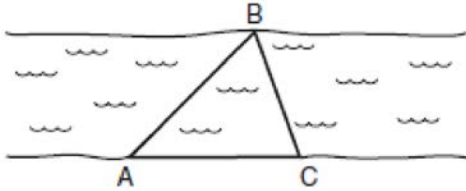


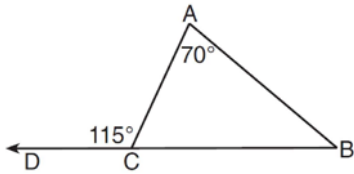
**G.CO.C.10: Angle Side Relationship**

- 1 On the banks of a river, surveyors marked locations  $A$ ,  $B$ , and  $C$ . The measure of  $\angle ACB = 70^\circ$  and the measure of  $\angle ABC = 65^\circ$ .



Which expression shows the relationship between the lengths of the sides of this triangle?

- 1)  $AB < BC < AC$  2)  $BC < AB < AC$   
3)  $BC < AC < AB$  4)  $AC < AB < BC$
- 2 As shown in the diagram below of  $\triangle ABC$ ,  $\overline{BC}$  is extended through  $D$ ,  $m\angle A = 70$ , and  $m\angle ACD = 115$ .



Which statement is true?

- 1)  $AC > AB$  2)  $AB > BC$  3)  $BC < AC$   
4)  $AC < AB$
- 3 In  $\triangle ABC$ ,  $m\angle A = 60$ ,  $m\angle B = 80$ , and  $m\angle C = 40$ . Which inequality is true?  
1)  $AB > BC$  2)  $AC > BC$  3)  $AC < BA$   
4)  $BC < BA$
- 4 In  $\triangle ABC$ ,  $m\angle B < m\angle A < m\angle C$ . Which statement is false?  
1)  $AC > BC$  2)  $BC > AC$  3)  $AC < AB$   
4)  $BC < AB$

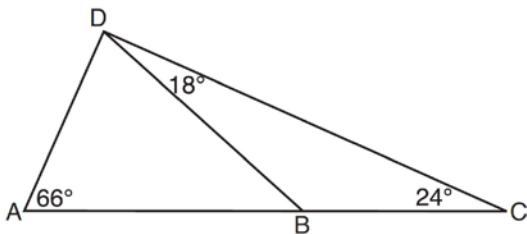
- 5 In  $\triangle ABC$ ,  $m\angle A = 95$ ,  $m\angle B = 50$ , and  $m\angle C = 35$ . Which expression correctly relates the lengths of the sides of this triangle?  
1)  $AB < BC < CA$  2)  $AB < AC < BC$   
3)  $AC < BC < AB$  4)  $BC < AC < AB$
- 6 In  $\triangle RST$ ,  $m\angle R = 58$  and  $m\angle S = 73$ . Which inequality is true?  
1)  $RT < TS < RS$  2)  $RS < RT < TS$   
3)  $RT < RS < TS$  4)  $RS < TS < RT$
- 7 In scalene triangle  $ABC$ ,  $m\angle B = 45$  and  $m\angle C = 55$ . What is the order of the sides in length, from longest to shortest?  
1)  $\overline{AB}, \overline{BC}, \overline{AC}$  2)  $\overline{BC}, \overline{AC}, \overline{AB}$  3)  $\overline{AC}, \overline{BC}, \overline{AB}$  4)  $\overline{BC}, \overline{AB}, \overline{AC}$
- 8 In  $\triangle ABC$ ,  $m\angle A = 65$  and  $m\angle B$  is greater than  $m\angle A$ . The lengths of the sides of  $\triangle ABC$  in order from smallest to largest are  
1)  $\overline{AB}, \overline{BC}, \overline{AC}$  2)  $\overline{BC}, \overline{AB}, \overline{AC}$  3)  $\overline{AC}, \overline{BC}, \overline{AB}$  4)  $\overline{AB}, \overline{AC}, \overline{BC}$
- 9 In  $\triangle ABC$ ,  $\angle A \cong \angle B$  and  $\angle C$  is an obtuse angle. Which statement is true?  
1)  $\overline{AC} \cong \overline{AB}$  and  $\overline{BC}$  is the longest side.  
2)  $\overline{AC} \cong \overline{BC}$  and  $\overline{AB}$  is the longest side.  
3)  $\overline{AC} \cong \overline{AB}$  and  $\overline{BC}$  is the shortest side.  
4)  $\overline{AC} \cong \overline{BC}$  and  $\overline{AB}$  is the shortest side.
- 10 In  $\triangle ABC$ ,  $AB = 7$ ,  $BC = 8$ , and  $AC = 9$ . Which list has the angles of  $\triangle ABC$  in order from smallest to largest?  
1)  $\angle A, \angle B, \angle C$  2)  $\angle B, \angle A, \angle C$   
3)  $\angle C, \angle B, \angle A$  4)  $\angle C, \angle A, \angle B$

- 11 In  $\triangle PQR$ ,  $PQ = 8$ ,  $QR = 12$ , and  $RP = 13$ . Which statement about the angles of  $\triangle PQR$  must be true?
- 1)  $m\angle Q > m\angle P > m\angle R$
  - 2)  $m\angle Q > m\angle R > m\angle P$
  - 3)  $m\angle R > m\angle P > m\angle Q$
  - 4)  $m\angle P > m\angle R > m\angle Q$

- 12 In  $\triangle ABC$ ,  $AB = 4$ ,  $BC = 7$ , and  $AC = 10$ . Which statement is true?
- 1)  $m\angle B > m\angle C > m\angle A$
  - 2)  $m\angle B > m\angle A > m\angle C$
  - 3)  $m\angle C > m\angle B > m\angle A$
  - 4)  $m\angle C > m\angle A > m\angle B$

- 13 For which measures of the sides of  $\triangle ABC$  is angle  $B$  the largest angle of the triangle?
- 1)  $AB = 2$ ,  $BC = 6$ ,  $AC = 7$
  - 2)  $AB = 6$ ,  $BC = 12$ ,  $AC = 8$
  - 3)  $AB = 16$ ,  $BC = 9$ ,  $AC = 10$
  - 4)  $AB = 18$ ,  $BC = 14$ ,  $AC = 5$

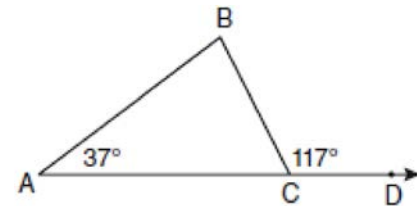
- 14 As shown in the diagram of  $\triangle ACD$  below,  $B$  is a point on  $AC$  and  $DB$  is drawn.



If  $m\angle A = 66$ ,  $m\angle CDB = 18$ , and  $m\angle C = 24$ , what is the longest side of  $\triangle ABD$ ?

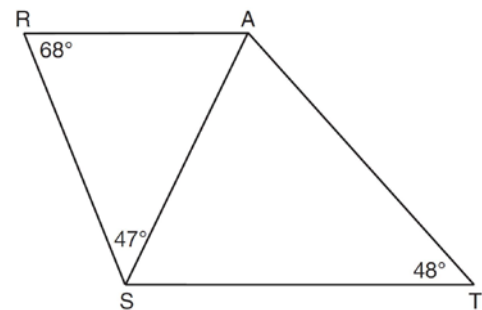
- 1)  $\overline{AB}$  2)  $\overline{DC}$  3)  $\overline{AD}$  4)  $\overline{BD}$
- 15 In  $\triangle CAT$ ,  $m\angle C = 65$ ,  $m\angle A = 40$ , and  $B$  is a point on side  $\overline{CA}$ , such that  $\overline{TB} \perp \overline{CA}$ . Which line segment is shortest?
- 1)  $\overline{CT}$  2)  $\overline{BC}$  3)  $\overline{TB}$  4)  $\overline{AT}$

- 16 In the diagram below of  $\triangle ABC$  with side  $\overline{AC}$  extended through  $D$ ,  $m\angle A = 37$  and  $m\angle BCD = 117$ . Which side of  $\triangle ABC$  is the longest side? Justify your answer.



(Not drawn to scale)

- 17 As shown in the diagram below,  $\overline{AS}$  is a diagonal of trapezoid  $STAR$ ,  $\overline{RA} \parallel \overline{ST}$ ,  $m\angle ATS = 48$ ,  $m\angle RSA = 47$ , and  $m\angle ARS = 68$ .



Determine and state the longest side of  $\triangle SAT$ .

- 18 In  $\triangle ABC$ ,  $m\angle A = x^2 + 12$ ,  $m\angle B = 11x + 5$ , and  $m\angle C = 13x - 17$ . Determine the longest side of  $\triangle ABC$ .

## G.CO.C.10: Angle Side Relationship

### Answer Section

1 ANS: 3

If  $\angle ACB = 70^\circ$  and  $\angle ABC = 65^\circ$  then  $\angle CAB = 45^\circ$  because  $70 + 65 + 45 = 180$ . The longest side is opposite the largest angle and the shortest side is opposite the smallest angle.  $BC < AC < AB$

REF: 060629a

2 ANS: 4 REF: 011607ge

3 ANS: 2 REF: 061321ge

4 ANS: 1 REF: 081524ge

5 ANS: 2

Longest side of a triangle is opposite the largest angle. Shortest side is opposite the smallest angle.

REF: 060911ge

6 ANS: 4 REF: 011222ge

7 ANS: 4  
 $m\angle A = 80$

REF: 011115ge

8 ANS: 1 REF: 061523ge

9 ANS: 2 REF: 081306ge

10 ANS: 4

Longest side of a triangle is opposite the largest angle. Shortest side is opposite the smallest angle.

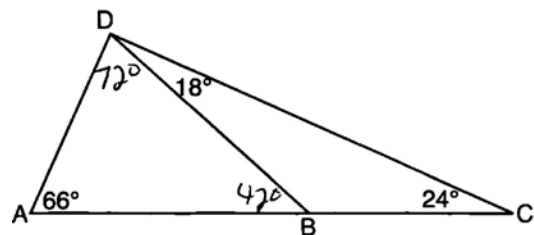
REF: 081011ge

11 ANS: 1 REF: 061010ge

12 ANS: 2 REF: 011510ge

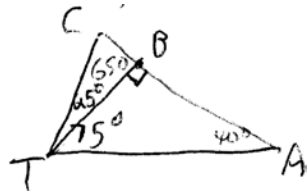
13 ANS: 1 REF: 011416ge

14 ANS: 1



REF: 081219ge

15 ANS: 2

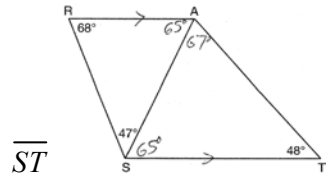


REF: 081422ge

- 16 ANS:  
 $\overline{AC}$ .  $m\angle BCA = 63$  and  $m\angle ABC = 80$ .  $\overline{AC}$  is the longest side as it is opposite the largest angle.

REF: 080934ge

- 17 ANS:



REF: 061430ge

- 18 ANS:  
 $x^2 + 12 + 11x + 5 + 13x - 17 = 180$ .  $m\angle A = 6^2 + 12 = 48$ .  $\angle B$  is the largest angle, so  $\overline{AC}$  is the longest side.

$$x^2 + 24x - 180 = 0 \quad m\angle B = 11(6) + 5 = 71$$

$$(x + 30)(x - 6) = 0 \quad m\angle C = 13(6) - 7 = 61$$

$$x = 6$$

REF: 011337ge