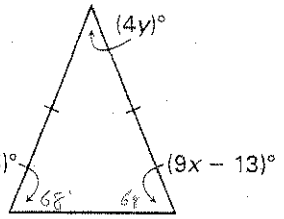
Adv. Geom. 4.7

Name Key

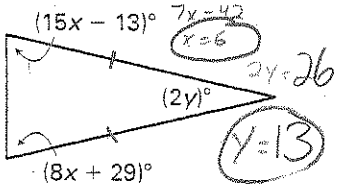
Find the values of *x* and *y*.

1.



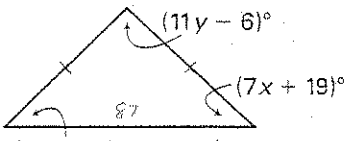
X = 9
Y = 11

2.



7x = 42
x = 6
2y = 26
Y = 13

3.

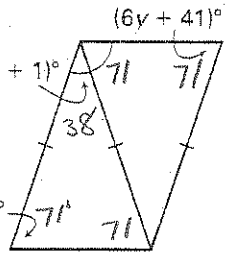


$\frac{49}{2} + \frac{38}{2} = \frac{87}{2}$

11y − 6 = 93
11y = 99
Y = 9

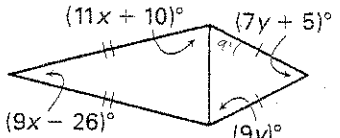
6x = 21
$X = \frac{21}{6} = \frac{7}{2}$

4.



6y + 41 = 12y + 11
30 = 6y
5 = y
9x + 1 = 109
X = 12

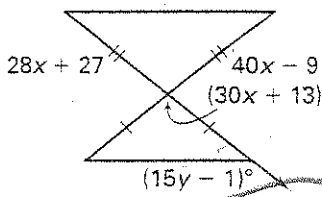
5.



9x − 26 + 22x + 10 = 180
31x = 186
X = 6

18y + 7y + 5 = 180
25y = 175
Y = 7

6.



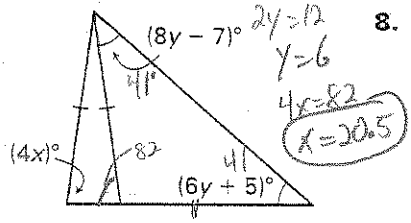
36 = 12x
3 = x

15y − 1 + 77/2 = 180
15y + 75/2 = 180
15y = 180 − 37.5
15y/15 = 142.5/15

Y = 142.5 / 15
Y = 9.5

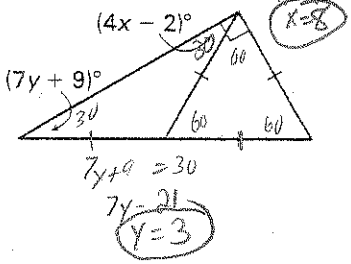
Find the values of *x* and *y*, if possible. If not possible, *explain* your reasoning.

7.



8y − 7 = 6y + 5
2y = 12
y = 6
4x = 82
x = 20.5

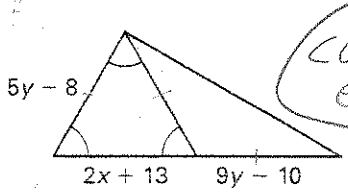
8.



4x − 2 = 30
4x = 32
X = 8

7y + 9 = 30
7y = 21
Y = 3

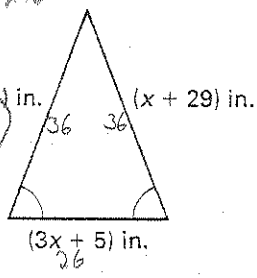
9.



Couldn't find either x or y

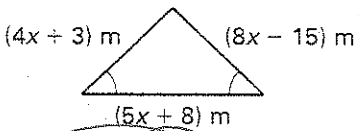
Find the perimeter of the triangle.

10.



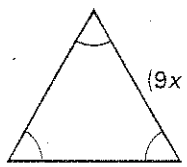
7x − 13 = x + 29
6x = 42
x = 7
P = 98"

11.



72.5 m

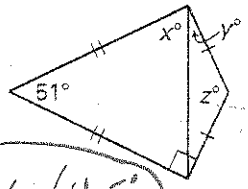
12.



149.25 ft

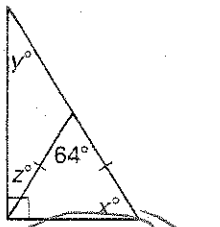
Find the values of *x*, *y*, and *z*.

13.



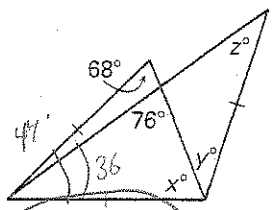
X = 64.5°
Y = 25.5
Z = 129

14.



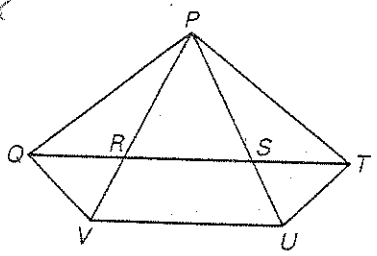
X = 58
Y = 32
Z = 32

15.



X = 68
Z = 36
Y = 40

In Exercises 11–16, use the diagram. Complete the statement. Tell what theorem you used.



11. If $\overline{PQ} \cong \overline{PT}$, then $\angle$? $\cong \angle$? . $\measuredangle PQT \cong \measuredangle PTQ$

12. If $\angle PQV \cong \angle PVQ$, then ? $\cong$? . $\overline{PQ} \cong \overline{PV}$

13. If $\overline{RP} \cong \overline{SP}$, then $\angle$? $\cong \angle$? . $\measuredangle PRS \cong \measuredangle PSR$

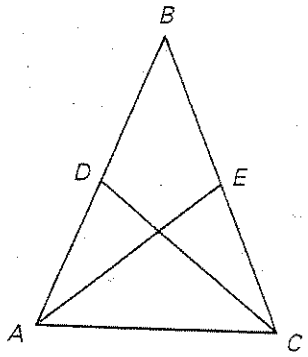
14. If $\overline{TP} \cong \overline{TR}$, then $\angle$? $\cong \angle$? . $\measuredangle TPR \cong \measuredangle TRP$

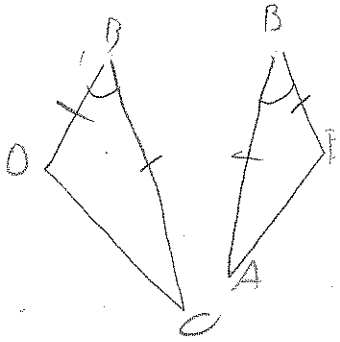
15. If $\angle PSQ \cong \angle SPQ$, then ? $\cong$? . $\overline{QS} \cong \overline{QP}$

16. If $\angle PUV \cong \angle PVU$, then ? $\cong$? . $\overline{PV} \cong \overline{PU}$

16. **GIVEN:** $\angle BAC \cong \angle BCA$, $\overline{BD} \cong \overline{BE}$

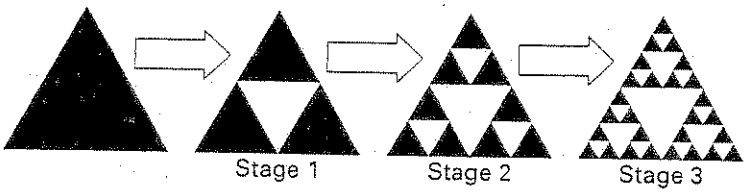
PROVE: $\angle BDC \cong \angle BEA$





Statements	Reasons
1. $\angle BAC \cong \angle BCA$	1. ? Given
2. ? $\overline{BA} \cong \overline{BC}$	2. Converse of Base Angles Theorem
3. $\angle B \cong \angle B$	3. ? Reflexive
4. ? $\overline{BD} \cong \overline{BE}$	4. Given
5. ? $\triangle BDC \cong \triangle BEA$	5. SAS Congruence Postulate
6. $\angle BDC \cong \angle BEA$	6. ? CPCTC

4. A *fractal* is a geometric figure that consists of a pattern that is repeated infinitely on a smaller and smaller scale. A well-known fractal that uses equilateral triangles is called the *Sierpinski Triangle*. The process involves removing smaller triangles from larger triangles by joining the midpoints of the sides of the larger triangles as shown below. Assume that the initial triangle is equilateral with sides 1 unit long.



a. Complete the table to determine the number of triangles remaining at each stage, the length of the sides of the remaining triangles, and the total area of the remaining triangles.

(*Hint:* The area of an equilateral triangle is $\frac{\sqrt{3}}{4}s^2$, where s is the length of the side.)

Stage	1	2	3	4	5							n	12
Triangles	?	?	?	?	?	1	2	3	4	5		3^n	531441
Side length	?	?	?	?	?	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$		$\frac{1}{2^n}$	$\frac{1}{4096}$
Area	?	?	?	?	?	$\frac{\sqrt{3}}{16}$	$\frac{\sqrt{3}}{64}$	$\frac{\sqrt{3}}{256}$	$\frac{\sqrt{3}}{1024}$	$\frac{\sqrt{3}}{4096}$		$\frac{\sqrt{3}}{4}\left(\frac{1}{2^n}\right)^2$	$\frac{\sqrt{3}}{67108864}$

b. Use the patterns in the table to write a rule for number of triangles T remaining, the length L of the sides of the remaining triangles, and the total area A of the remaining triangles at each stage n. Then predict the values of T, L, and A at the 12th stage.