Answers for Lesson 3-1, pp. 131–133 Exercises

1. $\overleftrightarrow{PQ}$ and $\overleftrightarrow{SR}$ with transversal $\overleftrightarrow{SQ}$; alt. int. ∠s

2. $\overleftrightarrow{PS}$ and $\overleftrightarrow{QR}$ with transversal $\overleftrightarrow{SQ}$; alt. int. ∠s

3. $\overleftrightarrow{PS}$ and $\overleftrightarrow{QR}$ with transversal $\overleftrightarrow{PQ}$; same-side int. ∠s

4. $\overleftrightarrow{PS}$ and $\overleftrightarrow{QR}$ with transversal $\overleftrightarrow{SR}$; corr. ∠s

5. $\angle 1$ and $\angle 2$: corr. ∠s
$\angle 3$ and $\angle 4$: alt. int. ∠s
$\angle 5$ and $\angle 6$: corr. ∠s

6. $\angle 1$ and $\angle 2$: same-side int. ∠s
$\angle 3$ and $\angle 4$: corr. ∠s
$\angle 5$ and $\angle 6$: corr. ∠s

7. $\angle 1$ and $\angle 2$: corr. ∠s
$\angle 3$ and $\angle 4$: same-side int. ∠s
$\angle 5$ and $\angle 6$: alt. int. ∠s

8. alt. int. ∠s

9. 2. Same-Side Int. Angles Thm.

4. Same-Side Int. Angles Thm.

5. Congruent Supplements Thm.

10. 1. $a \parallel b$ (Given)

2. $\angle 1 \cong \angle 4$ (Alt. Int. ∠s Thm.)

3. $c \parallel d$ (Given)

4. $\angle 4 \cong \angle 3$ (Corr. ∠s Post.)

5. $\angle 1 \cong \angle 3$ (Trans. Prop.)

11. $m\angle 1 = 75$ because corr. ∠s of ∥ lines are ≅;
$m\angle 2 = 105$ because same-side int. ∠s of ∥ lines are suppl.

12. $m\angle 1 = 120$ because corr. ∠s of ∥ lines are ≅; $m\angle 2 = 60$ because same-side int. ∠s of ∥ lines are suppl.

13. $m\angle 1 = 100$ because same-side int. ∠s of ∥ lines are suppl.;
$m\angle 2 = 70$ because alt. int. ∠s of ∥ lines have = measure.

14. 70; 70, 110 **15.** 25; 65, 65 **16.** 20; 100, 80

17. $m\angle 1 = m\angle 3 = m\angle 6 = m\angle 8 = m\angle 9 = m\angle 11 = m\angle 13 = m\angle 15 = 52$; $m\angle 2 = m\angle 4 = m\angle 5 = m\angle 7 = m\angle 10 = m\angle 12 = m\angle 14 = 128$

18. You must find the measure of one $\angle$. All $\angle$s that are vert., corr., or alt. int. to that $\angle$ will have that measure. All other $\angle$s will be the suppl. of that measure.

19. two **20.** four **21.** two

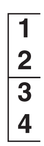
22. four **23.** 32

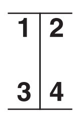
24. $x = 76, y = 37, v = 42, w = 25$

25. $x = 135, y = 45$

26. *Trans* means across or over. A transversal cuts across other lines.

27. Answers may vary.





Sample: *E* illustrates corr. $\angle$s ($\angle 1$ and $\angle 3$, $\angle 2$ and $\angle 4$) and same-side int. $\angle$s ($\angle 1$ and $\angle 2$, $\angle 3$ and $\angle 4$); *I* illustrates alt. int. $\angle$s ($\angle 1$ and $\angle 4$, $\angle 2$ and $\angle 3$) and same-side int. $\angle$s ($\angle 1$ and $\angle 3$, $\angle 2$ and $\angle 4$).

28. 1. $a \parallel b$ (Given)

2. $\angle 1 \cong \angle 2$ are suppl. (Same Side Int. $\angle$s Thm.)

3. $\angle 3 \cong \angle 4$ are suppl. (Same Side Int. $\angle$s Thm.)

4. $\angle 1 \cong \angle 4$ (Given)

5. $\angle 3 \cong \angle 1$ are suppl. (Subst.)

6. $\angle 2 \cong \angle 3$ ($\cong$ Suppl. Thm.)

29. Since $a \parallel b$, $\angle 1 \cong \angle 3$ because they are corr. $\angle$s. Also $\angle 3$ and $\angle 2$ are supplementary by the $\angle$ Add. Post. So by Subst., $\angle 1$ and $\angle 2$ are supplementary.

30. **a.** 57

b. same-side int. $\angle$s

31. **a.** alt. int. $\angle$s

b. He knew that alt. int. $\angle$s of $\parallel$ lines are $\cong$.

32. The $\angle$s labeled are corr. $\angle$s and should be $\cong$. If you solve $2x - 60 = 60 - 2x$, you get $x = 30$. This would be impossible since $2x - 60$ and $60 - 2x$ would equal 0.

33. Never; the two planes do not intersect.

34. Sometimes; if they are $\parallel$.

35. Sometimes; they may be skew.

36. Sometimes; they may be $\parallel$.

Answers for Lesson 3-2, pp. 137–139 Exercises

1. $\overleftrightarrow{BE} \parallel \overleftrightarrow{CG}$; Conv. of Corr. $\angle$s Post.

2. $\overline{CA} \parallel \overline{HR}$; Conv. of Corr. $\angle$s Post.

3. $\overline{JO} \parallel \overline{LM}$; if two lines and a transversal form same-side int. $\angle$s that are suppl., then the lines are $\parallel$.

4. $\overline{PQ} \parallel \overline{ST}$; Conv. of Alt. Int. $\angle$s Thm.

5. 30 **6.** 50 **7.** 59 **8.** 31

9. The corr. $\angle$s are $\cong$, so the lines are $\parallel$ by the Conv. of Corr. $\angle$s Post.

10. $a \parallel b$; if two lines and a transversal form same-side int. $\angle$s that are suppl., then the lines are $\parallel$.

11. $a \parallel b$; if two lines and a transversal form same-side int. $\angle$s that are suppl., then the lines are $\parallel$.

12. $a \parallel b$; if two lines and a transversal form same side ext. $\angle$s that are suppl., then the two lines are $\parallel$.

13. none

14. $a \parallel b$; Conv. of Corr. $\angle$s Post.

15. none

16. $a \parallel b$; Conv. of Alt. Int. $\angle$s Thm.

17. $\ell \parallel m$; Conv. of Corr. $\angle$s Post.

18. $a \parallel b$; if two lines and a transversal form alt. ext. $\angle$s that are congruent, then the two lines are $\parallel$.

19. $a \parallel b$; Conv. of Corr. $\angle$s Post.

20. none

21. $\ell \parallel m$; Conv. of Alt. Int. $\angle$s Thm.

22. **a.** $\angle 1$

b. $\angle 1$

c. $\angle 2$

d. $\angle 3$

e. Conv. of Corr. $\measuredangle$s

23. The corr. $\measuredangle$s he draws are $\cong$.

24. 5 **25.** 20 **26.** C

27. $m\angle 1 + m\angle 3 = 180$ (Given). $m\angle 1 + m\angle 2 = 180$ ($\angle$ Add. Post.). $m\angle 1 + m\angle 3 = m\angle 1 + m\angle 2$ (Substitution). $m\angle 3 = m\angle 2$ (Subt. Prop. of =). $\ell \parallel n$ (Conv. of Corres. $\measuredangle$s Post.)

28. 10; $m\angle 1 = m\angle 2 = 70$ **29.** 5; $m\angle 1 = m\angle 2 = 50$

30. 2.5; $m\angle 1 = m\angle 2 = 30$ **31.** 1.25; $m\angle 1 = m\angle 2 = 10$

32. The corr. $\measuredangle$s are $\cong$, and the oars are $\parallel$ by the Conv. of Corr. $\measuredangle$s Post.

33. Answers may vary. Sample: $\angle 3 \cong \angle 9$; $j \parallel k$ by Conv. of the Alt. Int. $\measuredangle$s Thm.

34. Answers may vary. Sample: $\angle 3 \cong \angle 9$; $j \parallel k$ by Conv. of the Alt. Int. $\measuredangle$s Thm. and $\ell \parallel m$ by Conv. of Same-Side Int. $\measuredangle$s Thm.

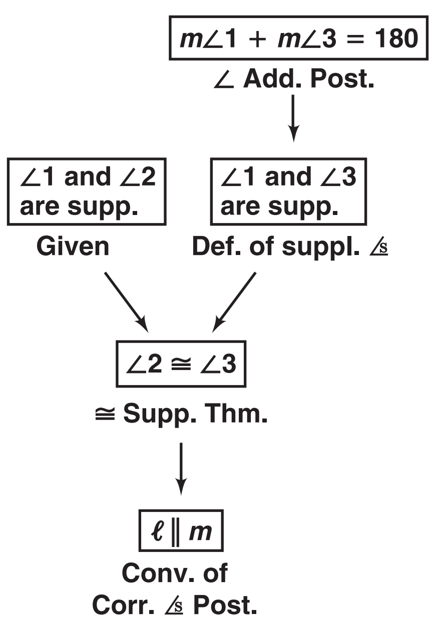
35. Answers may vary. Sample: $\angle 3 \cong \angle 11$; $\ell \parallel m$ by Conv. of the Alt. Int. $\measuredangle$s Thm. and $j \parallel k$ by Conv. of Corr. $\measuredangle$s Post.

36. Answers may vary. Sample: $\angle 3$ and $\angle 12$ are suppl.; $j \parallel k$ by the Conv. of Corr. $\measuredangle$s Post.

37. Vert. $\measuredangle$s Thm. and Conv. of Corr. $\measuredangle$s Post.

38.	1. $\ell \parallel n$	1. Given
	2. $\angle 8 \cong \angle 4$	2. Corres. ∠s Post.
	3. $\angle 12 \cong \angle 8$	3. Given
	4. $\angle 12 \cong \angle 4$	4. Trans. Prop. of $\cong$
	5. $j \parallel k$	5. Conv. of Corres. ∠s Post.
39.	1. $j \parallel k$	1. Given
	2. $m\angle 9 + m\angle 4 = 180$	2. Same-Side Int. ∠s Thm.
	3. $m\angle 8 + m\angle 9 = 180$	3. Given
	4. $m\angle 9 + m\angle 4 = m\angle 8 + m\angle 9$	4. Trans. Prop. of =
	5. $m\angle 4 = m\angle 8$	5. Subt. Prop. of =
	6. $\ell \parallel n$	6. Conv. of Corres. ∠s Post.

40.



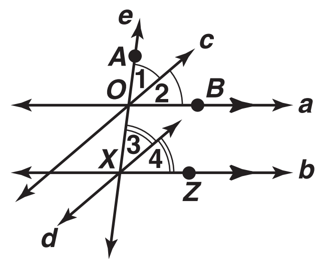
41. $\overline{PL} \parallel \overline{NA}$ and $\overline{PN} \parallel \overline{LA}$ by Conv. of Same-Side Int. ∠s Thm.

42. $\overline{PL} \parallel \overline{NA}$ by Conv. of Same-Side Int. ∠s Thm.

43. none

44. $\overline{PN} \parallel \overline{LA}$ by Conv. of Same-Side Int. ∠s Thm.

45. a. Answers may vary. Sample:



b. Given: $a \parallel b$ with transversal e, c bisects $\angle AOB$, d bisects $\angle AXZ$.

c. Prove: $c \parallel d$

d. To prove that $c \parallel d$, show that $\angle 1 \cong \angle 3$. $\angle 1 \cong \angle 3$ if $\angle AOB \cong \angle OXZ$. $\angle AOB \cong \angle OXZ$ by the Corr. ∠s Post.

e.
1. $a \parallel b$ (Given)
2. $\angle AOB \cong \angle AXZ$ (Corr. ∠s Post.)
3. $m\angle AOB = m\angle AXZ$ (Def. of ≅ ∠s)
4. $m\angle AOB = m\angle 1 + m\angle 2$; $m\angle AXZ = m\angle 3 + m\angle 4$ (∠ Add. Post.)
5. c bisects $\angle AOB$; d bisects $\angle AXZ$. (Given)
6. $m\angle 1 = m\angle 2$; $m\angle 3 = m\angle 4$ (Def. of ∠ bisector)
7. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$ (Trans. Prop. of ≅)
8. $m\angle 1 + m\angle 1 = m\angle 3 + m\angle 3$ (Subst.)
9. $2m\angle 1 = 2m\angle 3$ (Add. Prop.)
10. $m\angle 1 = m\angle 3$ (Div. Prop.)
11. $c \parallel d$ (Conv. of Corr. ∠s Post.)

Answers for Lesson 3-3, pp. 143–144 Exercises

1. a. $\angle 1 \cong \angle 2 \cong \angle 3$

b. Slat D is perp. to slats B and C. Explanations may vary. Sample: Slat D is perp. to slat A. Slats A, B, and C are parallel, so by Theorem 3-11, slat D is also perp. to B and C.

2. a is perp. to b and c is perp. to b, so a is parallel to c because two lines perp. to the same line are parallel. d is parallel to c and a is parallel to c, so by Thm. 3-9, a is parallel to d.

3. a. corr. ∠s

b,c. $\angle 1$, $\angle 3$ (any order)

d. Converse of Corr.

4–11. Answers may vary. Samples are given.

4. The rungs are parallel to each other because they are all perpendicular to the same side.

5. All of the rungs are perpendicular to one side. The side is perp. to the top rung, and because all of the rungs are parallel to each other, the side is perp. to all of the rungs.

6. The rungs are perpendicular to both sides. The rungs are perp. to one of two parallel lines, so they are perp. to both lines.

7. The rungs are parallel to each other because they are all perpendicular to one side. The sides are parallel because they are both perpendicular to one rung.

8. The sides are parallel because they are both perpendicular to one rung.

9. All of the rungs are parallel. All of the rungs are parallel to one rung, so they are all parallel to each other.

10. The rungs are parallel because they are all perpendicular to one side.

11. In the diagram, $a \perp b$ means the marked $\angle$ is a rt. $\angle$. $b \parallel c$ means that the corres. $\angle$ formed by a and c is a rt. $\angle$, so $a \perp c$.

12. Thm. 3-10

13. Answers may vary. Sample: In the diagram, $\overline{AB} \perp \overline{BH}$ and $\overline{AB} \perp \overline{BD}$, but $\overline{BH} \nparallel \overline{BD}$. They intersect.

14. $a \parallel d$ **15.** $a \perp d$ **16.** $a \perp d$ **17.** $a \perp d$

18. $a \parallel d$ **19.** $a \parallel d$ **20.** $a \parallel d$ **21.** $a \perp d$

22. Reflexive: $a \parallel a$; false; any line intersects itself.
Symmetric: If $a \parallel b$, then $b \parallel a$; true; b and a are coplanar and do not intersect.
Transitive: In general, if $a \parallel b$, and $b \parallel c$, then $a \parallel c$; true; however, when $a \parallel b$, and $b \parallel a$, it does not follow that $a \parallel a$.

23. Reflexive: $a \perp a$; false; $\perp$ lines are two lines that intersect to form right $\angle$s.
Symmetric: If $a \perp b$, then $b \perp a$; true; b and a intersect to form right $\angle$s.
Transitive: If $a \perp b$, and $b \perp c$, then $a \perp c$; false; in a plane, two lines $\perp$ to the same line are $\parallel$.

Answers for Lesson 3-4, pp. 150–152 Exercises

1. 30

2. 83.1

3. 90

4. $x = 70; y = 110; z = 30$

5. $x = 80; y = 80$

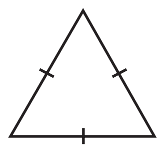
6. 60

7. right, scalene

8. acute, equiangular, equilateral

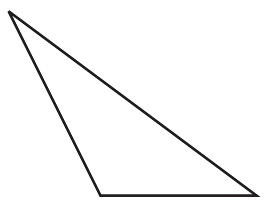
9. obtuse, isosceles

10.

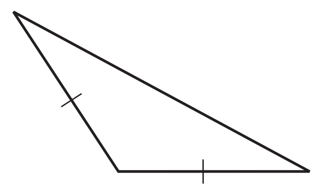


11. Not possible; a right △ will always have one longest side opp. the right ∠.

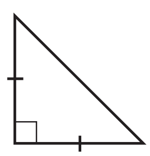
12.



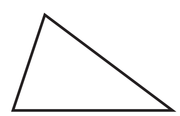
13.



14.



15.



16. **a.** ∠5, ∠6, ∠8

b. ∠1 and ∠3 for ∠5
∠1 and ∠2 for ∠6
∠1 and ∠2 for ∠8

c. They are ≅ vert. ∠s.

17. **a.** 2

b. 6

18. 123

19. 115.5

20. $m\angle 3 = 92; m\angle 4 = 88$

21. $x = 147, y = 33$

22. $a = 162, b = 18$

23. $x = 7$; 55, 35, 90; right

24. $x = 37$; 37, 65, 78; acute

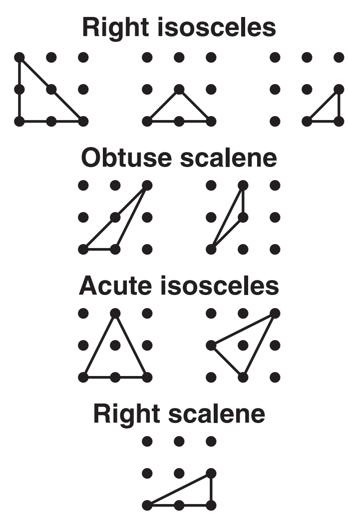
25. $x = 38, y = 36, z = 90$; $\triangle ABD$: 36, 90, 54; right; $\triangle BCD$: 90, 52, 38; right; $\triangle ABC$: 74, 52, 54; acute

26. $a = 67, b = 58, c = 125, d = 23, e = 90$; $\triangle FGH$: 58, 67, 55; acute; $\triangle FEH$: 125, 32, 23; obtuse; $\triangle EFG$: 67, 23, 90; right

27. 60; $180 \div 3 = 60$

28. Yes, an equilateral $\triangle$ is isosc. because if three sides of a $\triangle$ are $\cong$, then at least two sides are $\cong$. No, the third side of an isosc. $\triangle$ does not need to be $\cong$ to the other two.

29. eight



30. A

31. 30 and 60

32. **a.** 40, 60, 80

b. acute

33. Check students' work. Answers may vary. Sample: The two ext. ∠s formed at vertex A are vert. ∠s and thus have the same measure.

34. By the definition of right angle, $m\angle C = 90$.
By the Triangle Angle-Sum Theorem, $m\angle A + m\angle B + m\angle C = 180$.
Subtracting 90 from each side gives $m\angle A + m\angle B = 90$, so A and B are complementary by the definition of comp. angles.

35. $m\angle 1 + m\angle 4 = 180$ by the ∠ Add. Postulate.
$m\angle 2 + m\angle 3 + m\angle 4 = 180$ by the △ ∠-Sum Theorem.
$m\angle 1 + m\angle 4 = m\angle 2 + m\angle 3 + m\angle 4$ by the Trans. Property of Equality.
$m\angle 1 = m\angle 2 + m\angle 3$ by the Subtr. Property of Equality.

36. 132; since the third ∠ is 68, the largest ext. ∠ is $180 - 48 = 132$.

37. Check students' work.

38 **a.** 81

b. 45, 63, 72

c. acute

39. **a.–b.** There are no such triangles.

c. isosceles triangle.

40. 115

41. Answers may vary. Sample: The measure of the ext. ∠ is = to the sum of the measures of the two remote int. ∠s. Since these ∠s are ≅, the ∠s formed by the bisector of the ext. ∠ are ≅ to each of them. Therefore, the bisector is ∥ to the included side of the remote int. ∠s by the Conv. of the Alt Int. ∠s Thm.

Answers for Lesson 3-5, pp. 161–163 Exercises

1. yes

2. No; it has no sides.

3. No; it is not a plane figure.

4. No; two sides intersect between endpoints.

5. $MWBFX$; sides: $\overline{MW}$, $\overline{WB}$, $\overline{BF}$, $\overline{FX}$, $\overline{XM}$; $\angle$s: $\angle M$, $\angle W$, $\angle B$, $\angle F$, $\angle X$

6. $KCLP$; sides: $\overline{KC}$, $\overline{CL}$, $\overline{LP}$, $\overline{PK}$; $\angle$s: $\angle K$, $\angle C$, $\angle L$, $\angle P$

7. $HEPTAGN$; sides: $\overline{HE}$, $\overline{EP}$, $\overline{PT}$, $\overline{TA}$, $\overline{AG}$, $\overline{GN}$, $\overline{NH}$; $\angle$s: $\angle H$, $\angle E$, $\angle P$, $\angle T$, $\angle A$, $\angle G$, $\angle N$

8. pentagon; convex

9. decagon; concave

10. pentagon; concave

11. 1080

12. 1800

13. 1440

14. 3240

15. 180,000

16. 102

17. 103

18. 145

19. 37

20. 60, 60, 120, 120

21. 113, 119

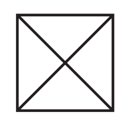
22. 108; 72

23. 150; 30

24. 160; 20

25. 176.4; 3.6

26. 45, 45, 90

27. 
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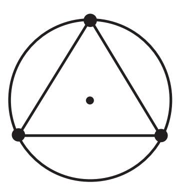
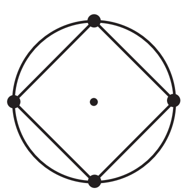
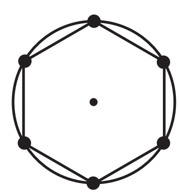
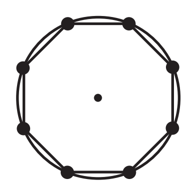
28. 

29. 

30. 

31. 

32. 3

33. 8

34. 13

35. 18

36. C

37. octagon; $m\angle 1 = 135$; $m\angle 2 = 45$

38. If you solve $\frac{(n - 2)180}{n} = 130$, you get $n = 7.2$. This number is not an integer.

39. 20-80-80; 50-50-80

40. 108; 5

41. 144; 10

42. 162; 20

43. 150; 12

44. $180 - x; \frac{360}{x}$

45. $\frac{4}{5}$

46. **a.** $n \cdot 180$

b. $(n - 2)180$

c. $180n - 180(n - 2) = 360$

d. Polygon Ext. ∠-Sum Thm.

47. $y = 103$; $z = 70$; quad.

48. $w = 72, x = 59, y = 49, z = 121$; △

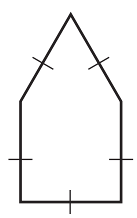
49. $x = 36, 2x = 72, 3x = 108, 4x = 144$; quad.

50–53. Answers may vary. Samples are given

50.

51.

52.



53.

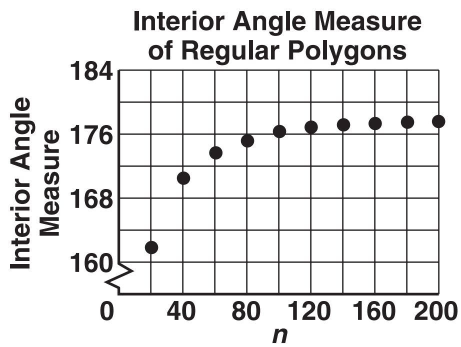
54. Yes; the sum of the measures of ∠s at the int. point is 360. The sum of the measures of all the △s is $180n$.
$180n - 360 = (n - 2)180$

55. Answers may vary. Sample: The figure is a convex equilateral quad. The sum of its ∠s is $2 \cdot 180$ or 360.

56. octagon

57. a. (20, 162), (40, 171), (60, 174), (80, 175.5), (100, 176.4), (120, 177), (140, 177.4), (160, 177.75), (180, 178), (200, 178.2)

b.



c. It is very close to 180.

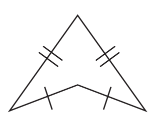
d. No, two sides cannot be collinear.

58. a. $[180(n - 2)] \div n = \frac{180n - 360}{n} = 180 - \frac{360}{n}$.

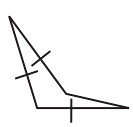
b. As n gets larger, the size of the angles get closer to 180. The more sides it has, the closer the polygon is to a circle.

59. 36

60–63. Answers may vary. Samples are given.

60. 

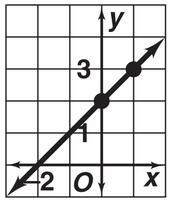
61. Not possible; opp. sides would overlap.

62. 

63. Not possible; opp. and adj. sides would overlap.

Answers for Lesson 3-6, pp. 169–170 Exercises

1.



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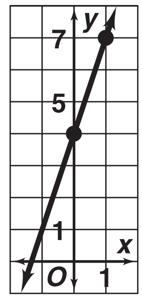

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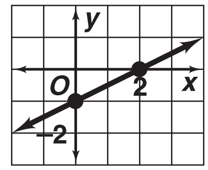

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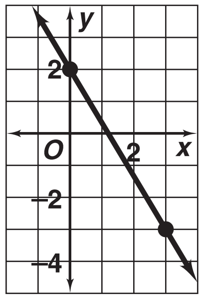

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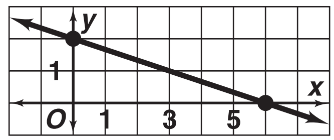

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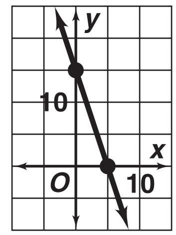

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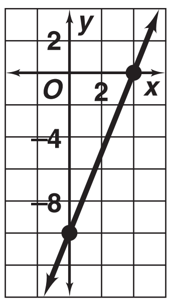

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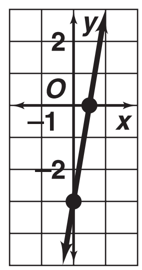

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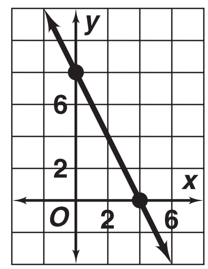

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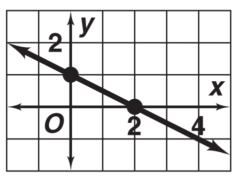
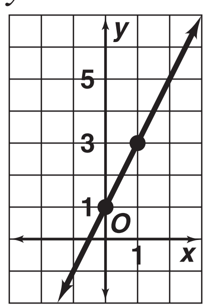
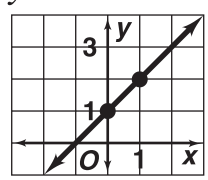


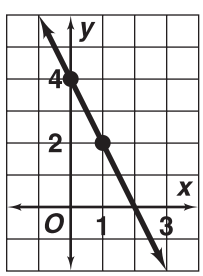
11. $y = 2x + 1$



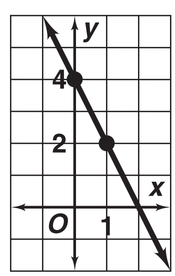
12. $y = x + 1$



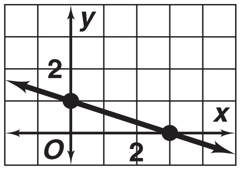
13. $y = -2x + 4$



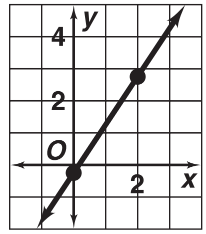
14. $y = -2x + 4$



15. $y = -\frac{1}{3}x + 1$



16. $y = \frac{3}{2}x - \frac{1}{4}$



17. $y - 3 = 2(x - 2)$

18. $y + 1 = 3(x - 4)$

19. $y - 5 = -1(x + 3)$

20. $y + 6 = -4(x + 2)$

21. $y - 1 = \frac{1}{2}(x - 6)$

22. $y - 4 = 1(x - 0)$ or $y - 4 = x$

23–28. Equations may vary from the pt. chosen. Samples are given.

23. $y - 5 = \frac{3}{5}(x - 0)$

24. $y - 2 = -\frac{1}{2}(x - 6)$

25. $y - 6 = 1(x - 2)$

26. $y - 4 = 1(x + 4)$

27. $y - 0 = \frac{1}{2}(x + 1)$

28. $y - 10 = \frac{2}{3}(x - 8)$

29. **a.** $y = 7$

b. $x = 4$

30. **a.** $y = -2$

b. $x = 3$

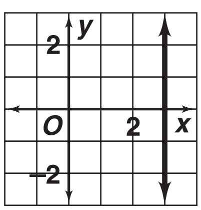
31. **a.** $y = -1$

b. $x = 0$

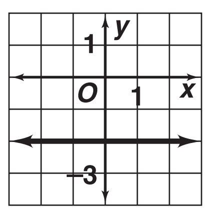
32. **a.** $y = 4$

b. $x = 6$

33.



34.



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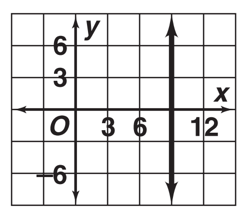
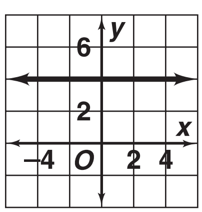
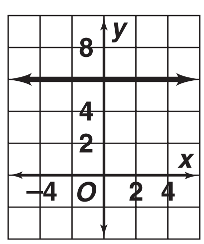


36.



37.



38. **a.** 0.05

b. the cost per min

c. 4.95

d. the initial charge for a call

39. No; a line with no slope is a vertical line. 0 slope is a horizontal line.

40. **a.** $m = 0$; it is a horizontal line.

b. $y = 0$

41. **a.** Undefined; it is a vertical line.

b. $x = 0$

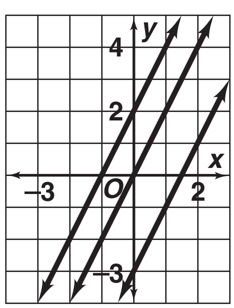
42–44. Answers may vary. Samples are given.

42. The eq. is in standard form; change to slope-intercept form, because it is easy to graph the eq. from that form.

43. The eq. is in slope-int. form; use slope-int. form, because the eq. is already in that form.

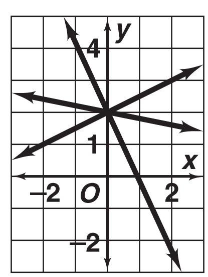
44. The eq. is in point-slope form; use point-slope form, because the eq. is already in that form.

45.



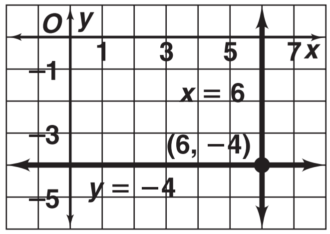
The slopes are the same, and the *y*-intercepts are different.

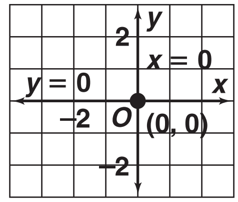
46.



The slopes are all different, and the *y*-intercepts are the same.

47. Check students' work.

48.


49.


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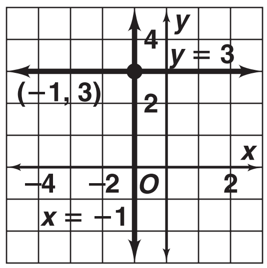

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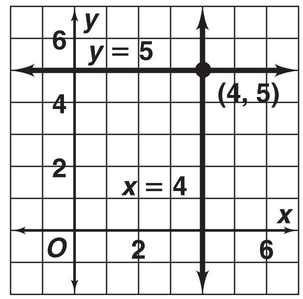


52. $\frac{3}{10} = 0.3, \frac{1}{12} = 0.08\overline{3}; \frac{3}{10} > \frac{1}{12}$; it is possible only if the ramp zigzags.

53. The y-intercepts are the same, and the lines have the same steepness. One line rises from left to right while the other falls from left to right.

54. Answers may vary. Sample: $x = 5, y - 6 = 2(x - 5)$, $y = x + 1$

55. $(2, 0), (0, 4); m = \frac{0 - 4}{2 - 0} = \frac{-4}{2} = -2$
$y - 0 = -2(x - 2), 2x + y = 4$ or $y = -2x + 4$

56. **a.** $y - 0 = \frac{5}{2}(x - 0)$ or $y = \frac{5}{2}x$

b. $y - 5 = -\frac{5}{2}(x - 2)$ or $y = -\frac{5}{2}x + 10$

c. The abs. value of the slopes is the same, but one slope is pos. and the other is neg. One y-int. is at $(0, 0)$ and the other is at $(0, 10)$.

57. Yes; the slope of $\overline{AB}$ = the slope of $\overline{BC}$.

58. No; the slope of $\overline{DE} \neq$ the slope of $\overline{EF}$.

59. Yes; the slope of $\overline{GH}$ = the slope of $\overline{HI}$.

60. Yes; the slope of $\overline{JK}$ = the slope of $\overline{KL}$.

61. $y - 2 = 3(x + 2); 3x - y = -8$

62. $y - 5 = \frac{1}{2}(x - 5); x - 2y = -5$

63. $y - 6 = \frac{2}{3}(x - 2); 2x - 3y = -14$

Answers for Lesson 3-7, pp. 177–179 Exercises

1. Yes; both slopes $= -\frac{1}{2}$.

2. No; the slope of $\ell_1 = \frac{1}{3}$ and the slope of $\ell_2 = \frac{1}{2}$.

3. No; the slope of $\ell_1 = \frac{3}{2}$, and the slope of $\ell_2 = 2$.

4. Yes; both slopes $= 4$.

5. Yes; both slopes $= 0$.

6. Yes; the lines both have a slope of 2 but different *y*-intercepts.

7. Yes; the lines both have a slope of $\frac{3}{4}$ but different *y*-intercepts.

8. Yes; the lines both have a slope of -1 but different *y*-intercepts.

9. No; one slope $= 7$ and the other slope $= -7$.

10. No; one slope $= -\frac{3}{4}$ and the other slope $= -3$.

11. Yes; the lines both have a slope of $-\frac{2}{5}$ but different *y*-intercepts.

12. $y - 3 = -2(x - 0)$ or $y - 3 = -2x$

13. $y - 0 = \frac{1}{3}(x - 6)$ or $y = \frac{1}{3}(x - 6)$

14. $y - 4 = \frac{1}{2}(x + 2)$

15. $y + 2 = -\frac{3}{2}(x - 6)$

16. Yes; the slope of $\ell_1 = -\frac{1}{2}$, and the slope of $\ell_2 = 2$; $-\frac{1}{2} \cdot 2 = -1$.

17. Yes; the slope of $\ell_1 = -\frac{3}{2}$, and the slope of $\ell_2 = \frac{2}{3}$; $-\frac{3}{2} \cdot \frac{2}{3} = -1$.

18. No; the slope of $\ell_1 = -1$, and the slope of $\ell_2 = \frac{4}{5}$; $-1 \cdot \frac{4}{5} \neq -1$.

19. Yes; the slope of $\ell_1 = -1$, and the slope of $\ell_2 = 1$; $-1 \cdot 1 = -1$.

20–23. Answers may vary. Samples are given.

20. $y - 6 = -\frac{3}{2}(x - 6)$

21. $y = -2(x - 4)$

22. $y - 4 = \frac{1}{2}(x - 4)$

23. $y = \frac{4}{5}x$

24. $y = -\frac{3}{2}x$

25. Yes; $1 \cdot (-1) = -1$.

26. Yes; one is vertical and the other is horizontal.

27. No; $\frac{2}{7} \cdot \left(-\frac{7}{4}\right) \neq -1$.

28. A

29. slope of $\overline{AB}$ = slope of $\overline{CD} = \frac{2}{3}$; $\overline{AB} \parallel \overline{CD}$
slope of $\overline{BC}$ = slope of $\overline{AD} = -3$; $\overline{BC} \parallel \overline{AD}$

30. slope of $\overline{AB}$ = slope of $\overline{CD} = -\frac{3}{4}$; $\overline{AB} \parallel \overline{CD}$
slope of $\overline{BC}$ = slope of $\overline{AD} = 1$; $\overline{BC} \parallel \overline{AD}$

31. slope of $\overline{AB} = \frac{1}{2}$; slope of $\overline{CD} = \frac{1}{4}$; $\overline{AB} \nparallel \overline{CD}$
slope of $\overline{BC} = -1$; slope of $\overline{AD} = -\frac{1}{2}$; $\overline{BC} \nparallel \overline{AD}$

32. slope of $\overline{AB}$ = slope of $\overline{CD} = 0$; $\overline{AB} \parallel \overline{CD}$
slope of $\overline{BC} = 3$ and slope of $\overline{AD} = \frac{3}{2}$; $\overline{BC} \nparallel \overline{AD}$

33. Answers may vary. Sample: $y = \frac{4}{5}x + 5$, $y = -\frac{5}{4}x + 5$

34. No; two $\parallel$ lines with the same y-intercept are the same line.

35. $\overline{RS}$ and $\overline{VU}$ are horizontal with slope = 0; $\overline{RS} \parallel \overline{VU}$;
slope of $\overline{RW}$ = slope of $\overline{UT} = 1$; $\overline{RW} \parallel \overline{UT}$;
slope of $\overline{WV}$ = slope of $\overline{ST} = -1$; $\overline{WV} \parallel \overline{ST}$

36. No; because no pairs of slopes have a product of -1.

37. The lines will have the same slope.

38. When lines are $\perp$, the product of their slopes is -1. So, two lines $\perp$ to the same line must have the same slope.

39. **a.** $y + 20 = \frac{3}{4}(x - 35)$

b. because you are given a point and can quickly find the slope

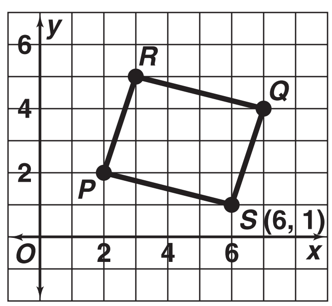
40. $\parallel$ **41.** $\perp$ **42.** neither

43. $\perp$ **44.** $\perp$

45. $\overline{AC}: d = \sqrt{(7 - 9)^2 + (11 - 1)^2} = \sqrt{104}$
$\overline{BD}: d = \sqrt{(13 - 3)^2 + (7 - 5)^2} = \sqrt{104}$
$\overline{AC} \cong \overline{BD}$

46. slope of $\overline{AC} = -5$; slope of $\overline{BD} = \frac{1}{5}$; since $-5 \cdot \frac{1}{5} = -1$, $\overline{AC} \perp \overline{BD}$; midpoint $\overline{AC} = (8, 6)$; midpoint $\overline{BD} = (8, 6)$; since the midpoints are the same, the diagonals bisect each other.

47. **a–b.** Answers may vary.
Sample:

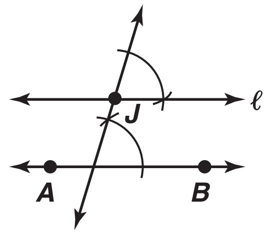


c. The other possible locations for S are $(-2, 3)$ and $(8, 7)$.

48. $y - 5 = \frac{1}{3}(x - 4)$

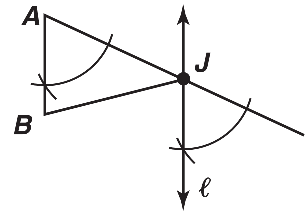
Answers for Lesson 3-8, pp. 184–186 Exercises

1.



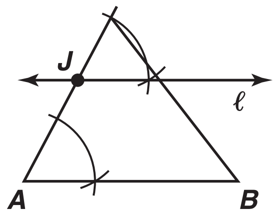
$\ell \parallel \overleftrightarrow{AB}$

2.



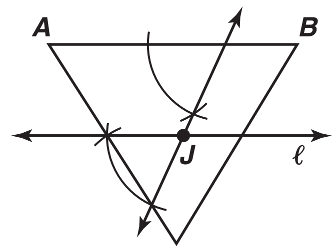
$\ell \parallel \overline{AB}$

3.



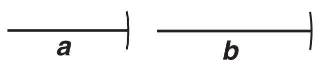
$\ell \parallel \overline{AB}$

4.

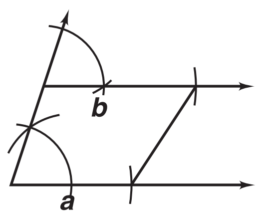


$\ell \parallel \overline{AB}$

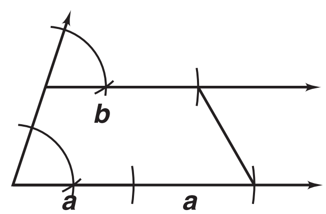
5–7. Constructions may vary. Samples using the following segments are shown:



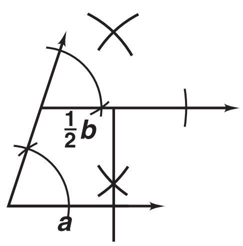
5.



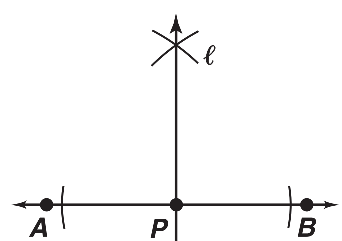
6.



7.

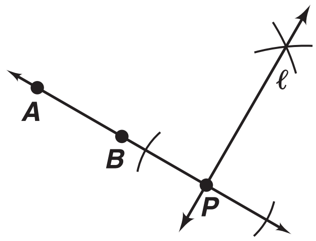


8.



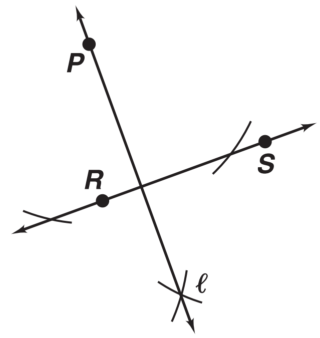
$\ell \perp \overleftrightarrow{AB}$

9.



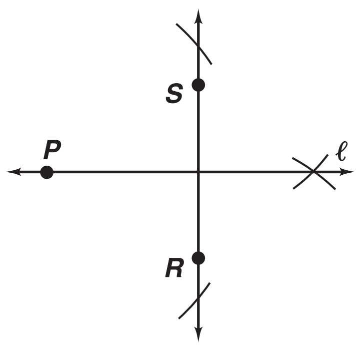
$\ell \perp \overleftrightarrow{AB}$

10.



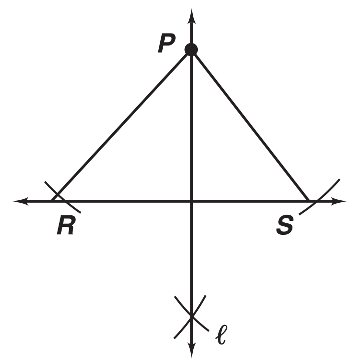
$\ell \perp \overleftrightarrow{RS}$

11.



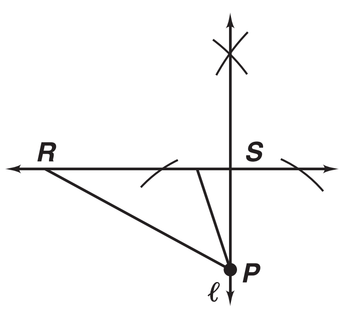
$\ell \perp \overleftrightarrow{RS}$

12.



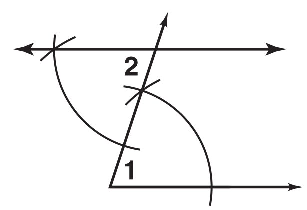
$\ell \perp \overleftrightarrow{RS}$

13.



$\ell \perp \overleftrightarrow{RS}$

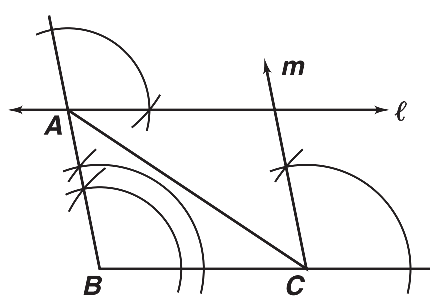
14.



$\angle 1 \cong \angle 2$

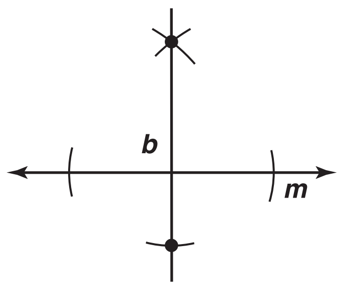
15. Construct a $\cong$ alt. int. $\angle$; then draw the $\parallel$ line.

16. a–b.



17–24. Constructions may vary. Samples are given.

17.



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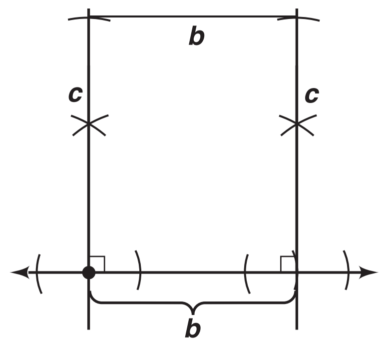
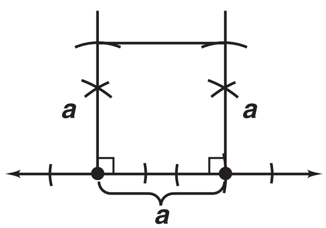
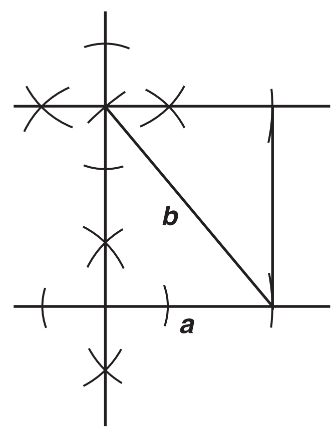


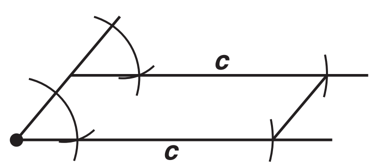
19.



20.



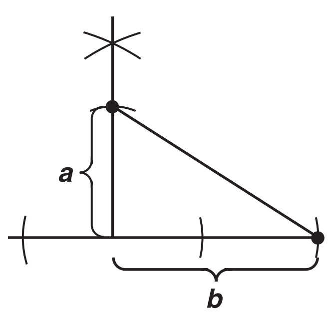
21. a.



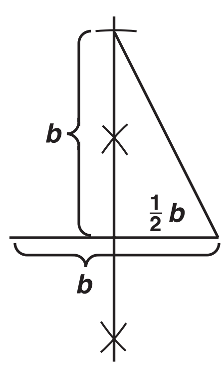
b. The sides are ∥ and ≅.

c. Check students' work.

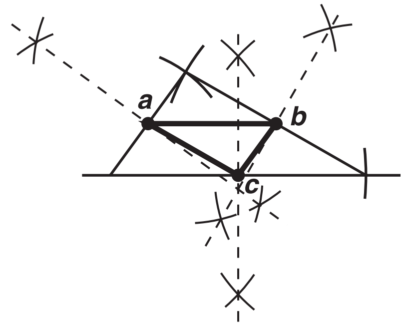
22.



23.



24. a–c.



d. The sides of the smaller △ are half the length of the sides of the larger △ that they are ∥ to.

e. Check students' work.

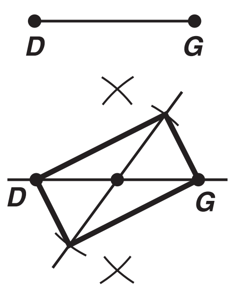
25. D

26. a–b. Check students' work.

c. $p \parallel m$; in a plane, two lines ⊥ to a third line are ∥.

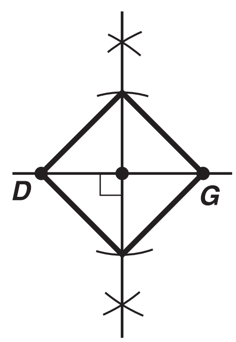
27–28. Answers may vary. Samples are given.

27.



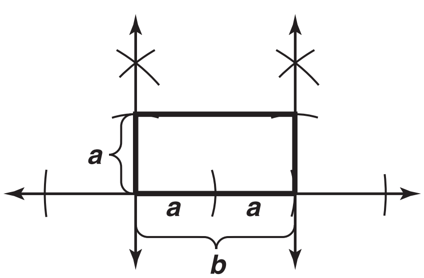
The quad. is a rectangle.

28.

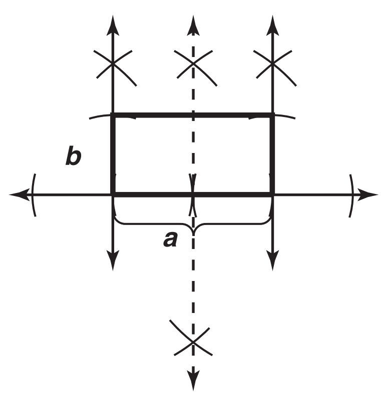


The quad. is a square.

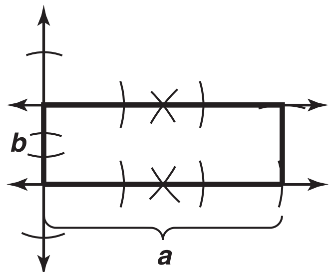
29.



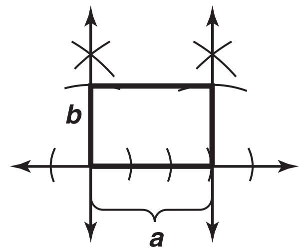
30.



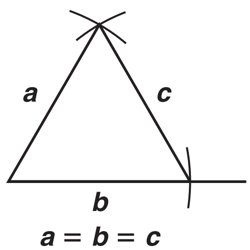
31.



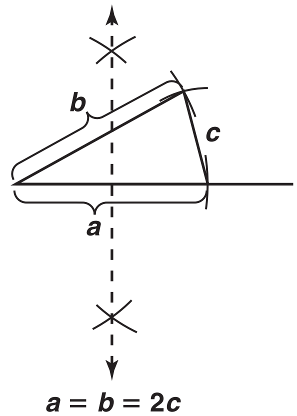
32.



33.



34.



35. Not possible; if $a = 2b = 2c$, then $2a = 2b + 2c$ or $a = b + c$. The smaller sides would meet at the midpoint of the longer side, forming a segment.

36. Not possible; the smaller sides would meet at the midpoint of the longer side, forming a segment.