Warm Up 48

1. flowchart proof
2. False
3. D

Lesson Practice 48

a. assume $m\angle X \neq m\angle Y$

b. $\overleftrightarrow{AB}$ is not perpendicular to $\overleftrightarrow{CB}$.

c. An isosceles triangle has no sides of equal length.

d. Assume that a triangle has more than one right angle. If, in $\triangle ABC$, $\angle A$ and $\angle B$ are right angles, then they each measure 90°. By the Triangle Angle Sum Theorem, $\angle A + \angle B + \angle C = 180°$. By substitution, $90° + 90° + \angle C = 180°$ or $\angle C = 0°$. This contradicts the definition of an angle, so a triangle cannot have more than one right angle.

e. Assume that $\angle 4$ is not congruent to $\angle 6$. Since $m \perp n$ and the corresponding angles formed by a transversal are congruent, $\angle 1 \cong \angle 5$. From the diagram, $\angle 1$ is a linear pair with $\angle 4$, and $\angle 5$ is a linear pair with $\angle 6$. Therefore, $\angle 1$ and $\angle 4$ are supplementary and $\angle 5$ and $\angle 6$ are supplementary. Since $\angle 1 \cong \angle 5$, both $\angle 4$ and $\angle 6$ are supplementary to $\angle 1$. This contradicts the assumption, because angles that are supplementary to the same angle are congruent to each other.

Practice 48

1. See student work.

2.

Statements	Reasons
1. $AD \parallel BC$, $AB \parallel DC$	1. Given
2. $m\angle ADB = m\angle CBD$	2. Alternate Interior Angles Theorem
3. $DB = BD$	3. Symmetric Property of Equality
4. $m\angle ABD = m\angle CDB$	4. Alternate Interior Angles Theorem
5. $\triangle ADB \cong \triangle CBD$	5. ASA Theorem
6. $AD = CB$	6. CPCTC

3. 7.07

4. $\angle W$, $\angle C$, $\angle D$

5. Yes, since the opposite angles are supplementary.

6. The student found a perpendicular bisector and a median instead of three altitudes.

7. 1:22

8. 34 m^2

9. $g = 4.5$

10. Sample: $(2h, 0)$ or $(0, 2k)$

11. 31.4 ft^2

12. $BC = DF$

13. Assume $m\angle P \not> m\angle X$. So either $m\angle P < m\angle X$ or $m\angle P = m\angle X$.

Case 1: If $m\angle P < m\angle X$, then $QR < YZ$ by the Hinge Theorem. This contradicts the given information, so $m\angle P \not< m\angle X$.

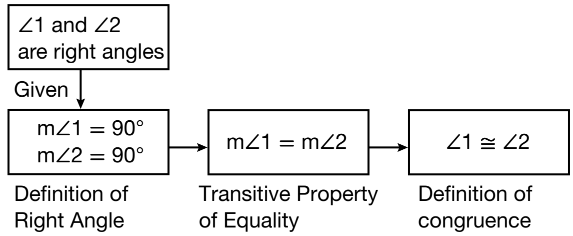
Case 2: If $m\angle P = m\angle X$, then $\angle P \cong \angle X$. So $\triangle PQR \cong \triangle XYZ$ by SAS. Then $\overline{QR} \cong \overline{YZ}$ by CPCTC, and $QR = YZ$. This contradicts given information, so $m\angle P \neq m\angle X$. Therefore, $m\angle P > m\angle X$.

14. 7.8 cm

15. $AB : MN = AC : MP$, $\angle A \cong \angle M$, so $\triangle ABC \sim \triangle MNP$ by SAS~

16. D

17.



18. Assume that two lines can intersect in two different planes. By the definition of intersecting lines, this means that the points of both lines are contained in both planes. This means that the points in common to both planes form at least these two lines. This contradicts the postulate that if two planes intersect then their intersection is a line, so the assumption was false and exactly one plane contains two intersecting lines.

19. Since the tongs are to be the same length, the triangles they create when open would have two congruent side pairs. The Hinge Theorem can be used to determine which should have the larger spread angle. The tong that needs to pick up larger items needs to be able to open through a longer length, so this needs to open through the greatest angle.

20. 105°

21. 4 units

22. perimeter = 30 ft; area = 32.5 ft^2

23. $n = 8$, $x = 500$

24. Assume that $\angle KJL$ is not congruent to $\angle MIN$. $\angle MIN \cong \angle HIJ$ by the Vertical Angles Theorem. By CPCTC, $\angle HIJ \cong \angle KJL$ and by the transitive property of congruence, $\angle KJL \cong \angle MIN$. This contradicts the assumption we made, so $\angle KJL \cong \angle MIN$.

25. 24

26. 152°

27. Finding arc length applies an angle-measure-to-360° ratio to the formula for circumference.

28. $\angle SUT \cong \angle VUW$ by the Symmetric Property of Equality, $\angle TSU \cong \angle WVU$, so $\triangle STU \sim \triangle VWU$ by AA Similarity. Therefore $x = 39$.

29. The triangles are right triangles, and each triangle has an 8-in. leg and an 11-in. leg; by the definition of congruent segments, the triangles have two pairs of congruent legs; therefore the hypothesis of the LL Congruence Theorem is met.

30. Assume there are distinct points X and Y such that $\overline{PX}$ and $\overline{PY}$ are both perpendicular to $\overleftrightarrow{AB}$. Then by definition of perpendicularity, $\angle AXP$ and $\angle BYP$ are both right angles. Since $\angle YXP$ and $\angle XYP$ are both complementary to right angles, they are both right angles. But then $\triangle PXY$ has two right angles in it, which implies by the Triangle Sum Theorem that $m\angle XPY = 0°$, which contradicts the assumption that both $\overline{PX}$ and $\overline{PY}$ are perpendicular. So there is only one point on $\overleftrightarrow{AB}$ through which there is a perpendicular through P.