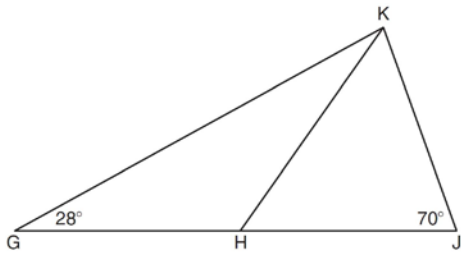
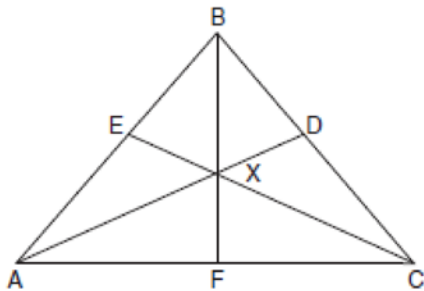


**G.SRT.B.5: Isosceles Triangle Theorem 2**

- 1 In the diagram below of  $\triangle GJK$ ,  $H$  is a point on  $\overline{GJ}$ ,  $\overline{HJ} \cong \overline{JK}$ ,  $m\angle G = 28$ , and  $m\angle GJK = 70$ . Determine whether  $\triangle GHK$  is an isosceles triangle and justify your answer.

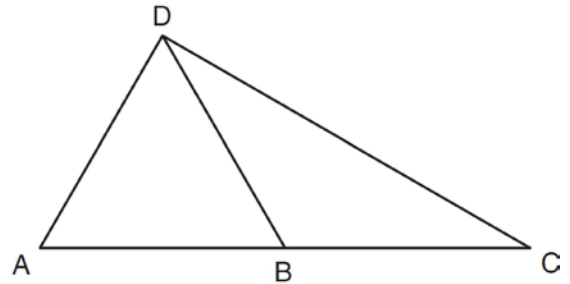


- 2 In the diagram below of isosceles triangle  $ABC$ ,  $\overline{AB} \cong \overline{CB}$  and angle bisectors  $\overline{AD}$ ,  $\overline{BF}$ , and  $\overline{CE}$  are drawn and intersect at  $X$ .

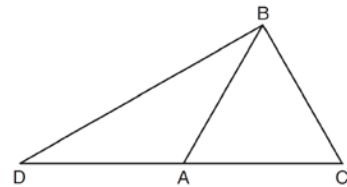


If  $m\angle BAC = 50^\circ$ , find  $m\angle AXC$ .

- 3 In the diagram below of  $\triangle ACD$ ,  $B$  is a point on  $\overline{AC}$  such that  $\triangle ADB$  is an equilateral triangle, and  $\triangle DBC$  is an isosceles triangle with  $\overline{DB} \cong \overline{BC}$ . Find  $m\angle C$ .



- 4 In the diagram of  $\triangle BCD$  shown below,  $\overline{BA}$  is drawn from vertex  $B$  to point  $A$  on  $\overline{DC}$ , such that  $\overline{BC} \cong \overline{BA}$ .

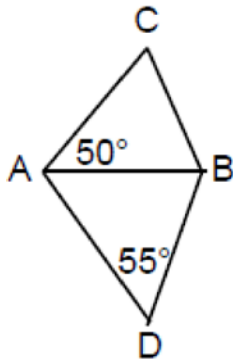


In  $\triangle DAB$ ,  $m\angle D = x$ ,  $m\angle DAB = 5x - 30$ , and  $m\angle DBA = 3x - 60$ . In  $\triangle ABC$ ,  $AB = 6y - 8$  and  $BC = 4y - 2$ . [Only algebraic solutions can receive full credit.] Find  $m\angle D$ . Find  $m\angle BAC$ . Find the length of  $\overline{BC}$ . Find the length of  $\overline{DC}$ .

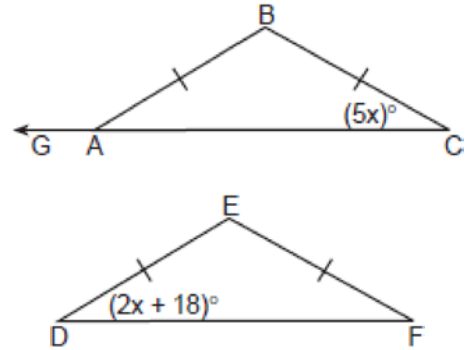
- 5 In isosceles  $\triangle MNP$ , line segment  $NO$  bisects vertex  $\angle MNP$ , as shown below. If  $MP = 16$ , find the length of  $MO$  and explain your answer.



- 6 In the accompanying diagram,  $\triangle ABC$  and  $\triangle ABD$  are isosceles triangles with  $m\angle CAB = 50$  and  $m\angle BDA = 55$ . If  $AB = AC$  and  $AB = BD$ , what is  $m\angle CBD$ ?



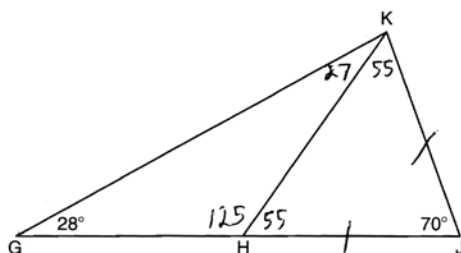
- 7 In the accompanying diagram, isosceles  $\triangle ABC \cong$  isosceles  $\triangle DEF$ ,  $m\angle C = 5x$ , and  $m\angle D = 2x + 18$ . Find  $m\angle B$  and  $m\angle BAG$ .



- 8 In  $\triangle RST$ ,  $m\angle RST = 46$  and  $\overline{RS} \cong \overline{ST}$ . Find  $m\angle STR$ .
- 9 Vertex angle  $A$  of isosceles triangle  $ABC$  measures  $20^\circ$  more than three times  $m\angle B$ . Find  $m\angle C$ .
- 10 The perimeter of an isosceles triangle is 71 centimeters. The measure of one of the sides is 22 centimeters. What are all the possible measures of the other two sides?
- 11 Hersch says if a triangle is an obtuse triangle, then it cannot also be an isosceles triangle. Using a diagram, show that Hersch is incorrect, and indicate the measures of all the angles and sides to justify your answer.
- 12 Dylan says that all isosceles triangles are acute triangles. Mary Lou wants to prove that Dylan is *not* correct. Sketch an isosceles triangle that Mary Lou could use to show that Dylan's statement is not true. In your sketch, state the measure of *each* angle of the isosceles triangle.

**G.SRT.B.5: Isosceles Triangle Theorem 2**  
**Answer Section**

1 ANS:



No,  $\angle KGH$  is not congruent to  $\angle GKH$ .

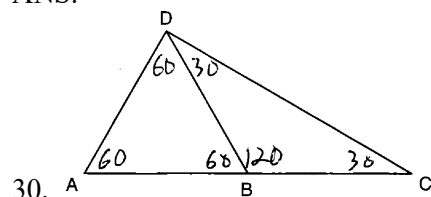
REF: 081135ge

2 ANS:

$$180 - 2(25) = 130$$

REF: 011730geo

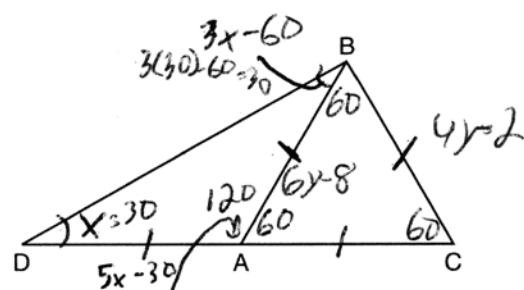
3 ANS:



REF: 011129ge

4 ANS:

$$\begin{aligned} x + 3x - 60 + 5x - 30 &= 180 & 5(30) - 30 &= 120 & 6y - 8 = 4y - 2 & \overline{DC} = 10 + 10 = 20 \\ 9x - 90 &= 180 & m\angle BAC &= 180 - 120 = 60 & 2y &= 6 \\ 9x &= 270 & & & y &= 3 \\ x &= 30 = m\angle D & & & 4(3) - 2 &= 10 = \overline{BC} \end{aligned}$$



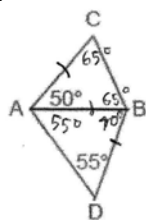
REF: 011435ge

5 ANS:

$\triangle MNO$  is congruent to  $\triangle PNO$  by SAS. Since  $\triangle MNO \cong \triangle PNO$ , then  $\overline{MO} \cong \overline{PO}$  by CPCTC. So  $\overline{NO}$  must divide  $\overline{MP}$  in half, and  $MO = 8$ .

REF: fall1405geo

6 ANS:



135.  $m\angle CBD = 65^\circ + 70^\circ = 135^\circ$

REF: 069930a

7 ANS:

$$5x = 2x + 18$$

$m\angle B = 120$  and  $m\angle BAG = 150$ .  $3x = 18$ . Therefore the triangles' congruent angles are  $30^\circ$ .

$$x = 6$$

REF: 060838a

8 ANS:

$$67. \frac{180 - 46}{2} = 67$$

REF: 011029ge

9 ANS:

$$A = 3x + 20 \quad 3x + 20 + x + x = 180$$

$$32. B = x \quad 5x + 20 = 180$$

$$C = x \quad x = 32$$

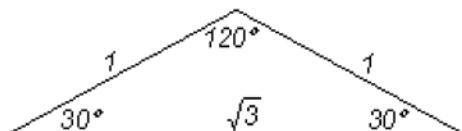
REF: 010223a

10 ANS:

If the measure of the second side is also 22, the measure of the third side is 27 ( $71 - (22 + 22)$ ). If the second and third sides are equal, their measures are  $24.5 \left(\frac{71 - 22}{2}\right)$  each.

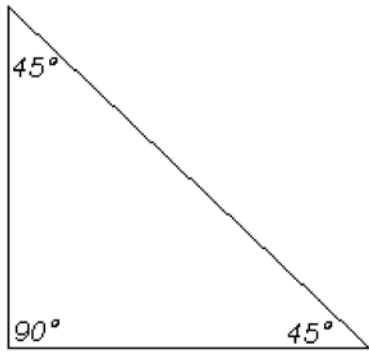
REF: 060733a

11 ANS:



REF: 060027a

12 ANS:



REF: 080433a