2.6 Skill Practice

1. A theorem is a statement that can be proven; a postulate is a rule that is accepted without proof.

2. *Sample answer:* Definitions, properties, postulates; Definition of a Right Angle, Transitive Property, Angle Addition Postulate

3. $AC = 11$; Substitution Property of Equality

4. A

5. $\overline{SE}$

6. $\angle JKL, \angle RST$

7. $\angle J, \angle L$

8. Symmetric Property of Congruence

9. Reflexive Property of Congruence

10. Transitive Property of Congruence

11. Reflexive Property of Equality

12. C

13. The reason is the Transitive Property of Congruence, not the Reflexive Property of Congruence.

14.
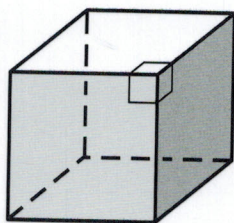
15.

| Cottage | Snack Shop | Bike Rental | Arcade | Kite Shop |

16. Given; Definition of congruent segments

17.

	Equation	Explanation	Reason
1	$\overline{QR} \cong \overline{PQ}, \overline{RS} \cong \overline{PQ}$	Write original statement.	Given
2	$\overline{QR} \cong \overline{RS}$	Both segments are congruent to $\overline{PQ}$.	Transitive Property Congruent Segments
3	$QR = RS$	Write an equation using the equal segment lengths.	Definition of congruent segments
4	$2x + 5 = 10 - 3x$		Substitution Prop
5	$5x + 5 = 10$	Add $3x$ to each side.	Addition Property of Equality
6	$5x = 5$	Subtract 5 from each side.	Subtraction Property of Equality
7	$x = 1$	Divide each side by 5.	Division Property of Equality

18.

Equation	Explanation	Reason
$m\angle ABC = 90°$	Write original statement.	Given
$m\angle ABC = 6x° + (3x - 9)°$	Marked in diagram.	Angle Addition Postulate
$6x° + (3x - 9)° = 90°$	Replace $m\angle ABC$ with $6x° + (3x - 9)°$.	Substitution
	Add $6x$ to $3x$.	~~Combine like terms.~~ **Distributive POE**
$9x - 9 = 90$	Add 9 to each side.	Addition Property of Equality
$9x = 99$	Divide each side by 9.	Division Property of Equality
$x = 11$		

19. A proof is deductive reasoning because it uses facts, definitions, accepted properties, and laws of logic.

20. a. x. *Sample answer:* implies that $AB = MP$ and $MP = PN$, so $AB = PN$ by the Transitive Property of Equality, $PN = x$, therefore $AB = x$.

b. $2x$. *Sample answer:* $MP = PN = x$, $MP + PN = MN$, therefore $MN = 2x$.

c. $\frac{x}{2}$. *Sample answer:*

$MQ = QP$, $MQ + QP = x$, $MQ + MQ = x$, $2MQ = x$, therefore $MQ = \frac{x}{2}$.

d. $\frac{3x}{2}$. *Sample answer:* $NP = x$, $PQ = \frac{x}{2}$, $NP + PQ = NQ$, $x + \frac{x}{2} = NQ$, therefore $\frac{3x}{2} = NQ$.

2.6 Problem Solving

21. Definition of angle bisector; Transitive Property of Congruence

22. D, A, F, C, G, B, E

23. Statements (Reasons)

1. $2AB = AC$ (Given)

2. $AC = AB + BC$

    (Segment Addition Postulate)

3. $2AB = AB + BC$ (Transitive Property of Segment Equality)

4. $AB = BC$

 (Subtraction Property of Equality)

24. Statements (Reasons)

1. $m\angle 1 + m\angle 2 = 180°,$
   $m\angle 1 = 62°$ (Given)

2. $62° + m\angle 2 = 180°$
             (Substitution)

3. $m\angle 2 = 118°$

 (Subtraction Property of Equality)

25. Statements (Reasons)

1. A is an angle.   (Given)

2. $m\angle A = m\angle A$
   (Reflexive Property of Equality)

3. $\angle A \cong \angle A$ (Definition of congruent angles)

26. Statements (Reasons)

1. $\overline{WX} \cong \overline{XY}$ and $\overline{XY} \cong \overline{YZ}$
             (Given)

2. $WX = XY$ and $XY = YZ$
   (Definition of congruent

segments)

3. $WX = YZ$ (Transitive Property

of Equality)

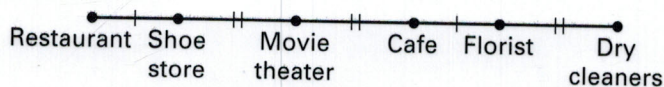4. $WX \cong YZ$
   (Definition of

congruent segments)

27. Equiangular; Transitive Property of Congruent Angles implies $\angle 1 \cong \angle 3$, so all angle measures are the same.

28. *Sample answer:* The length of each segment is the same, therefore the segments are congruent.

29. a.

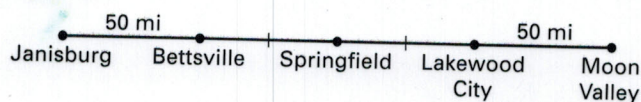Restaurant — Shoe store — Movie theater — Cafe — Florist — Dry cleaners

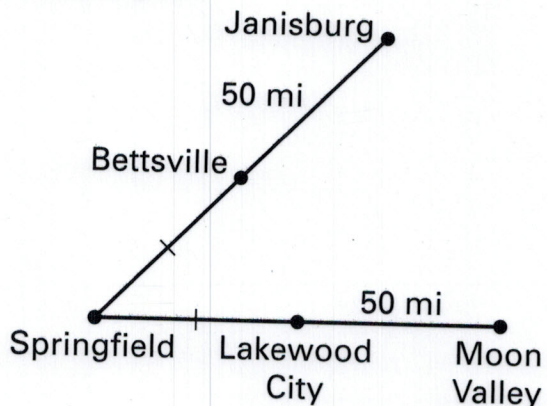**b.** Given: $RS = CF$,
$SM = MC = FD$;
Prove: $RM = CD$

c. Statements (Reasons)

1. $RS = CF$, $SM = MC = FD$
   (Given)

2. $RS + SM = RM$ (Segment Addition Postulate)

3. $CF + FD = CD$ (Segment Addition Postulate)

4. $CF + FD = RM$
   (Substitution)

5. $RM = CD$ (Transitive Property of Equality)

30. a.

Janisburg — 50 mi — Bettsville — Springfield — Lakewood City — 50 mi — Moon Valley

b. Sample:

Janisburg
50 mi
Bettsville
Springfield — Lakewood City — 50 mi — Moon Valley

c. *Sample answer:* In the second diagram Bettsville and Lakewood City are not in opposite directions from Springfield.

2.6 Mixed Review

31. 43°, 133°   **32.** 61°, 151°

33. 1°, 91°

34. Equation (Reason)

$5x + 14 = -16$ (Given)

$5x = -30$
(Substitution Property of Equality)

$x = -6$
(Division Property of Equality)

35. <u>Equation (Reason)</u>

$2x - 9 = 15 - 4x$ (Given)

$6x - 9 = 15$
     (Addition Property of Equality)

$6x = 24$
     (Addition Property of Equality)

$x = 4$
     (Division Property of Equality)

36. <u>Equation (Reason)</u>

$x + 28 = -11 - 3x - 17$
     (Given)

$x + 28 = -3x - 28$ (Simplify.)

$4x + 28 = -28$
     (Addition Property of Equality)

$4x = -56$
(Subtraction Property of Equality)

$x = -14$
(Division Property of Equality)