Name _____ Date _____

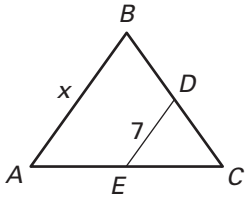
LESSON 5.1

Practice B

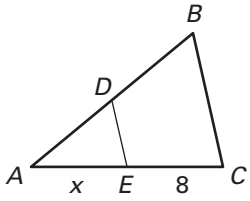
For use with pages 308–315

$\overline{DE}$ is a midsegment of $\triangle ABC$. Find the value of x.

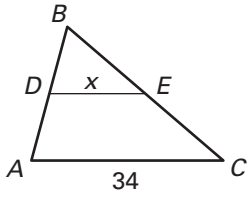
1.



2.



3.



In $\triangle JKL$, $\overline{JR} \cong \overline{RK}$, $\overline{KS} \cong \overline{SL}$, and $\overline{JT} \cong \overline{TL}$. Copy and complete the statement.

4. $\overline{RS} \parallel$ ___?___

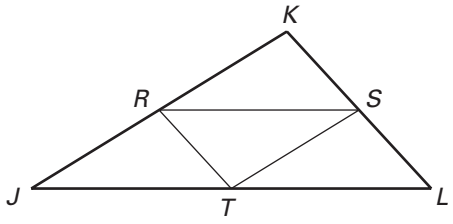
5. $\overline{ST} \parallel$ ___?___

6. $\overline{KL} \parallel$ ___?___

7. $\overline{SL} \cong$ ___?___ $\cong$ ___?___

8. $\overline{JR} \cong$ ___?___ $\cong$ ___?___

9. $\overline{JT} \cong$ ___?___ $\cong$ ___?___



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

10. Right triangle: leg lengths are 5 units and 3 units

11. Rectangle: length is 7 units and width is 4 units

12. Square: side length is 6 units

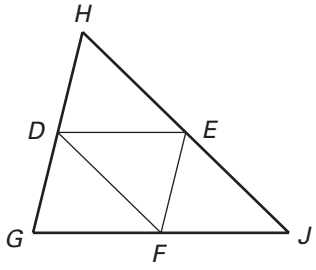
13. Isosceles right triangle: leg length is 12 units

Use $\triangle GHJ$, where D, E, and F are midpoints of the sides.

14. If $DE = 4x + 5$ and $GJ = 3x + 25$, what is DE?

15. If $EF = 2x + 7$ and $GH = 5x - 1$, what is EF?

16. If $HJ = 8x - 2$ and $DF = 2x + 11$, what is HJ?



Name _____ Date _____

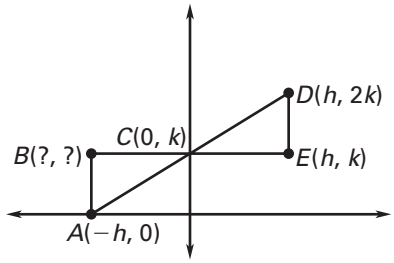
LESSON 5.1

Practice B *continued*

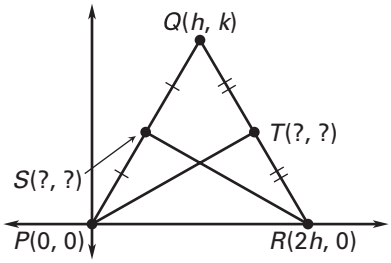
For use with pages 308–315

Find the unknown coordinates of the point(s) in the figure. Then show that the given statement is true.

17. $\triangle ABC \cong \triangle DEC$

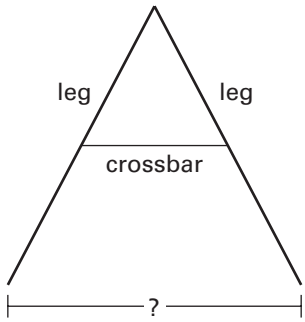


18. $\overline{PT} \cong \overline{SR}$

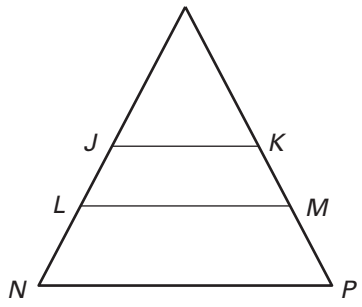


19. The coordinates of $\triangle ABC$ are $A(0, 5)$, $B(8, 20)$, and $C(0, 26)$. Find the length of each side and the perimeter of $\triangle ABC$. Then find the perimeter of the triangle formed by connecting the three midsegments of $\triangle ABC$.

20. **Swing Set** You are assembling the frame for a swing set. The horizontal crossbars in the kit you purchased are each 36 inches long. You attach the crossbars at the midpoints of the legs. At each end of the frame, how far apart will the bottoms of the legs be when the frame is assembled? *Explain*.



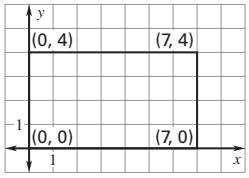
21. **A-Frame House** In an A-frame house, the floor of the second level, labeled $\overline{LM}$, is closer to the first floor, $\overline{NP}$, than is the midsegment $\overline{JK}$. If $\overline{JK}$ is 14 feet long, can $\overline{LM}$ be 12 feet long? 14 feet long? 20 feet long? 24 feet long? 30 feet long? *Explain*.



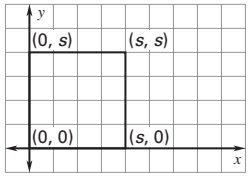
Lesson 5.1

Practice Level A

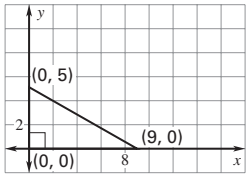
1. 8 **2.** 14 **3.** 4 **4.** 9 **5.** $\overline{DF}$ **6.** $\overline{JF}$, $\overline{GK}$
7. $\overline{KJ}$ **8.** $\overline{DK}$, $\overline{KF}$ **9.** 7 **10.** 7
11. $S(3, 3)$, $T(5, 1)$, $U(2, 0)$
12. slope of $\overline{ST} = -1$; slope of $\overline{PR} = -1$; length of $\overline{ST}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



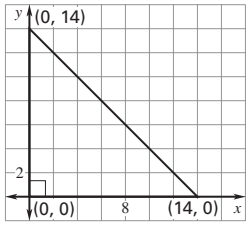
14. *Sample answer:*



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

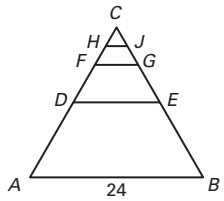
1. $\overline{WY}$ **2.** $\overline{WX}$ **3.** 4 **4.** 14 **5.** 32 **6.** 27
7. $A(-h, 4k)$, $C(-2h, 4k)$, $D(-h, 0)$
8. $B\left(\frac{h}{2}, \frac{3k}{2}\right)$, $D(h, k)$, $F\left(\frac{h}{2}, \frac{k}{2}\right)$
9. BD is not parallel to $\overline{AD}$.
10. Use the Midpoint Formula to find the 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