Warm Up 36

1. Side-Angle-Side
2. 50°
3. C

Lesson Practice 36

a. $\triangle ABC$ and $\triangle DEF$ are right triangles, legs $\overline{AB}$ and $\overline{DE}$ are congruent, and acute angles A and D are congruent; Therefore, by the LA Triangle Congruence Theorem, $\triangle ABC \cong \triangle DEF$.

b. $\triangle ABC$ and $\triangle DEF$ are right triangles, hypotenuses $\overline{AC}$ and $\overline{DF}$ are congruent, and acute angles A and D are congruent; therefore, by the HA Triangle Congruence Theorem, $\triangle ABC \cong \triangle DEF$.

c. $\triangle ABC$ and $\triangle DEF$ are right triangles, legs $\overline{AB}$ and $\overline{DE}$ are congruent, and legs $\overline{BC}$ and $\overline{EF}$ are congruent; therefore, by the LL Triangle Congruence Theorem, $\triangle ABC \cong \triangle DEF$.

d. $\triangle ABC$ and $\triangle DEF$ are right triangles, hypotenuses $\overline{AC}$ and $\overline{DF}$ are congruent, and legs $\overline{BC}$ and $\overline{EF}$ are congruent; therefore, by the HL Triangle Congruence Theorem, $\triangle ABC \cong \triangle DEF$.

e. HL Triangle Congruence Theorem

Practice 36

1. $\triangle OPQ$ and $\triangle TRS$ are right triangles, hypotenuses $\overline{PQ} \cong \overline{RS}$, and acute $\angle P \cong \angle R$; by Hypotenuse-Angle Congruence Theorem, $\triangle OPQ \cong \triangle TRS$.

2. $m\overset{\frown}{AB} + m\overset{\frown}{BC} + m\overset{\frown}{CD} = m\overset{\frown}{AD}$

3. The square's right angles are still present in these triangles, so they are right triangles. Their hypotenuses are congruent because they are the square's sides. They also have one shared leg, which is congruent to itself by the Reflexive Property. Therefore, by the HL Congruence Theorem, the triangles are congruent.

4. Greta used the diameter, not the radius, in her calculation.

5. 0.5 yards

6. $\triangle JKL$ and $\triangle MNO$ are right triangles, $\overline{JK} \cong \overline{MN}$, and $\overline{KL} \cong \overline{NO}$; by the Leg-Leg Congruence Theorem, $\triangle \overline{JKL} \cong \triangle \overline{MNO}$.

7. 25 cm

8. **a.** $A = \frac{1}{2}(b_1 + b_2)h$

   b. $h = \frac{2A}{(b_1 + b_2)}$

9. Draw a line that is perpendicular to $\overline{AB}$ at Y. So $m\angle AYX$ and $m\angle BYX$ are both 90° by the definition of perpendicular lines. It is given that $AX = BX$, so $\overline{AX} \cong \overline{BX}$ by definition of congruent segments. By the Reflexive Property of Congruence, $\overline{XY} \cong \overline{XY}$, so by the HL Congruence Theorem, $\triangle AXY \cong \triangle BXY$. So by CPCTC, $\overline{AY} \cong \overline{BY}$. By the definition of midpoint, Y is the midpoint of $\overline{AB}$, and since $\overline{XY}$ is

perpendicular to $\overline{AB}$ at its midpoint, it is the perpendicular bisector of $\overline{AB}$. Since X is on $\overline{XY}$, it is on the perpendicular bisector of $\overline{AB}$.

10. 113.10 cm^2

11. 12.6 in^2

12. $x = 10$

13. 25 $units^2$

14. A

15. $h = 3$

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

17. $\triangle ABC \cong \triangle EFD$

18. 60°; 24π

19.

Statements	Reasons
1. $AE = CE$, $m\angle BAE = m\angle DCE$	1. Given
2. $m\angle AEB = m\angle CED$	2. Vertical Angles Theorem
3. $\angle AEB \cong \angle CED$	3. ASA Theorem

20. The triangles are not congruent since the first has a side length of 12 units and the second does not have a corresponding side length of 12 units.

21.

Statements	Reasons
1. $\overline{VX} \perp \overline{YX}$, $\overline{VZ} \perp \overline{YZ}$, $VX = VZ$	1. Given
2. $\angle VXY$ and $\angle VZY$ are right angles	2. Definition of perpendicular
3. $YV \cong YV$	3. Reflexive Property
4. $\triangle YXV \cong \triangle YZV$	4. HL Theorem
5. $\angle XYV \cong \angle ZYV$	5. CPCTC
6. $\overrightarrow{YV}$ bisects $\angle XYZ$	6. Definition of angle bisector

22. $x = 11$

23. no; obtuse

24. Sample: Since all sides of a square are congruent, each triangle has two sides which are congruent, and since the included angle of the sides of each triangle is a right angle, by the SAS Congruence Theorem, the triangles are congruent.

25. $x = \{5, 7\}$

26. a.

Organism is an animal	Organism has leaves	Organism is an animal or has leaves
T	T	T
T	F	T
F	T	T
F	F	F

b. The truth table shows that the disjunction is false when both statements are false; An organism can be a nonanimal without leaves, such as algae.

27. $\triangle JKL$ and $\triangle MNO$ are right triangles, $\overline{JK} \cong \overline{MN}$, and $\angle J \cong \angle M$; so by the Leg-Angle Congruence Theorem, $\triangle JKL \cong \triangle MNO$.

28. She is correct because by the converse of the Pythagorean Theorem, $5^2 + 8^2 > 9^2$, so the triangle is acute.

29.

Statements	Reasons
1. $\triangle ABC$ and $\triangle DEF$ are right triangles	1. Given
2. $\overline{AB} \cong \overline{DE}$	2. Given
3. $\angle A \cong \angle D$	3. Given
4. $\angle B$ and $\angle E$ are right angles	4. Given
5. $\angle B \cong \angle E$	5. Right Angle Congruence Theorem
6. $\triangle ABC \cong \triangle DEF$	6. ASA Postulate

30. Because multiple different lines can only intersect in a single point, the intersection of two altitudes will be the same point as the intersection of all three.