by the SSS Congruence Postulate.

Practice B

For use with pages 240–246

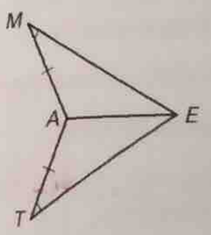
Use the diagram to name the included angle between the given pair of sides.

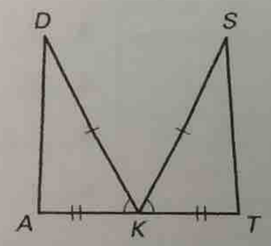
1. $\overline{AB}$ and $\overline{BC}$ $\angle ABC$
2. $\overline{BC}$ and $\overline{CD}$ $\angle BCD$
3. $\overline{AB}$ and $\overline{BD}$ $\angle ABD$
4. $\overline{BD}$ and $\overline{DA}$ $\angle BDA$
5. $\overline{DA}$ and $\overline{AB}$ $\angle DAB$
6. $\overline{CD}$ and $\overline{DB}$ $\angle CDB$

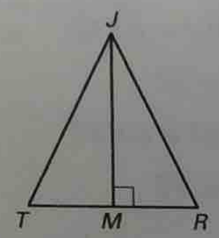


Decide whether enough information is given to prove that the triangles are congruent using the SAS Congruence Postulate.

7. $\triangle MAE, \triangle TAE$ not enough
8. $\triangle DKA, \triangle TKS$ enough
9. $\triangle JRM, \triangle JTM$ not enough

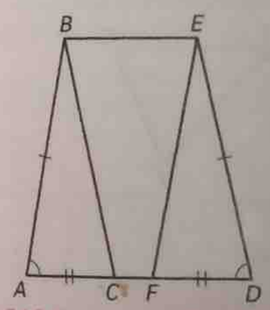




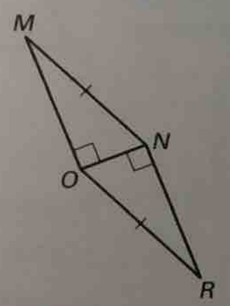


Decide whether enough information is given to prove that the triangles are congruent. If there is enough information, state the congruence postulate or theorem you would use.

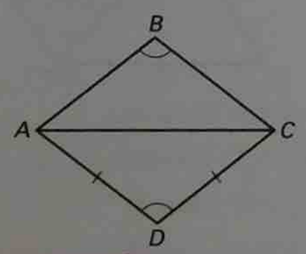
10. $\triangle ABC, \triangle DEF$
11. $\triangle MNO, \triangle RON$
12. $\triangle ABC, \triangle ADC$



Yes, SAS Congruence Postulate



Yes, HL Congruence Theorem



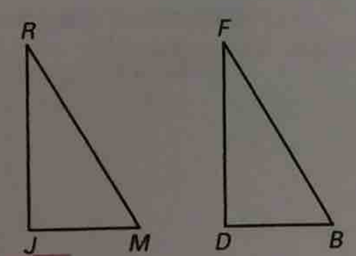
not enough

State the third congruence that must be given to prove that $\triangle JRM \cong \triangle DFB$ using the indicated postulate.

13. GIVEN: $\overline{JR} \cong \overline{DF}, \overline{JM} \cong \overline{DB}$, ___?___ $\cong$ ___?___
Use the SSS Congruence Postulate. $\overline{RM} \cong \overline{FB}$

14. GIVEN: $\overline{JR} \cong \overline{DF}, \overline{JM} \cong \overline{DB}$, ___?___ $\cong$ ___?___
Use the SAS Congruence Postulate. $\angle J \cong \angle D$

15. GIVEN: $\overline{RM} \cong \overline{FB}$, $\angle J$ is a right angle and $\angle J \cong \angle D$, ___?___ $\cong$ ___?___
Use the HL Congruence Theorem. $\overline{JM} \cong \overline{DB}$ or $\overline{JR} \cong \overline{DF}$



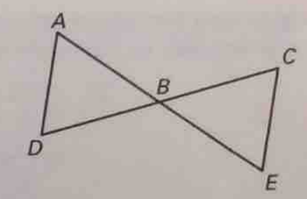
Practice B *continued*

For use with pages 240–246

16. **Proof** Complete the proof.

GIVEN: B is the midpoint of $\overline{AE}$.
B is the midpoint of $\overline{CD}$.

PROVE: $\triangle ABD \cong \triangle EBC$

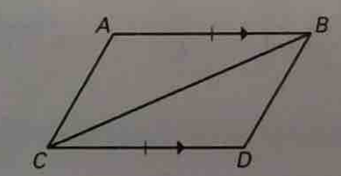


Statements	Reasons
1. B is the midpoint of $\overline{AE}$.	1. ___?___ Given
2. ___?___ $\overline{AB} \cong \overline{BE}$	2. Definition of midpoint
3. B is the midpoint of $\overline{CD}$.	3. ___?___ Given
4. ___?___ $\overline{CB} \cong \overline{BD}$	4. Definition of midpoint
5. $\angle ABD \cong \angle EBC$	5. ___?___ Vertical Angles Theorem
6. $\triangle ABD \cong \triangle EBC$	6. ___?___ SAS Congruence Postulate

17. **Proof** Complete the proof.

GIVEN: $\overline{AB} \parallel \overline{CD}, \overline{AB} \cong \overline{CD}$

PROVE: $\triangle ABC \cong \triangle DCB$



Statements	Reasons
1. $\overline{AB} \parallel \overline{CD}$	1. ___?___ Given
2. $\angle ABC \cong \angle DCB$	2. ___?___ Alternate Interior Angles Theorem
3. $\overline{AB} \cong \overline{CD}$	3. ___?___ Given
4. $\overline{CB} \cong \overline{CB}$	4. ___?___ Reflexive Property of Congruence
5. $\triangle ABC \cong \triangle DCB$	5. ___?___ SAS Congruence Postulate