2. congruent

3. base

4. congruence transformation

5. vertex

6. Yes, map one figure to the other by reflecting across a vertical line between the two figures.

7. No, the two figures are not the same size. In order to be congruent, figures must be the same size and shape.

8. Yes, it will map the figure onto itself. In order to be congruent, figures must be the same size and shape. Since the reflected figure will be the same size and shape and mapped across the same space as the original figure, the two figures are congruent.

9. 45°, 90°. By the definition of an isosceles triangle, since two sides of $\triangle GHI$ are congruent, the angles opposite those sides are also congruent. Thus, $\angle H \cong \angle I$, and we solve for the unknown angle measurements.

$$m\angle H = m\angle I = 45$$
$$m\angle H + m\angle I + m\angle G = 180$$
$$45 + 45 + m\angle G = 180$$
$$m\angle G = 90$$

10. 70°, 70°; By the definition of an isosceles triangle, since two sides of $\triangle LMN$ are congruent, the angles opposite those sides are also congruent. Thus, $\angle L \cong \angle M$, and we solve for the unknown angle measurements.

$$m\angle L = m\angle M$$
$$m\angle L + m\angle M + m\angle N = 180$$
$$m\angle L + m\angle M + 40 = 180$$
$$m\angle L + m\angle M = 140$$
$$2m\angle M = 140$$
$$m\angle M = 70$$
$$m\angle M = m\angle L = 70$$

11. 30°, 60°, 90°;

By definition, an equilateral triangle has interior angles of 60°. Therefore, the angle opposite the bisector has a value of 60°.

By Theorem 4-2, when an equilateral is divided by perpendicular bisect, the result is two triangles of equal bases which create right angles with the bisector.

Solve for the value of the third angle.

$$60^\circ + 90^\circ + x = 180^\circ$$
$$x = 30^\circ$$

12. SSS; According to Theorem 4-5, if three sides of one triangle are congruent to three sides of another triangle, then the two triangles are congruent. Two pairs of corresponding sides are given and the third pair is congruent by the Reflexive Property of Congruence.

13. There is not enough information to tell if these two triangles are congruent. There are two pairs corresponding congruent sides but the pair of congruent angles is not the pair of included angles.

14. There are 28 pairs from the smaller triangles. There are 6 pairs from triangles bordered by two sides of the table and a diagonal. There are 2 pairs of triangles that are formed by the one side of the table and two diagonals.

15. SSS; According to Theorem 4-5, if three sides of one triangle are congruent to three sides of another triangle, then the two triangles are congruent. The two given sides, plus the shared side due to the reflexive property.

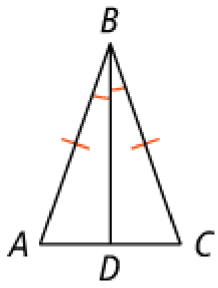
16. AAS; According to Theorem 4-7, if two angles and a non-included side of one triangle are congruent to two angles and a non-included side of another triangle, then the two triangles are congruent. There are two given angles and a given side that is not between the angles.

17. Yes, if the pair of congruent sides is included by the two pairs of congruent angles, then the triangles are congruent by ASA. If the pair of congruent sides is not included, then the triangles are congruent by AAS.

18. There is not enough information to tell whether the triangles are congruent. Note that the congruent side is adjacent to different angles in each triangle, and thus they are not congruent by AAS.

19. Both triangles are right triangles by definition. The diagram indicates that the hypotenuses are congruent. Each triangle has a leg with a common segment and another segment that is given to be congruent to each other. By the Segment Addition Postulate, the triangles have a leg with the same length so there is a pair of congruent legs. The two triangles are congruent by HL.

20.



$\angle ABD \cong \angle CBD$ by definition of angle bisector. $\overline{AB} \cong \overline{CB}$ by definition of isosceles triangle. $\overline{BD} \cong \overline{BD}$ by the Reflexive Property of Congruence. $\triangle ABD \cong \triangle CBD$ by SAS.

21. Both triangles have a right angle and all right angles are congruent. The length of one triangle's hypotenuse is given as $3x$, and the length of the other triangle's hypotenuse is $x + x + x = 3x$ by the Segment Addition Postulate. Since the lengths of the hypotenuses are equal, the hypotenuses are congruent by definition. It is given that the two triangles have a congruent pair of angles. By AAS, the triangles are congruent.

22. $\angle D \cong \angle C$ and $\overline{ED} \cong \overline{BC}$ are given. By the Vertical Angles Theorem, $\angle EGD \cong \angle BGC$, so $\triangle DEG \cong \triangle CBG$ by AAS. $\overline{EG} \cong \overline{BG}$ and $\overline{DG} \cong \overline{CG}$ using CPCTC. $\overline{AE} \cong \overline{FB}$ is given. Apply the Segment Addition Postulate to get $DG + GB + BF = D$ and $CG + GE + EA = CA$. Using the Substitution Property and the Transitive Property, $D = CA$, so $\overline{DF} \cong \overline{CA}$ by definition. $\triangle ABC \cong \triangle FED$ by SAS.

23. Place point E on $\overline{AC}$ such that $AE = CD$. By applying the Segment Addition Postulate and the Substitution Property, $AD = AE + ED = CD + ED = CE$, so $\overline{AD} \cong \overline{CE}$. By the Converse of the Isosceles Triangle Theorem, $\overline{AB} \cong \overline{BC}$. Then using SAS, $\triangle ABD \cong \triangle CBE$.