Name _____ Date _____

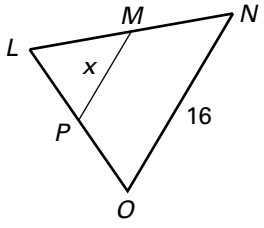
LESSON 5.1

Practice A

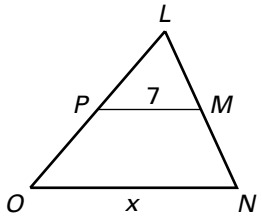
For use with pages 308–315

$\overline{MP}$ is a midsegment of $\triangle LNO$. Find the value of x.

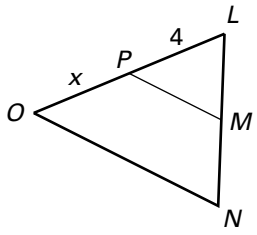
1.



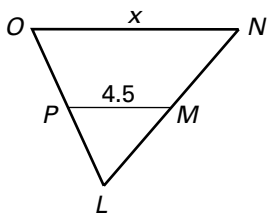
2.



3.



4.



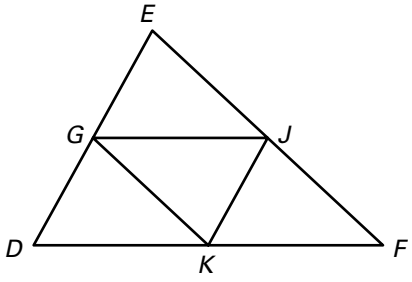
In $\triangle DEF$, $\overline{EJ} \cong \overline{JF}$, $\overline{FK} \cong \overline{KD}$, and $\overline{DG} \cong \overline{GE}$. Copy and complete the statement.

5. $\overline{GJ} \parallel$?

6. $\overline{EJ} \cong$? $\cong$?

7. $\overline{DE} \parallel$?

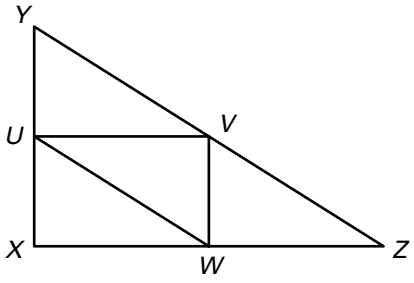
8. $\overline{GJ} \cong$? $\cong$?



Use the diagram of $\triangle XYZ$ where U, V, and W are the midpoints of the sides.

9. If $UW = 4x - 1$ and $YZ = 5x + 4$, what is UW?

10. Find YV.



Name _____ Date _____

LESSON 5.1

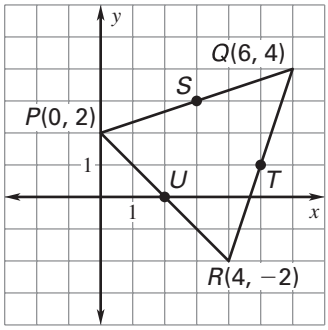
Practice A *continued*

For use with pages 308–315

Use the graph shown.

11. Find the coordinates of the endpoints of each midsegment of $\triangle PQR$.

12. Use the slope and the Distance Formula to verify that the Midsegment Theorem is true for $\overline{ST}$.



Place the figure in a coordinate plane. Assign coordinates to each vertex.

13. A 4 unit by 7 unit rectangle with one vertex at (0, 0).

14. A square with side length s and one vertex at $(s, 0)$.

Place the figure in a coordinate plane. Assign coordinates to each vertex. *Explain* the advantage of your placement.

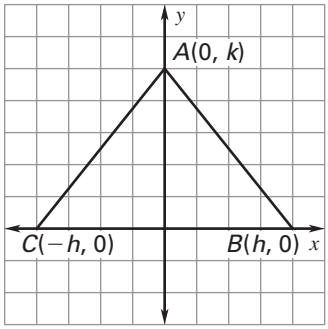
15. Right triangle: leg lengths are 5 units and 9 units

16. Isosceles right triangle: leg length is 14 units

17. **Proof** Describe a plan for the proof.

GIVEN: Coordinates of vertices of $\triangle ABC$

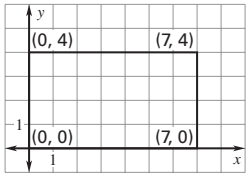
PROVE: $\triangle ABC$ is isosceles.



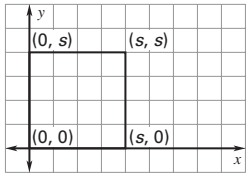
Lesson 5.1

Practice Level A

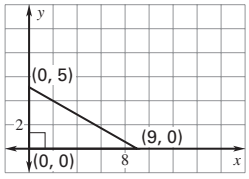
1. 8 **2.** 14 **3.** 4 **4.** 9 **5.** $\overline{DF}$ **6.** $\overline{JF}$, $\overline{GK}$
7. $\overline{KJ}$ **8.** $\overline{DK}$, $\overline{KF}$ **9.** 7 **10.** 7
11. $S(3, 3)$, $T(5, 1)$, $U(2, 0)$
12. slope of $\overline{ST} = -1$; slope of $\overline{PR} = -1$; length of $\overline{ST} = 2\sqrt{2}$, length of $\overline{PR} = 4\sqrt{2}$
13. *Sample answer:*



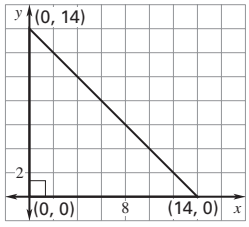
14. *Sample answer:*



15. *Sample answer:*



16. *Sample answer:*



17. Use the Distance Formula to show that $\overline{AB} \cong \overline{AC}$.

Practice Level B

1. 14 **2.** 8 **3.** 17 **4.** $\overline{JL}$ **5.** $\overline{JK}$ **6.** $\overline{RT}$
7. $\overline{KS}$, $\overline{RT}$ **8.** $\overline{KR}$, $\overline{ST}$ **9.** $\overline{LT}$, $\overline{RS}$
10. *Sample answer:* (0, 0), (5, 0), (0, 3)
11. *Sample answer:* (0, 0), (7, 0), (7, 4), (0, 4)
12. *Sample answer:* (0, 0), (6, 0), (6, 6), (0, 6)
13. *Sample answer:* (0, 0), (12, 0), (0, 12)
14. 17 **15.** 37 **16.** 46
17. $B(-h, k)$; Using the distance formula, $AB = DE = k$, $BC = EC = h$, and $AC = DC = \sqrt{(k^2 + h^2)}$. That means $\overline{AB} \cong \overline{DE}$, $\overline{BC} \cong \overline{EC}$, $\overline{AC} \cong \overline{DC}$ by the definition of congruence. So, $\triangle ABC \cong \triangle DEC$ by the SSS Congruence Postulate. **18.** $S\left(\frac{h}{2}, \frac{k}{2}\right)$, $T\left(\frac{3h}{2}, \frac{k}{2}\right)$; Using the distance formula, $PT = SR = \sqrt{\frac{(9h^2 + k^2)}{4}}$. So, $\overline{PT} \cong \overline{SR}$ by the definition of congruence.
19. $AB = 17$, $BC = 10$, $AC = 21$; 48; 24
20. 72 in.; The crossbar is the midsegment of the legs. **21.** no; no; yes; yes; no; $14 < LM < 28$

Practice Level C

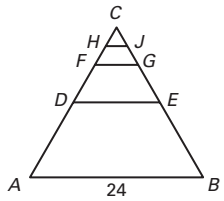
1. $\overline{WY}$ **2.** $\overline{WX}$ **3.** 4 **4.** 14 **5.** 32 **6.** 27
7. $A(-h, 4k)$, $C(-2h, 4k)$, $D(-h, 0)$
8. $B\left(\frac{h}{2}, \frac{3k}{2}\right)$, $D(h, k)$, $F\left(\frac{h}{2}, \frac{k}{2}\right)$
9. BD is not parallel to $\overline{AD}$.
10. Use the Midpoint Formula to find the coordinates of $G\left(\frac{e}{2}, \frac{d}{2}\right)$ and $H\left(\frac{f-e}{2}, \frac{d}{2}\right)$.
Use the Distance Formula to show $GH = \sqrt{\left(\frac{f-e}{2} - \frac{e}{2}\right)^2 + \left(\frac{d}{2} - \frac{d}{2}\right)^2} = \frac{f}{2}$ and $DF = \sqrt{(f-0)^2 + (0-0)^2} = f$. So, $GH = \frac{1}{2}DF$.
11. By the definition of an angle bisector, $\angle ABD \cong \angle CBD$. Use the Distance Formula to show $AB = \sqrt{\frac{c^2}{4} + b^2}$ and $BC = \sqrt{\frac{c^2}{4} + b^2}$.
Because $\overline{BD} \cong \overline{BD}$, you can apply the SAS Congruence Postulate to conclude that $\triangle ABD \cong \triangle CBD$. **12.** 15; By the Midsegment Theorem, the midsegment of the truss is half of the base of the truss.

Review for Mastery

1. $MN = 53$ cm, $ZY = 14$ cm **2.** $DF = 7$ in., $BC = 12$ in. **3.** $\overline{ST} \parallel \overline{BA}$, $ST = \frac{1}{2}BA$ **4.** $(0, k)$

Challenge Practice

1. $AB = BC = 7$ in., $AC = 10$ in. or $AB = BC = 10$ in., $AC = 4$ in.
2. $B(8, 16)$, $C(12, 0)$, $D(4, 8)$, $E(10, 8)$, $F(6, 0)$, $H(7, 8)$
3. a–c.



d.

Stage, *n*	0	1	2	3	4	5
Midsegment length	24	12	6	3	1.5	0.75