14. The diagram indicates that $AD = BD = 3$ and $AC = 8$. Since CD is the perpendicular bisector of BA, we know that $AC = BC = 8$ by the Perpendicular bisector theorem.

The perimeter of $\triangle ABC = 3 + 3 + 8 + 8 = 22$.

15. The diagram indicates that $BC = 10$, $AB = 7$ and the perimeter of $\triangle ABC$ is 27. First, solve for the unknown length AC.

$$AB + BC + AC = 27$$
$$10 + 7 + AC = 27$$
$$AC = 10$$

Since $AC = BC$, CD is the perpendicular bisector of BA and $BD = AD$ by the Converse of the Perpendicular Bisector Theorem. Thus, solve for BD.

$$BD + AD = AB$$
$$BD + BD = 7$$
$$BD = 3.5$$

16. Since $BF = DF$, by the Converse of the Perpendicular Bisector Theorem $FC \perp BD$ and $BC = CD$. Since FC is along the same line as AC, it follows that $AC \perp BD$. Thus, $AD = AB$ by the Perpendicular Bisector Theorem. So $AD = AB = 21$.

17. Given $EB = ED = 6.2$, apply the Converse of the Perpendicular Bisector Theorem to find that $DC = CB$. Given that $CD = 3.3$, solve for BD.

$$BD = DC + CB$$
$$= 3.3 + 3.3$$
$$= 6.6$$

18. Given $YW = WZ = 5$, it follows that $m\angle YXW = m\angle WXZ$ by the Converse of Angle Bisector Theorem. Given $m\angle YXW = 21^\circ$, find $m\angle ZXY$.

$$m\angle ZXY = m\angle YXW + m\angle WXZ$$
$$= 21^\circ + 21^\circ$$
$$= 42^\circ$$

19. Given $m\angle YXZ = 38^\circ$ and $m\angle WXZ = 19^\circ$, solve for $m\angle YXW$.

$m\angle WXZ + m\angle YXW = m\angle YXZ$
$19^\circ + m\angle YXW = 38^\circ$
$m\angle YXW = 19^\circ$

Thus, $m\angle WXZ = m\angle YXW$. By the Angle Bisector Theorem, $WZ = YW$. Given $WZ = 8.1$,

$WZ = YW = 8.1$.

20. Since $CD = 4$ and $AC = AE$, we know that $CD = DE$ by the Converse of the Perpendicular Bisector Theorem. Thus, $CD = DE = 4$. Given that the perimeter of $\Delta ABCC$ is 23 and knowing $AC = AE$, we solve for the perimeter of $\Delta\ ABC$

Perimeter: $23 + CD + CE = 23 + 4 + 4 = 31$

21. Given: $\angle ACF \cong \angle ECF$, $\angle ABF$ and $\angle EDF$ are right angles.

Prove: $\triangle ABF \cong \triangle EDF$

Statement	**Reason**
1. $\angle ACF \cong \angle ECF$	1. Given
2. $\angle ABF$ and $\angle EDF$ are right angles.	2. Given
3. $BF = DF$	3. Angle Bisector Theorem
4. $\overline{BF} \cong \overline{DF}$	4. Definition of congruent segments
5. $\angle ABF \cong \angle EDF$	5. Right angles are congruent.
6. $\angle BFA \cong \angle DFE$	6. Vertical angles theorem
7. $\triangle ABF \cong \triangle EDF$	7. Angle-Side-Angle (ASA)

22. The lower-left side and the lower-right side have equal lengths by the perpendicular bisector theorem. The upper-left side and the upper-right side also have equal lengths by the perpendicular bisector theorem. So the perimeter of the garden is $12 + 12 + 14 + 14 = 52$ feet.

23. $\angle FCE$ is cut at 23°; to solve for the angle she should cut, first solve for $m\angle EFC$.

Since $\angle BFE$ and $\angle EFC$ make up a straight angle, the sum of the two angles equals 180°. Given $m\angle BFE = 90^\circ$, we know that $m\angle EFC = 90^\circ$.

Solve for $m\angle CEF$.

We know that $m\angle DEB = m\angle BEF$ by the Converse of Angle Bisector Theorem. Therefore, $m\angle DEB = m\angle BEF = 31^\circ$.

Since $\angle EDB$ and $\angle ADE$ make up a straight angle, the sum of the two angles equals 180°. Given that $m\angle EDB = 90^\circ$, we know that $m\angle ADE = 90^\circ$.

We can then solve for $m\angle DEA$ and use the definition of straight angle to solve for $m\angle CEF$.

$$m\angle DEA + m\angle ADE + m\angle EDA = 180^\circ$$
$$m\angle DEA + 90^\circ + 39^\circ = 180^\circ$$
$$m\angle DEA = 51^\circ$$

$$m\angle DEA + m\angle DEB + m\angle FEB + m\angle CEF = 180^\circ$$
$$51^\circ + 31^\circ + 31^\circ + m\angle CEF = 180^\circ$$
$$m\angle CEF = 67^\circ$$

Use $m\angle EFC$ and $m\angle CEF$ to solve for $m\angle FCE$.

$$m\angle EFC + m\angle CEF + m\angle FCE = 180^\circ$$
$$67^\circ + 90^\circ + m\angle FCE = 180^\circ$$
$$m\angle FCE = 23^\circ$$

Therefore, triangle $\triangle EFC$ should be cut with angle measures of $23^\circ, 67^\circ,$ and 90°.

25.

	Yes	No	Explanation
$AP = XP$		x	AP is not given.
$AB = XY$		x	AB and XY are not given.
$AP = BP$		x	AP is not given.
$XB = YB$	x		Perpendicular Bisector Theorem
$AY = XB$		x	The points A and B are not necessarily equidistant from X and Y.
$XP = YP$	x		Point P is the midpoint of $\overline{XY}$.

26. The points G , J, and K form an isosceles triangle. In an isosceles triangle, the sides opposite the legs are congruent. This means that $\angle GJP \cong \angle GKP$. We already know that $GJ = GK$. In order to use the angle bisector theorem, we need $\angle JGK \cong \angle KGP$. In order for this to be true, $\angle GPJ$ must be a right angle.