Warm Up 31

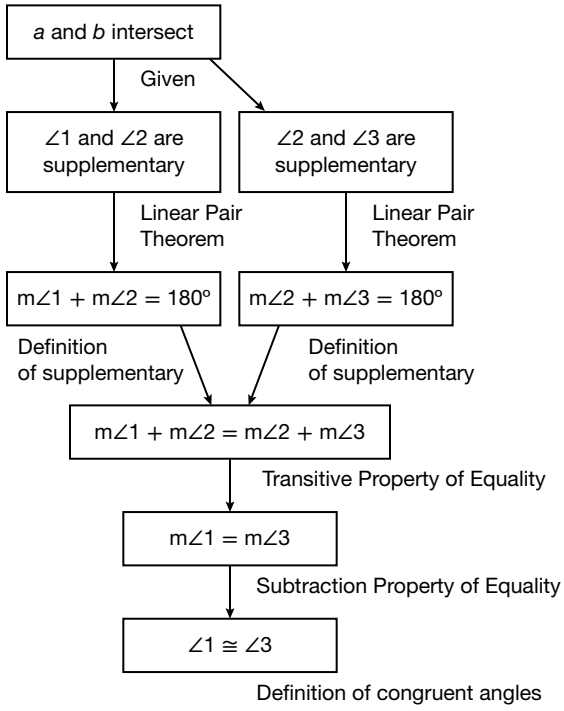
1. deductive
2. D
3. I will go to the store;
   Law of Detachment

Lesson Practice 31

a.

Statements	Reasons
1. $\angle 1$ and $\angle 2$ are complementary.	1. Given
2. $\angle 1$ and $\angle 3$ are congruent.	2. Given
3. $m\angle 1 + m\angle 2 = 90°$	3. Definition of complementary angles
4. $m\angle 1 = m\angle 3$	4. Definition of congruent angles
5. $m\angle 3 + m\angle 2 = 90°$	5. Substitution Property of Equality
6. $\angle 3$ and $\angle 2$ are complementary.	6. Definition of complementary angles

b.



c.

Statements	Reasons
1. $\angle 1$ and $\angle 4$ are complementary.	1. Given
2. $m\angle 1 + m\angle 4 = 90°$	2. Definition of complementary angles
3. $\angle 1$ and $\angle 3$ are congruent. $\angle 2$ and $\angle 4$ are congruent.	3. Vertical Angles Theorem
4. $m\angle 1 = m\angle 3$, $m\angle 2 = m\angle 4$	4. Definition of congruent angles
5. $m\angle 2 + m\angle 3 = 90°$	5. Substitution Property of Equality
6. $\angle 2$ and $\angle 3$ are complementary.	6. Definition of complementary angles

d. It is given that *s* and *t* are perpendicular lines. By the definition of perpendicular lines, angles 1 and 2 are right angles. Angles 1 and 2 are congruent by Theorem 5-3: All right angles are congruent. Angles 1 and 2 are adjacent by the definition of adjacent angles. Therefore, angles 1 and 2 are congruent adjacent angles.

Practice 31

1. 90°

2.

Statements	Reasons
1. $\overline{AE} \cong \overline{CE}$, $\overline{DE} \cong \overline{BE}$	1. Given
2. $AE = CE$, $DE = BE$	2. Definition of congruent segments
3. $m\angle AED = m\angle CEB$	3. Vertical Angles Theorem
4. $\triangle AED \cong \triangle CEB$	4. SAS Theorem
5. $\overline{AD} \cong \overline{CB}$	5. CPCTC

3. 60°

4. 3 cm

5. 290°

6. By the Vertical Angles Theorem, $\angle 1 \cong \angle 2$. Then by the Same-Side Interior Angles Theorem, $\angle 2$ and $\angle 3$ are supplementary. By the Alternate Interior Angles Theorem, $\angle 3 \cong \angle 4$. By substitution $\angle 2$ and $\angle 4$ are supplementary. By the definition of a linear pair, $\angle 4$ and $\angle 5$ are supplementary. Using the Congruent Supplements Theorem, $\angle 2 \cong \angle 5$. Finally, $\angle 1 \cong \angle 5$ by the Transitive Property of Congruence.

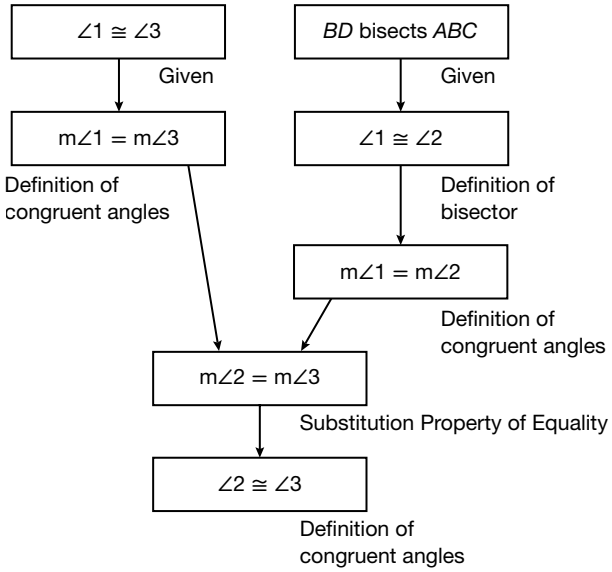
7. 25

8. no

9. 135°

10. 32 in.

11.



12. $\angle A \cong \angle X$, $\angle B \cong \angle Y$, $\angle C \cong \angle Z$, $\overline{AB} \cong \overline{XY}$, $\overline{BC} \cong \overline{YZ}$, $\overline{CA} \cong \overline{ZX}$; Transitive Property of Congruence

13.

Statements	Reasons
1. $A = 25$, $\ell = 5$	1. Given
2. $A = \ell w$	2. Area of a rectangle
3. $25 = 5w$	3. Substitution Property of Equality
4. $\frac{25}{5} = \frac{5w}{5}$	4. Division Property of Equality
5. $w = 5$	5. Simplify
6. *ABCD* is a square	6. Definition of a square

14. If two numbers are opposites, then they have midpoint 0 on a number line; Both the statement and the converse are true.

15. C

16. a: $x = -3$; b: $y = 2$

17. There is a good chance of wind and rain later in the day.

18. Gayle is correct because according to the ASA Theorem or the AAS Postulate, corresponding sides must be congruent in order for the triangles to be congruent.

19. Sample: The equation $x + 1 = x + 2$ has no solutions.

20.

Statements	Reasons
1. $\overline{AD} \parallel \overline{BC}$, $\overline{AD} \cong \overline{BC}$	1. Given
2. $AD = BC$	2. Definition of congruent segments
3. $m\angle ADE = m\angle CBE$	3. Alternate Interior Angles Theorem
4. $m\angle AED = m\angle CEB$	4. Vertical Angles Theorem
5. $\triangle ADE \cong \triangle CBE$	5. AAS Theorem
6. $\overline{AE} = \overline{CE}$	6. CPCTC

21. Since $\overline{AD}$ bisects $\overline{CB}$, $\overline{CD} \cong \overline{BD}$ by definition of bisector. Because $\overline{AD} \perp \overline{CB}$, $\angle ADC$ and $\angle ADB$ are right angles by definition of perpendicular. Then $\angle ADC \cong \angle ADB$, because all right angles are congruent. From the drawing, $\overline{AD} \cong \overline{AD}$ by the Reflexive Property. Finally, $\triangle ACD \cong \triangle ABD$ by SAS Postulate.

22. $\sqrt{((x-3)-1)^2+((4x+1)-1)^2}=5$ Distance Formula

$\sqrt{(x-4)^2+(4x)^2}=5$ Simplify.

$\sqrt{x^2-8x+16+16x^2}=5$ Expand exponents.

$\sqrt{17x^2-8x+16}=5$ Simplify.

$\left(\sqrt{17x^2-8x+16}\right)^2=5^2$ Square both sides.

$17x^2-8x+16=25$ Simplify.

$17x^2-8x+16-25=25-25$ Subtraction Property of Equality

$17x^2-8x-9=0$ Simplify.

$(17x+9)(x-1)=0$ Factor.

$x-1=0$ $x>0$

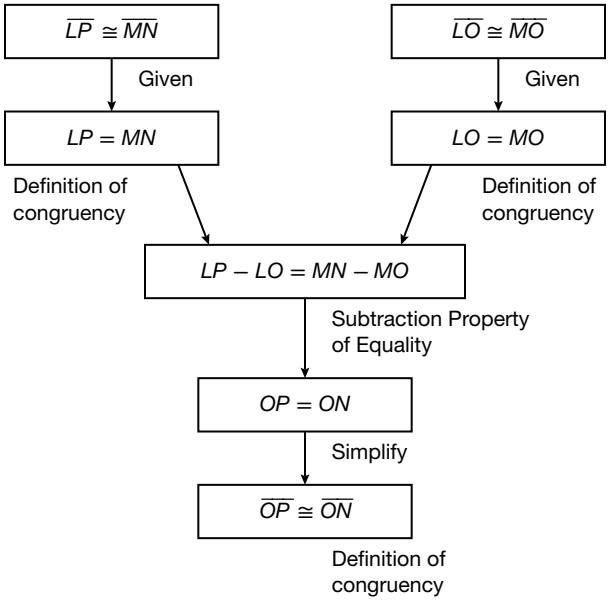
$x-1+1=1$ Addition Property of Equality

$x=1$ Simplify.

The coordinates are $(-2, 5)$.

23. $y-2=4(x+3)$ or $y=4x+14$

24.



25. yes;

Statements	Reasons
1. $\angle B$ and $\angle E$ are right angles, $AB = DE$, $AC = DF$	1. Given
2. $AB^2 + BC^2 = AC^2$	2. Pythagorean Theorem
3. $DE^2 + EF^2 = DF^2$	3. Pythagorean Theorem
4. $AB^2 + BC^2 = DE^2 + EF^2$	4. Substitution Property of Equality
5. $BC^2 = EF^2$	5. Subtraction Property of Equality
6. $BC = EF$	6. Square root
7. $m\angle ABC = m\angle DEF$	7. All right angles are congruent
8. $\triangle ABC \cong \triangle DEF$	8. SAS Theorem

26. **a.** $0.9\ m^2$

b. 3.51 m

27. **a.** $\sim p$ or q

b. $\sim p$ and $\sim q$

c. p and $\sim q$

28. interior: $\angle TSZ$, $\angle WVU$; exterior: $\angle AZY$, $\angle SZB$, and $\angle WVC$

29. No, the circumference is 40.82 cm.

30. $x = 5$