

# Adv. Geometry 4.1

Name key

Classify the triangle by its sides. Then find the value of  $x$  and classify the triangle by its angles.

1.   
 $2x^\circ$    
 $3x^\circ$   $4x^\circ$    
 scalene   
 $9x = 180$    
 $x = 20$    
 acute

2.   
 $(2x + 2)^\circ$    
 $(2x + 2)^\circ$    
 $(3x + 1)^\circ$    
 Isosceles   
 $7x + 5 = 180$    
 $7x = 175$    
 $x = 25$    
 acute

3.   
 $x^\circ$    
 $x^\circ$    
 equilateral   
 $x = 60^\circ$    
 equiangular

Find the value of  $x$  and  $y$ .

4.   
 $38^\circ$    
 $(10x + 9)^\circ$    
 $(7x + 1)^\circ$   $y^\circ$    
 $7x + 1 + 38 = 10x + 9$    
 $39 = 3x + 9$    
 $30 = 3x$    
 $10 = x$    
 $y = 71$

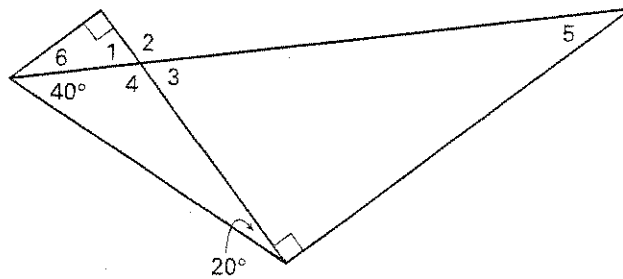
5.   
 $55^\circ$    
 $2y^\circ$   $71^\circ$   $x^\circ$   $40^\circ$    
 $x = 50^\circ$    
 $2y + 55 = 71 + 50$    
 $2y = 66$    
 $y = 33$

6.   
 $(4x - 1)^\circ$    
 $65^\circ$   $2y^\circ$    
 $2y + 65 + 31 = 180$    
 $2y + 96 = 180$    
 $2y = 84$    
 $y = 42$    
 $4x - 1 + 31 = 90$    
 $4x + 30 = 90$    
 $4x = 60$    
 $x = 15$

7.   
 $32^\circ$   $x^\circ$    
 $27^\circ$   $y^\circ$    
 $y + 32 = 90$    
 $y = 58$    
 $27 + 58 = x$    
 $85 = x$

Find the measure of the numbered angle.

- 8.  $m\angle 1 = 60^\circ$
- 9.  $m\angle 2 = 120^\circ$
- 10.  $m\angle 3 = 60^\circ$
- 11.  $m\angle 4 = 120^\circ$
- 12.  $m\angle 5 = 30^\circ$
- 13.  $m\angle 6 = 30^\circ$



14. **Angle Measures** The measure of one interior angle of a triangle is  $32^\circ$ . The other interior angles are congruent. Find their measure.

$32$    
 $x$   $x$    
 $2x + 32 = 180$    
 $2x = 148$    
 $x = 74^\circ$

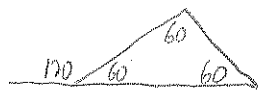
15. In  $\triangle ABC$ ,  $m\angle A = 42^\circ$ . The measure of  $\angle B$  is five times the measure of  $\angle C$ . Find  $m\angle B$  and  $m\angle C$ .

$42 + 5\angle C + \angle C = 180$    
 $42 + 6\angle C = 180$    
 $6\angle C = 138$    
 $\angle C = 23^\circ$    
 $\angle B = 115^\circ$

16. **Coat Hanger** A 30 inch piece of metal wire is used to make the triangular portion of a coat hanger. One side of this isosceles triangle is 8 inches. Find two different sets of measurements to make the coat hanger.



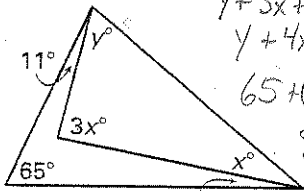
3. The measure of an exterior angle of a triangle is  $120^\circ$ . The interior angles that are not adjacent to this exterior angle are congruent. Find the measures of the interior angles of the triangle. *all  $60^\circ$*



4. The measures of the angles of a triangle are  $(9\sqrt{2x+17})^\circ$ ,  $(9\sqrt{x})^\circ$ , and  $(12\sqrt{x+33})^\circ$ . Find the measure of each angle. Classify the triangle by its angles.  
*you will need a extra piece of paper to solve this.*

In Exercises 5 and 6, find the values of  $x$  and  $y$ . Round your answers to one decimal place, if necessary.

5.



$$y + 3x + x = 180$$

$$y + 4x = 180$$

$$65 + (11 + y) + (11 + x) = 180$$

$$87 + y + x = 180$$

$$y + 3x = 180$$

$$(y + x = 93)$$

$$2x = 87$$

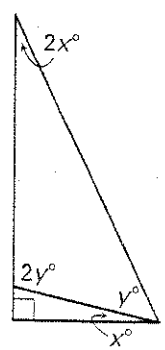
$$x = \frac{87}{2}$$

$$y + 4\left(\frac{87}{2}\right) = 180$$

$$y + 174 = 180$$

$$y = 6$$

6.



$$(3x + y = 90) \times (-3)$$

$$-9x - 3y = -270$$

$$+ \quad 2x + 3y = 180$$

$$-7x = -90$$

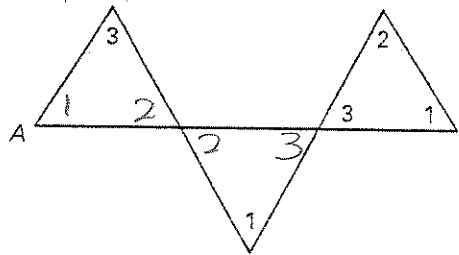
$$x = \frac{90}{7}$$

$$3\left(\frac{90}{7}\right) + y = 90$$

$$\frac{270}{7} + y = 90$$

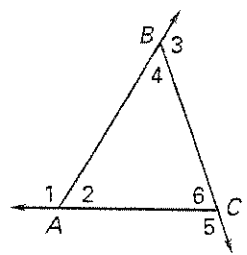
$$y = \frac{630}{7} - \frac{270}{7} = \frac{360}{7} = y$$

7. Use the diagram to find  $m\angle A$ , in terms of  $\angle 1$ ,  $\angle 2$  or  $\angle 3$



$$m\angle A = 1$$

8. Use the diagram to prove that the sum of the exterior angles of a triangle is  $360^\circ$ .



$$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 = 540$$

$$\angle 1 + \angle 3 + \angle 5 + (\angle 2 + \angle 4 + \angle 6) = 540$$

$$\angle 1 + \angle 3 + \angle 5 + 180 = 540$$

$$\angle 1 + \angle 3 + \angle 5 = 360$$