Warm Up 12

1. transversal

2. Alternate exterior angles

3. A

Lesson Practice 12

a. $m\angle 1 = m\angle 2$, so $\angle 1 \cong \angle 2$; angles 1 and 2 are corresponding angles; by Postulate 12, *a* and *b* are parallel.

b. Since $\angle 2$ and $\angle 3$ form a linear pair and thus are supplementary angles, $m\angle 2 + 111° = 180°$ so $m\angle 2 = 69°$. Since $m\angle 1 = 69°$, $\angle 1 \cong \angle 2$. Since $\angle 1$ and $\angle 2$ are alternate interior angles, by Theorem 12-1, lines *u* and *v* are parallel.

c. $\angle 1$ and $\angle 7$, $\angle 4$ and $\angle 6$

d. $\angle 1$ and $\angle 7$ are $\cong$ alternate exterior angles; lines *m* and *n* are parallel by Theorem 12-2.

e. $\angle 2$ and $\angle 5$, $\angle 3$ and $\angle 8$

f. Angles 5 and 6 are supplementary; since $\angle 2 \cong \angle 6$, $\angle 2$ and $\angle 5$ are supplementary; lines *m* and *n* are parallel by Theorem 12-3.

g. transversal

h. Angles marked 33° at Fox St. and Elati St. are congruent and corresponding angles; by Postulate 12, Fox St. and Elati St.are parallel; by the same argument, Elati St. and Delaware St. are parallel; since two lines that are parallel to the same line are also parallel to each other, all three streets are parallel to each other.

   Saxon Geometry

Practice 12

1. Pair of marked angles in figure are both congruent and are alternate interior angles; so by the Converse of the Alternate Interior Angles Postulate, lines *m* and *n* are parallel.

2. Inductive reasoning is being used.

3. **a.** Angles 1 and 5 are corresponding angles and $\angle 1 \cong \angle 5$; lines *x* and *y* are parallel by the Converse of the Corresponding Angles Postulate.

   b. $\angle 1$ and $\angle 8$; $\angle 2$ and $\angle 7$

4. If the two lines are parallel, then the same-side interior angles are supplementary, so we add the two expressions and set them equal to 180°, then solve for *x*. If $x = 34$, then the lines are parallel.

5. 6

6. 3.5 in., 8.5 in.

7. Draw a picture and use the Pythagorean Theorem. The line segment will make a right triangle with the segment's rise and run, and the run is known to be 4 units. The rise is unknown, call it *y*, and the segment's length is *a*. Using the Pythagorean Theorem, *y* can be found for any given length. The coordinates of the endpoint will be (4, *y*).

Saxon Geometry

8. (2, 3); (4, 1.5)

9. (2, 1.5)

10. true

11. true

12. $x = 17$

13. 5.83 ft

14. (0.5, −0.5)

15. always

16. 13.5 m

17. 96 tiles

18. $\overleftrightarrow{PQ} \parallel \overleftrightarrow{RS}$

19. Angles 1 and 2 have equal measures, so they are congruent alternate exterior angles; the Converse of the Alternate Exterior Angles Theorem implies lines a and b are parallel.

20. 58°

21. A

22. Yes, since $\overleftrightarrow{XY}$ and $\overleftrightarrow{TU}$ are parallel, and $\overleftrightarrow{AB}$ is perpendicular to $\overleftrightarrow{TU}$, and $\overleftrightarrow{DF}$ is perpendicular to $\overleftrightarrow{XY}$. Therefore, $\overleftrightarrow{AB}$ and $\overleftrightarrow{DF}$ must be parallel.

23. D

24. Two lines can intersect at one point (with different slopes), they can be non-intersecting (parallel lines that have a different y-intercept) or have an infinite number of points of intersection (if they are coincident lines).

25. approximately 381 in^2

26. The lines could be skew.

27. 120°

28. A

29. $AC = 24$

30. They can have zero, one, two, or three points of intersection.

   Saxon Geometry