

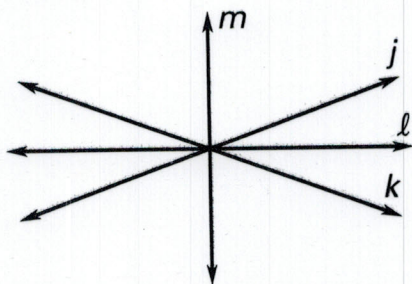
Answers for 2.7

For use with pages 127–132

2.7 Skill Practice

1. vertical
2. The sum is 90° ; the sum is 180° ; same; the sum is 180° .
3. $\angle MSN$ and $\angle PSQ$, $\angle NSP$ and $\angle QSR$, $\angle MSP$ and $\angle PSR$; indicated in diagram, Congruent Complements Theorem, Right Angles Congruence Theorem
4. $\angle ABC$ and $\angle DEF$, $\angle CBD$ and $\angle FEB$; Congruent Supplements Theorem
5. $\angle FGH$ and $\angle WXZ$; Right Angles Congruence Theorem
6. $\angle GML$ and $\angle HMJ$, $\angle GMH$ and $\angle LMJ$, $\angle JMK$ and $\angle GMK$; Vertical Angles Congruency Theorem, Vertical Angles Congruency Theorem, Right Angles Congruency Theorem
7. Yes; perpendicular lines form right angles, and all right angles are congruent.
8. 35° , 145° , 35°
9. 168° , 12° , 12°
10. 143° , 37° , 143°
11. 118° , 118° , 62°
12. $x = 11$, $y = 17$
13. $x = 13$, $y = 20$
14. $x = 4$, $y = 9$
15. *Sample answer:* It was assumed that $\angle 1$ and $\angle 3$, and $\angle 2$ and $\angle 4$ are linear pairs, but they are not; $\angle 1$ and $\angle 4$, and $\angle 2$ and $\angle 3$ are not vertical angles and are not congruent.
16. D 17. 30° 18. 25°
19. 27° 20. 133° 21. 58°
22. false 23. true
24. false 25. false
26. true 27. true
28. 130° , 50° , 130° , 50°
29. 140° , 40° , 140° , 40°
30. *Sample answer:* $m\angle CBX = 100^\circ$, $m\angle ABX = 100^\circ$
31. $\angle FGH$ and $\angle EGH$; Definition of angle bisector
32. $\angle 1$ and $\angle 9$; Congruent Supplements Theorem
33. *Sample answer:* $\angle CEB$ and $\angle DEB$; Right Angles Congruence Theorem
34. $\angle 5$ and $\angle 1$; Congruent Complements Theorem

35. Sample:



2.7 Problem Solving

36. Statements (Reason)

1. $\angle 1$ and $\angle 2$ are supplements;
 $\angle 3$ and $\angle 4$ are supplements;
 $\angle 1 \cong \angle 4$. (Given)
2. $m\angle 1 + m\angle 2 = 180^\circ$;
 $m\angle 3 + m\angle 4 = 180^\circ$
(Definition of supplementary angles)
3. $m\angle 1 = m\angle 4$ (Definition of congruent angles)
4. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$
(Transitive Property of Equality)
Subst. p.p.e. or
5. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 1$
(Substitution)
p.p.e.
6. $m\angle 2 = m\angle 3$ (Subtraction Property of Equality)
7. $\angle 2 \cong \angle 3$ (Definition of congruent angles)

- 37.** $m\angle 1 + m\angle 2 = m\angle 1 + m\angle 3$,
 $m\angle 2 = m\angle 3$, Given, Definition
of complementary angles,
Definition of congruent angles

38. Statements (Reasons)

1. $\angle ABD$ is a right angle; $\angle CBE$
is a right angle. (Given)
2. $\angle ABC$ and $\angle CBD$ are
complementary. (Definition of
complementary angles)
3. $\angle DBE$ and $\angle CBD$ are
complementary. (Definition of
complementary angles)
4. $\angle ABC \cong \angle DBE$ (Congruent
Complements Theorem)

39. Statements (Reasons)

1. $\overline{JK} \perp \overline{JM}$, $\overline{KL} \perp \overline{ML}$,
 $\angle J \cong \angle M$, $\angle K \cong \angle L$ (Given)
2. $\angle J$ and $\angle L$ are right angles.
(Definition of
perpendicular lines)
3. $\angle M$ and $\angle K$ are right angles.
(Right Angle
Congruence Theorem)
4. $\overline{JM} \perp \overline{ML}$, $\overline{JK} \perp \overline{KL}$
(Definition of
perpendicular lines)

Answers for 2.7 *continued*

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40. a. $m\angle 2 = (180 - x)^\circ$,
 $m\angle 3 = x^\circ$, $m\angle 4 = (180 - x)^\circ$

b. *Sample answer:* $x \approx 110$,
 $m\angle 2 \approx 70^\circ$, $m\angle 3 \approx 110^\circ$,
 $m\angle 4 \approx 70^\circ$

c. $\angle 2$ gets smaller, while $\angle 1$ and $\angle 3$ will get larger. *Sample answer:* $\angle 3$ and $\angle 4$, and $\angle 1$ and $\angle 2$ form linear pairs. Since the sum of the angles in a linear pair is always 180° , as one angle in a linear pair gets smaller the other angle of the linear pair will get larger.

41. Statements (Reasons)

- $\angle 1$ and $\angle 2$ are complementary; $\angle 3$ and $\angle 2$ are complementary. (Given)
- $m\angle 1 + m\angle 2 = 90^\circ$;
 $m\angle 3 + m\angle 2 = 90^\circ$
(Definition of complementary)
- $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$
(Transitive Property of Equality)
- $m\angle 1 = m\angle 3$ (Subtraction Property of Equality)
- $\angle 1 \cong \angle 3$ (Definition of congruent angles)

42. Statements (Reasons)

- $\angle 1 \cong \angle 3$ (Given)
- $\angle 1 \cong \angle 2$; $\angle 3 \cong \angle 4$ (Vertical Angles Theorem)
- $\angle 2 \cong \angle 3$ (Transitive Property of Angle Congruence)
- $\angle 2 \cong \angle 4$ (Transitive Property of Angle Congruence)

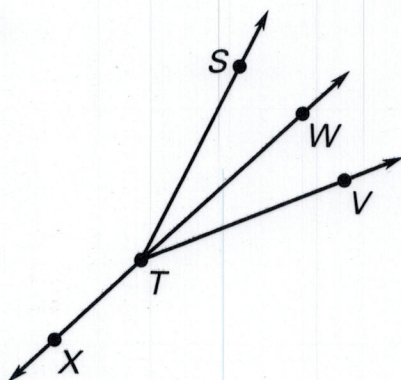
43. Statements (Reasons)

- $\angle QRS$ and $\angle PSR$ are supplementary. (Given)
- $\angle QRS$ and $\angle QRL$ are a linear pair. (Definition of linear pair)
- $\angle QRS$ and $\angle QRL$ are supplementary. (Definition of linear pair)
- $\angle QRL \cong \angle PSR$ (Congruent Supplements Theorem)

44. Statements (Reasons)

1. $\angle 1$ and $\angle 3$ are complementary; $\angle 2$ and $\angle 4$ are complementary. (Given)
2. $m\angle 1 + m\angle 3 = 90^\circ$
 $m\angle 2 + m\angle 4 = 90^\circ$
(Definition of complementary)
3. $\angle 2 \cong \angle 3$ (Vertical Angles Congruence Theorem)
4. $m\angle 1 + m\angle 2 = 90^\circ$
(Substitution)
5. $m\angle 1 + m\angle 2 = m\angle 2 + m\angle 4$
(Transitive Property of Equality)
6. $m\angle 1 = m\angle 4$ (Subtraction Property of Equality)
7. $\angle 1 \cong \angle 4$ (Definition of congruent angles)

45. a.



- b.** Given: $\angle STV$ is bisected by \overrightarrow{TW} , and \overrightarrow{TX} and \overrightarrow{TW} are opposite rays.
Prove: $\angle STX \cong \angle VTX$

c. Statements (Reasons)

1. $\angle STV$ is bisected by \overrightarrow{TW} ; \overrightarrow{TX} and \overrightarrow{TW} are opposite rays. (Given)
2. $\angle STW \cong \angle VTW$
(Definition of angle bisector)
3. $\angle VTW$ and $\angle VTX$ are a linear pair; $\angle STW$ and $\angle STX$ are a linear pair.
(Definition of linear pair)
4. $\angle VTW$ and $\angle VTX$ are supplementary; $\angle STW$ and $\angle STX$ are supplementary.
(Linear Pair Postulate)
5. $\angle STW$ and $\angle VTX$ are supplementary.
(Substitution)
6. $\angle STX \cong \angle VTX$ (Congruent Supplements Theorem)

46. a. =

b. =

c. <

d. >

Answers for 2.7 continued

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47. Statements (Reasons)

1. $m\angle WYZ = m\angle TWZ = 45^\circ$
(Given)
2. $\angle TWZ$ and $\angle SWZ$ are a linear pair; $\angle WYZ$ and $\angle XYW$ are a linear pair.
(Definition of linear pair)
3. $\angle TWZ$ and $\angle SWZ$ are supplementary; $\angle WYZ$ and $\angle XYW$ are supplementary.
(Linear Pair Postulate)
4. $m\angle TWZ + m\angle SWZ = 180^\circ$;
 $m\angle WYZ + m\angle XYW = 180^\circ$
(Definition of supplementary angles)
5. $m\angle TWZ + m\angle SWZ =$
 $m\angle WYZ + m\angle XYW$
(Transitive Property of Equality)
6. $45^\circ + m\angle SWZ = 45^\circ +$
 $m\angle XYW$ (Substitution)
7. $m\angle SWZ = m\angle XYW$
(Subtraction Property of Equality)
8. $\angle SWZ \cong \angle XYW$ (Definition of congruent angles)

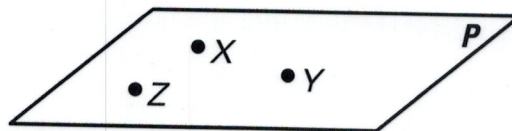
48. Statements (Reasons)

1. The hexagon is regular.
(Given)
2. $\angle 1$ is congruent to an interior angle of the hexagon. (Vertical Angles Congruence Theorem)
3. $\angle 2$ is supplementary to an interior angle of the hexagon.
(Linear Pair Postulate)
4. $\angle 2$ is supplementary to $\angle 1$.
(Substitution)
5. $m\angle 1 + m\angle 2 = 180^\circ$
(Definition of supplementary angles)

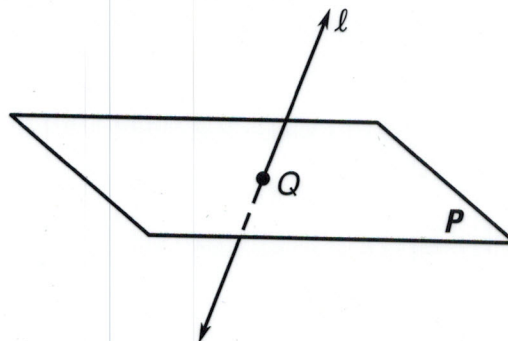
2.7 Mixed Review

49–52. Sample answers are given.

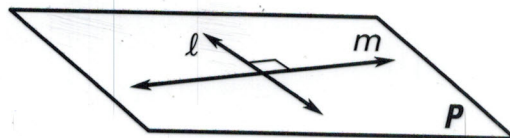
49.



50.



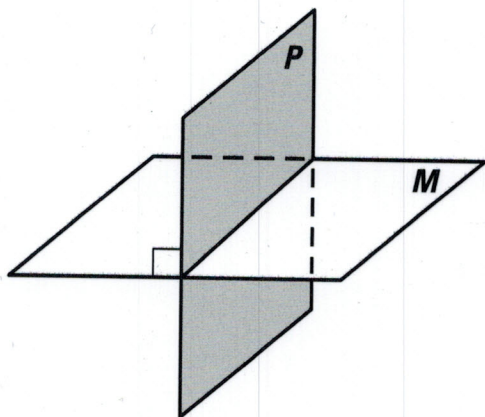
51.



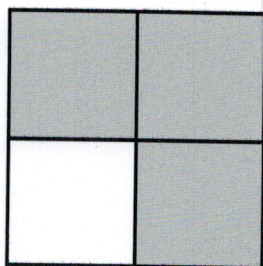
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52.



53.



2.5–2.7 Mixed Review of Problem Solving

1. a. Statements (Reasons)

1. \overrightarrow{BD} bisects $\angle ABC$; \overrightarrow{BC} bisects $\angle DBE$. (Given)

2. $m\angle ABD = m\angle DBC$;
 $m\angle DBC = m\angle CBE$
 (Definition of angle bisector)

3. $m\angle ABD = m\angle CBE$
 (Transitive Property of Equality)

b. 33° ; $m\angle DBC = \frac{1}{3} m\angle ABE$

2. Yes; each piece is $\frac{1}{4}$ the original width.

3. 100° ;

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| (9) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

4. *Sample answer:* Congruent Supplements Theorem states exactly what is to be explained while the Transitive Property of Angle Congruence requires $\angle 1 \cong \angle 2$ and $\angle 2 \cong \angle 3$ to be able to state $\angle 1 \cong \angle 3$.

5. a. Equation (Reason)

$$T = c(1 + s) \quad (\text{Given})$$

$$\frac{T}{c} = 1 + s \quad (\text{Division Property of Equality})$$

$$\frac{T}{c} - 1 = s \quad (\text{Subtraction Property of Equality})$$

b. 0.07, or 7%

Answers for 2.7 *continued*

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5. **c.** Yes; distribute the c then subtract c from both sides, followed by dividing both sides by c .
6. *Sample answer:* Either $m\angle BAC$ or $m\angle CAD$; since $\angle GAD$ is a straight angle, if two of the three angles are known, the third angle can be found.
7. $m\angle 1 = m\angle 2 = 45^\circ$,
 $m\angle 3 = m\angle 4 = 135^\circ$;
 $m\angle 1 + m\angle 3 = m\angle 1 + 3m\angle 1$
 $= 4m\angle 1 = 180^\circ$
8. $\angle EAF$ and $\angle BAC$ are complementary. *Sample answer:* $m\angle BAC + m\angle CAD + m\angle DAE + m\angle EAF = m\angle BAF$ by the Angle Addition Postulate; $m\angle BAF = 180^\circ$ and $m\angle CAD + m\angle DAE = 90^\circ$, so $m\angle BAC + m\angle EAF = 90^\circ$.