G.CO.C.10: Triangle Inequality Theorem

1 Which numbers could represent the lengths of the sides of a triangle?
1) $5,9,14$ 2) $7,7,15$ 3) $1,2,4$ 4) $3,6,8$

2 Which set of numbers represents the lengths of the sides of a triangle?
1) $\{5,18,13\}$ 2) $\{6,17,22\}$ 3) $\{16,24,7\}$
4) $\{26,8,15\}$

3 Phil is cutting a triangular piece of tile. If the triangle is scalene, which set of numbers could represent the lengths of the sides?
1) $\{2,4,7\}$ 2) $\{4,5,6\}$ 3) $\{3,5,8\}$ 4) $\{5,5,8\}$

4 Which set can *not* represent the lengths of the sides of a triangle?
1) $\{4,5,6\}$ 2) $\{5,5,11\}$ 3) $\{7,7,12\}$
4) $(8,8,8\}$

5 Which set could *not* represent the lengths of the sides of a triangle?
1) $\{3,4,5\}$ 2) $\{2,5,9\}$ 3) $\{5,10,12\}$
4) $\{7,9,11\}$

6 In $\triangle ABC$, $AB = 5$ feet and $BC = 3$ feet. Which inequality represents all possible values for the length of $\overline{AC}$, in feet?
1) $2 \le AC \le 8$ 2) $2 < AC < 8$ 3) $3 \le AC \le 7$
4) $3 < AC < 7$

7 The lengths of two sides of a triangle are 7 and 11. Which inequality represents all possible values for x, the length of the third side of the triangle?
1) $4 \le x \le 18$ 2) $4 < x \le 18$ 3) $4 \le x < 18$
4) $4 < x < 18$

8 If two sides of a triangle have lengths of $\frac{1}{4}$ and $\frac{1}{5}$, which fraction can *not* be the length of the third side?
1) $\frac{1}{9}$ 2) $\frac{1}{8}$ 3) $\frac{1}{3}$ 4) $\frac{1}{2}$

9 If two sides of a triangle are 1 and 3, the third side may be
1) 5 2) 2 3) 3 4) 4

10 If two sides of a triangle have lengths of 4 and 10, the third side could be
1) 8 2) 2 3) 16 4) 4

11 Which set of numbers could be the lengths of the sides of an isosceles triangle?
1) $\{1,1,2\}$ 2) $\{3,3,5\}$ 3) $\{3,4,5\}$ 4) $\{4,4,9\}$

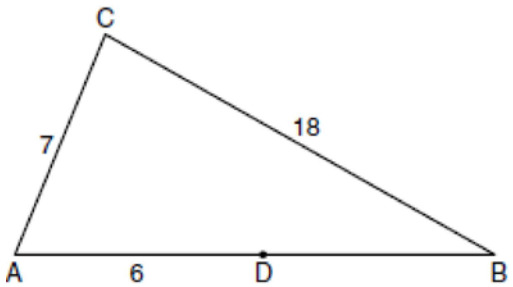
12 Sara is building a triangular pen for her pet rabbit. If two of the sides measure 8 feet and 15 feet, the length of the third side could be
1) 13 ft 2) 7 ft 3) 3 ft 4) 23 ft

13 The direct distance between city *A* and city *B* is 200 miles. The direct distance between city *B* and city *C* is 300 miles. Which could be the direct distance between city *C* and city *A*?
1) 50 miles 2) 350 miles 3) 550 miles
4) 650 miles

14 A box contains one 2-inch rod, one 3-inch rod, one 4-inch rod, and one 5-inch rod. What is the maximum number of different triangles that can be made using these rods as sides?
1) 1 2) 2 3) 3 4) 4

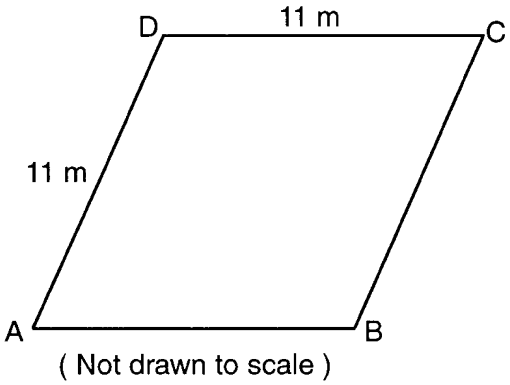
15 How many integer values of *x* are there so that *x*, 5, and 8 could be the lengths of the sides of a triangle?
1) 6 2) 9 3) 3 4) 13

16 In the diagram below of $\triangle ABC$, *D* is a point on $\overline{AB}$, $AC = 7$, $AD = 6$, and $BC = 18$.



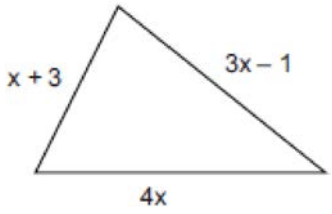
The length of $\overline{DB}$ could be
1) 5 2) 12 3) 19 4) 25

17 A plot of land is in the shape of rhombus *ABCD* as shown below.



Which can *not* be the length of diagonal *AC*?
1) 24 m 2) 18 m 3) 11 m 4) 4 m

18 The plot of land illustrated in the accompanying diagram has a perimeter of 34 yards. Find the length, in yards, of *each* side of the figure. Could these measures actually represent the measures of the sides of a triangle? Explain your answer.



19 José wants to build a triangular pen for his pet rabbit. He has three lengths of boards already cut that measure 7 feet, 8 feet, and 16 feet. Explain why José cannot construct a pen in the shape of a triangle with sides of 7 feet, 8 feet, and 16 feet.

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Answer Section

1 ANS: 4
$3 + 6 > 8$

REF: 061416ge

2 ANS: 2
$6 + 17 > 22$

REF: 080916ge

3 ANS: 2
(1) and (2) are not possible. (4) is not scalene.

REF: 080830a

4 ANS: 2
$4 + 5 > 6$

$5 + 5 < 11$

$7 + 7 > 12$

$8 + 8 > 8$

REF: 080425a

5 ANS: 2
$3 + 4 > 5$

$2 + 5 < 9$

$5 + 10 > 12$

$7 + 9 > 11$

REF: 060515a

6 ANS: 2
$5 - 3 = 2, 5 + 3 = 8$

REF: 011228ge

7 ANS: 4
$11 - 7 = 4, 11 + 7 = 18$

REF: 061525ge

8 ANS: 4
$\frac{5}{20} - \frac{4}{20} = \frac{1}{20}$ $\frac{1}{20} < s < \frac{9}{20}$ $\frac{1}{2} > \frac{9}{20}$

$\frac{5}{20} + \frac{4}{20} = \frac{9}{20}$

REF: 011625ge

9 ANS: 3
$3-1<T<3+1$

$2<T<4$

REF: 080018a

10 ANS: 1
$10-4<s<10+4$

$6<s<14$

REF: 011519ge

11 ANS: 2 REF: 081527ge

12 ANS: 1
$15-8<T<15+8$

$7<T<23$

REF: 080520a

13 ANS: 2
$300-200<T<300+200$

$100<T<500$

REF: 069905a

14 ANS: 3
$2+3>4$

$2+4>5$

$3+4>5$

REF: 080120b

15 ANS: 2
$5+8=13$ and $8-5=3$. There are 9 integers between 3 and 13.

REF: spring9809a

16 ANS: 2
$7+18>6+12$

REF: fall0819ge

17 ANS: 1
$11-11<T<11+11$

$0<T<22$

REF: 010010a

18 ANS:

7, 11, 16 and yes because $7 + 11 > 16$. $x + 3 + 3x - 1 + 4x = 34$

$x = 4$

REF: 060227a

19 ANS:

The sum of any two sides of a triangle must be greater than the third side.

REF: 010534a