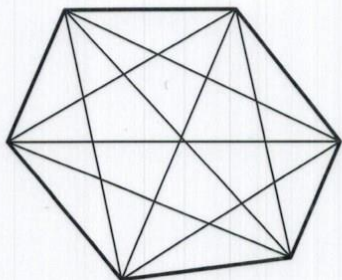


# Answers for 8.1

For use with pages 510–513

## 8.1 Skill Practice

1. Sample:



2.  $2n$ ; no; only  $n$  angles are considered.

3.  $1260^\circ$       4.  $2160^\circ$

5.  $2520^\circ$       6.  $3240^\circ$

7. quadrilateral      8. hexagon

9. 13-gon      10. 15-gon

11. 117      12. 150      13.  $28\frac{1}{3}$

14. 111      15. 66      16. 53

17. The student thinks that because an octagon has 8 exterior angles while a hexagon has only 6 exterior angles, the sum of the measures of the 8 angles must be greater than the sum of the measures of the 6 angles. The sum of the measures of the exterior angles of any convex  $n$ -gon is always  $360^\circ$ .

18. B      19.  $108^\circ, 72^\circ$

20.  $160^\circ, 20^\circ$       21.  $176^\circ, 4^\circ$

22. 20

23. The interior angle measures are the same in both pentagons and the ratios of corresponding sides would be the same.

24. 15      25. 40

26. a. Yes; the number of sides would be 24.

b. Yes; the number of sides would be 40.

c. No; solving the equation  $(n - 2) \cdot 180 = 75n$  does not yield a positive integer greater than or equal to 3.

d. No; solving the equation  $(n - 2) \cdot 180 = 40n$  does not yield a positive integer greater than or equal to 3.

27. 3 sides; solve the equation  $(n + x - 2) \cdot 180 = 540 + (n - 2) \cdot 180$  for  $x$  where  $n$  is the number of original sides and  $x$  is the number of sides added.

## 8.1 Problem Solving

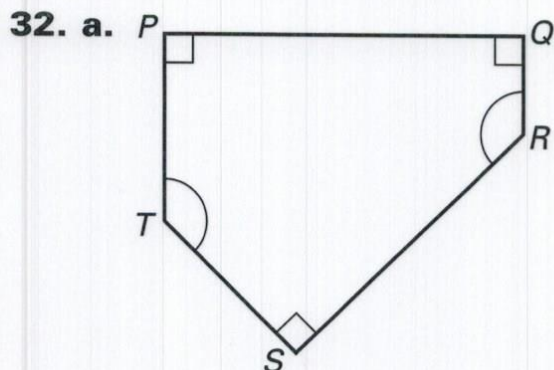
28.  $540^\circ$       29.  $720^\circ$

30.  $120^\circ$       31.  $144^\circ; 36^\circ$



# Answers for 8.1 continued

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**b.**  $540^\circ$

**c.**  $135^\circ, 135^\circ$

**33.** In a pentagon draw all the diagonals from one vertex. Observe that the polygon is divided up into three triangles. Since the sum of the measures of the interior angles of each triangle is  $180^\circ$  the sum of the measures of the interior angles of the pentagon is  $(5 - 2) \cdot 180^\circ = 3 \cdot 180^\circ = 540^\circ$ .

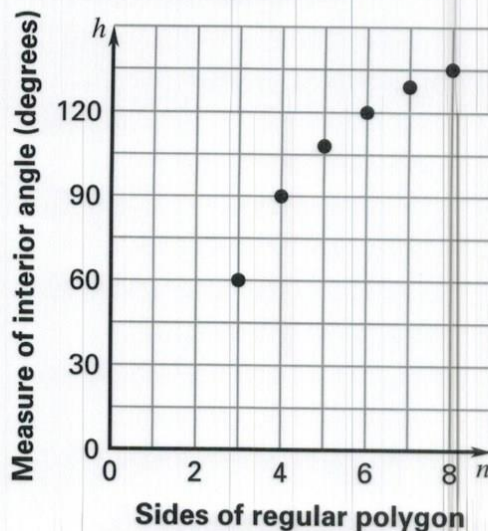
**34.** In a quadrilateral, draw all the diagonals from one vertex. Observe that the polygon is divided up into two triangles. Since the sum of the measures of the interior angles of each triangle is  $180^\circ$ , the sum of the measures of the interior angles of the quadrilateral is  $2 \cdot 180^\circ = 360^\circ$ .

**35.** *Sample answer:* In a convex  $n$ -gon the sum of the measures of the  $n$  interior angles is  $(n - 2) \cdot 180^\circ$  using the Polygon Interior Angles Theorem. Since each of the  $n$  interior angles forms a linear pair with its corresponding exterior angle, you know that the sum of the measures of the  $n$  interior and exterior angles is  $180n^\circ$ . Subtracting the sum of the interior angle measures from the sum of the measures of the linear pairs  $(180n^\circ - [(n - 2) \cdot 180^\circ])$ , you get  $360^\circ$ .

**36. a.**  $h(n) = \frac{(n - 2) \cdot 180^\circ}{n}$

**b.**  $140^\circ; 12$

**c.**  $h(n)$  increases but its growth rate is slowing down.





# Answers for 8.1 continued

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37. a.

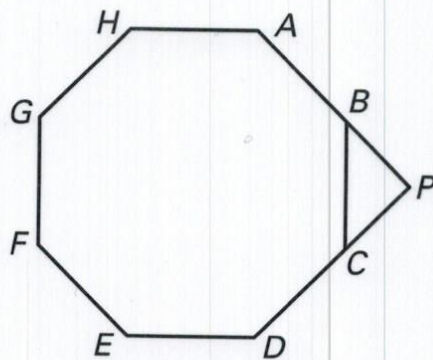
Polygons	Number of sides
Quadrilateral	4
Pentagon	5
Hexagon	6
Heptagon	7

Polygons	Number of triangles
Quadrilateral	2
Pentagon	3
Hexagon	4
Heptagon	5

Polygons	Sum of measures of interior angles
Quadrilateral	$2 \cdot 180^\circ = 360^\circ$
Pentagon	$3 \cdot 180^\circ = 540^\circ$
Hexagon	$4 \cdot 180^\circ = 720^\circ$
Heptagon	$5 \cdot 180^\circ = 900^\circ$

- b.  $s(n) = (n - 2) \cdot 180^\circ$ ; the table shows that the number of triangles is two less than the number of sides.

38.  $90^\circ$ ; the measure of each interior angle is  $135^\circ$ . This makes the measure of each exterior angle  $45^\circ$ . Since the interior angles of  $\triangle BPC$  contain two exterior angles and  $\angle BPC$ ,  $m\angle BPC = 90^\circ$ .



## 8.1 Mixed Review

39.  $82^\circ, 82^\circ$ ;  $m\angle 2 + 98^\circ = 180^\circ$  since they are a linear pair and  $\angle 1 \cong \angle 2$  using the Corresponding Angles Postulate.
40.  $150^\circ, 30^\circ$ ;  $m\angle 1 = 150^\circ$  using vertical angles and  $m\angle 2 = 30^\circ$  using the Consecutive Interior Angles Theorem.
41.  $54^\circ, 54^\circ$ ;  $m\angle 1 + 126^\circ = 180^\circ$  since they are a linear pair and  $\angle 1 \cong \angle 2$  using the Alternate Interior Angles Theorem.
42.  $\frac{3}{1}$                       43. 56.25 ft
44.  $50.4^\circ$                 45.  $20.5^\circ$
46.  $35.9^\circ$                 47.  $76.7^\circ$