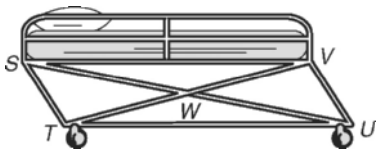
Name _____ Date _____ Class _____

LESSON 6-2

Practice B

Properties of Parallelograms



A gurney is a wheeled cot or stretcher used in hospitals. Many gurneys are made so that the base will fold up for easy storage in an ambulance. When partially folded, the base forms a parallelogram. In $\square STUV$, $VU = 91$ centimeters, $UW = 108.8$ centimeters, and $m\angle TSV = 57°$. Find each measure.

1. *SW* _____

2. *TS* _____

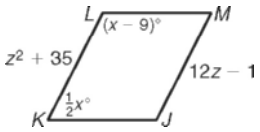
3. *US* _____

4. $m\angle SVU$ _____

5. $m\angle STU$ _____

6. $m\angle TUV$ _____

***JKLM* is a parallelogram. Find each measure.**

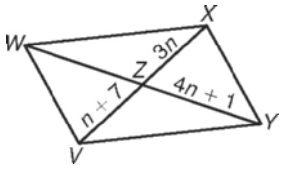


7. $m\angle L$ _____

8. $m\angle K$ _____

9. *MJ* _____

***VWXY* is a parallelogram. Find each measure.**



10. *VX* _____

11. *XZ* _____

12. *ZW* _____

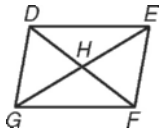
13. *WY* _____

14. Three vertices of $\square ABCD$ are $B(-3, 3)$, $C(2, 7)$, and $D(5, 1)$. Find the coordinates of vertex A. _____

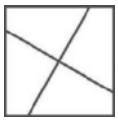
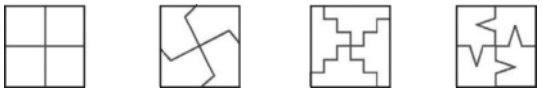
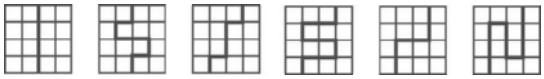
Write a two-column proof.

15. **Given:** *DEFG* is a parallelogram.

    Prove: $m\angle DHG = m\angle EDH + m\angle FGH$



Challenge

1. 
2. 
   Answers will vary.
3. 
   Answers will vary.
4. 
   Answers will vary.
5. Descriptions will vary.
6. There are six possible dissections.
   

Problem Solving

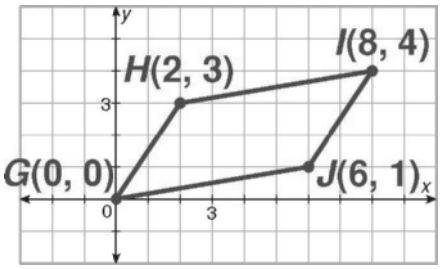
1. 90°, 90°, 85°, 95°
2. 75°, 75°, 72°, 72°, 66°
3. 54°
4. C
5. J
6. B
7. F

Reading Strategies

1. five
2. Sample answer: pedestrian crossing street signs, front faces of barns
3. four
4. There is an equal number of sides and vertices in polygons.
5. octagon
6. three
7. Sample answer: 
8. Sample answer: 

LESSON 6-2

Practice A

1. supplementary
2. congruent or parallel
3. parallel
4. bisect
5. congruent
6. 2 ft
7. $4\frac{1}{2}$ ft
8. 9 ft
9. 105°
10. 75°
11. 105°
12. 6
13. 100°
14. 80°
15. 

16. 3
17. 2
18. 8; 4
20. $\frac{1}{6}$; $\frac{1}{6}$
21. yes

Practice B

1. 108.8 cm
2. 91 cm
3. 217.6 cm
4. 123°
5. 123°
6. 57°
7. 117°
8. 63°
9. 71
10. 21
11. 10.5
12. 15
13. 30
14. (0, –3)
15. Possible answer:

Statements	Reasons
1. *DEFG* is a parallelogram.	1. Given
2. m∠*EDG* = m∠*EDH* + m∠*GDH*, m∠*FGD* = m∠*FGH* + m∠*DGH*	2. Angle Add. Post.
3. m∠*EDG* + m∠*FGD* = 180°	3. ▱ → cons. ∡s supp.
4. m∠*EDH* + m∠*GDH* + m∠*FGH* + m∠*DGH* = 180°	4. Subst. (Steps 2, 3)

5. $m\angle GDH + m\angle DGH + m\angle DHG = 180°$	5. Triangle Sum Thm.
6. $m\angle GDH + m\angle DGH + m\angle DHG = m\angle EDH + m\angle GDH + m\angle FGH + m\angle DGH$	6. Trans. Prop. of =
7. $m\angle DHG = m\angle EDH + m\angle FGH$	7. Subtr. Prop. of =

Practice C

1. Possible answer: The height of *ABCD* is $2b$ and the length of the base is $2c$, so the area of *ABCD* is $4bc$. Because *ABCD* is a parallelogram, $AB = DC$ and $BC = AD$ and $\angle A$ is congruent to $\angle C$ and $\angle B$ is congruent to $\angle D$. Furthermore, because *E*, *F*, *G*, and *H* are midpoints, $AE = BE = CG = DG$ and $BF = CF = AH = DH$. So by SAS, $\triangle AEH$ is congruent to $\triangle CGF$ and $\triangle BEF$ is congruent to $\triangle DGH$. Now find the coordinates of the midpoints: $E(a, b)$, $F(c + 2a, 2b)$, $G(2c + a, b)$, $H(c, 0)$. The height of $\triangle AEH$ is b and the length of the base is c, so its area is $\frac{1}{2}bc$. The areas of congruent triangles are equal, so the area of $\triangle CGF$ is also $\frac{1}{2}bc$. The height of $\triangle DGH$ is b and the length of the base is c, so its area is $\frac{1}{2}bc$. The area of $\triangle BEF$ is also $\frac{1}{2}bc$. The area of all four triangles is thus $2bc$. The area of *EFGH* is the area of *ABCD* minus the area of the triangles, or $4bc - 2bc = 2bc$. And the area of *EFGH* is $2bc = \frac{1}{2}(4bc) = \frac{1}{2}$(area of *ABCD*).
2. Possible answer: Use the slope formula to find the slope of each side: slope of $\overline{EF} = \frac{b}{a + c}$, slope of $\overline{GH} = \frac{b}{a + c}$, slope of $\overline{FG} = \frac{b}{a - c}$, slope of $\overline{EH} = \frac{b}{a - c}$. Segments with equal slopes are parallel, so $\overline{EF}$ is parallel to $\overline{GH}$ and $\overline{FG}$ is parallel to $\overline{EH}$. Therefore *EFGH* is a parallelogram.
3. 80 books
4. 92 books
5. $9 < \ell < 15$
6. $x < \ell < 3x$
7. $0 < \ell < 2x$

Reteach

1. 10 cm
2. 70°
3. 12 m
4. 10 m
5. 62°
6. 18 m
7. 32°
8. 9 m
9. 36
10. 36
11. 48°
12. 132°
13. *D*(0, 3)
14. *N*(–2, 4)

Challenge

1. Triangle Sum
2. $m\angle 7$
3. 90°
4. $m\angle 5$
5. 180°
6. 180°
7. $m\angle CDA$
8. $m\angle DAB$
9. 360°
10. supplementary
11. supplementary
12. Converse of the Same-Side Interior Angles
13. definition
14. Yes; explanations will vary.
15. No; the puck will have to land in the goal.
16. No; explanations will vary.

Problem Solving

1. $m\angle C = 135°$; $m\angle D = 45°$
2. 15 in.
3. 4.5 ft
4. 65°
5. B
6. H
7. D

Reading Strategies

1. 100 mm
2. 138°
3. 86 mm
4. 42°
5. 138°
6. 12 in.
7. 18 in.
8. 12 in.
9. 24 in.
10. 36 in.