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) $2 \leq AC \leq 8$
2) $2 < AC < 8$
3) $3 \leq AC \leq 7$
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) $4 \leq x \leq 18$
2) $4 < x \leq 18$
3) $4 \leq x < 18$
4) $4 < x < 18$

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

9 If two sides of a triangle have lengths of 2 and 7, the length of the third side could be
1) 9
2) 8
3) 5
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 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) $\frac{1}{2}$

12 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) $\{4,4,9\}$

13 Which set of integers could represent the lengths of the sides of an isosceles triangle?
1) $\{1,1,3\}$
2) $\{2,2,5\}$
3) $\{3,3,6\}$
4) $\{4,4,7\}$

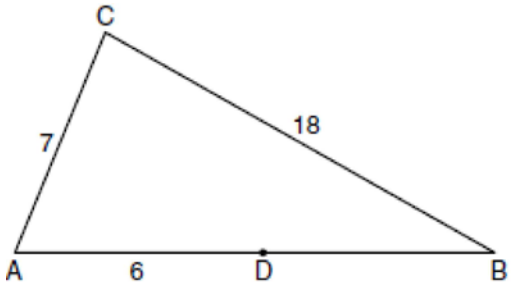
14 Sara is building a triangular pen for her pet rabbit. If two of the sides measure 8 feet and 15 feet, the length of the third side could be
1) 13 ft
2) 7 ft
3) 3 ft
4) 23 ft

15 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

16 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

17 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

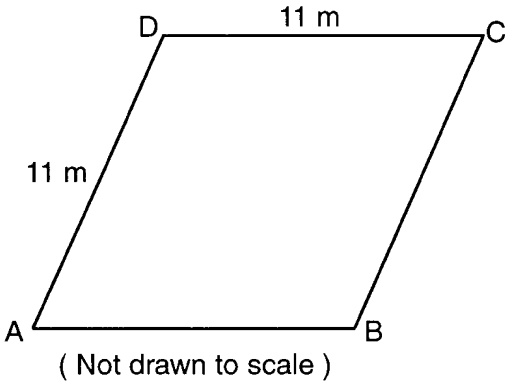
18 In the diagram below of $\triangle ABC$, D is a point on $\overline{AB}$, $AC = 7$, $AD = 6$, and $BC = 18$.



(Not drawn to scale)

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

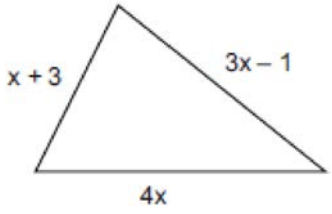
19 A plot of land is in the shape of rhombus $ABCD$ as shown below.



(Not drawn to scale)

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

20 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.



21 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: 3
$3 - 1 < T < 3 + 1$

$2 < T < 4$

REF: 080018a

9 ANS: 2
$7-2<T<7+2$

$5<T<9$

REF: 012522geo
10 ANS: 1
$10-4<s<10+4$

$6<s<14$

REF: 011519ge
11 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
12 ANS: 2 REF: 081527ge
13 ANS: 4
$4+4>7$

REF: 062421geo
14 ANS: 1
$15-8<T<15+8$

$7<T<23$

REF: 080520a
15 ANS: 2
$300-200<T<300+200$

$100<T<500$

REF: 069905a
16 ANS: 3
$2+3>4$

$2+4>5$

$3+4>5$

REF: 080120b
17 ANS: 2
$5+8=13$ and $8-5=3$. There are 9 integers between 3 and 13.

REF: spring9809a

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

REF: fall0819ge

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

$0 < T < 22$

REF: 010010a

20 ANS:
7, 11, 16 and yes because $7 + 11 > 16$.

$$x + 3 + 3x - 1 + 4x = 34$$
$$x = 4$$

REF: 060227a

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

REF: 010534a