Name: _____

G.CO.C.10: Interior and Exterior Angles of Triangles 3

1 In which of the accompanying figures are segments XY and YZ perpendicular?

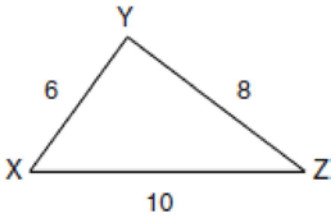


Figure 1

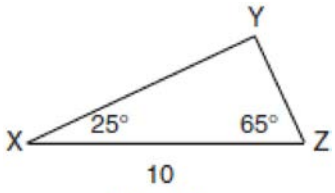
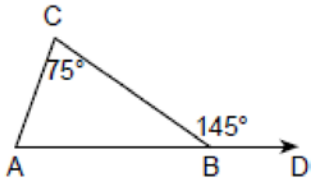


Figure 2

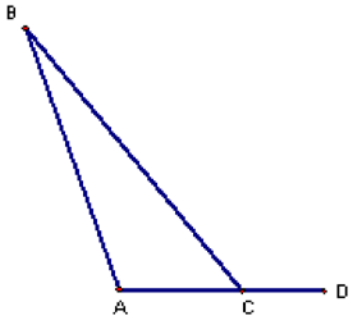
1) figure 1, only
2) figure 2, only
3) both figure 1 and figure 2
4) neither figure 1 nor figure 2

2 In the accompanying diagram of $\triangle ABC$, $\overline{AB}$ is extended to D, exterior angle CBD measures 145°, and $m\angle C = 75$.



What is $m\angle CAB$?
1) 35
2) 70
3) 110
4) 220

3 In the diagram below, $m\angle BCD = 130$ and $m\angle B = 20$. What is $m\angle A$?



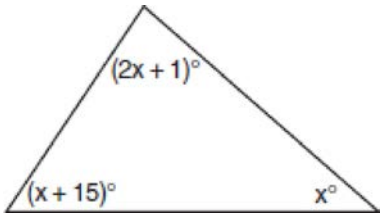
1) 50
2) 70
3) 110
4) 150

4 In the accompanying diagram of $\triangle ABC$, $\overline{AB}$ is extended through D, $m\angle CBD = 30$, and $\overline{AB} \cong \overline{BC}$.

What is the measure of $\angle A$?
1) 15°
2) 30°
3) 75°
4) 150°

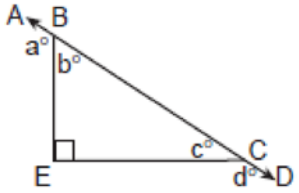
Name: _____

5 What is the measure of the largest angle in the accompanying triangle?



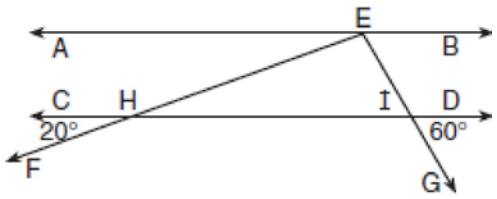
1) 41
2) 46.5
3) 56
4) 83

6 In the accompanying diagram, $\overleftrightarrow{ABCD}$ is a straight line, and angle E in triangle BEC is a right angle.



What does $a° + d°$ equal?
1) 135°
2) 160°
3) 180°
4) 270°

7 In the accompanying diagram, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$. From point E on $\overleftrightarrow{AB}$, transversals $\overrightarrow{EF}$ and $\overrightarrow{EG}$ are drawn, intersecting $\overleftrightarrow{CD}$ at H and I, respectively.



If m∠CHF = 20 and m∠DIG = 60, what is m∠HEI ?
1) 60
2) 80
3) 100
4) 120

8 In right triangle ABC, m∠$C = 3y - 10$, m∠$B = y + 40$, and m∠$A = 90$. What type of right triangle is triangle ABC?
1) scalene
2) isosceles
3) equilateral
4) obtuse

9 If the measures, in degrees, of the three angles of a triangle are x, $x + 10$, and $2x - 6$, the triangle must be
1) isosceles
2) equilateral
3) right
4) scalene

10 If the measures of the angles of a triangle are represented by $2x$, $3x - 15$, and $7x + 15$, the triangle is
1) an isosceles triangle
2) a right triangle
3) an acute triangle
4) an equiangular triangle

Regents Exam Questions
G.CO.C.10: Interior and Exterior Angles of Triangles 3
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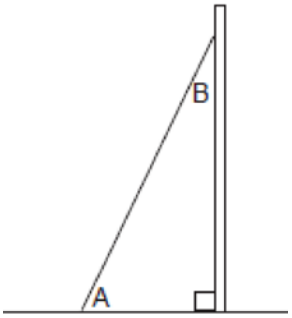
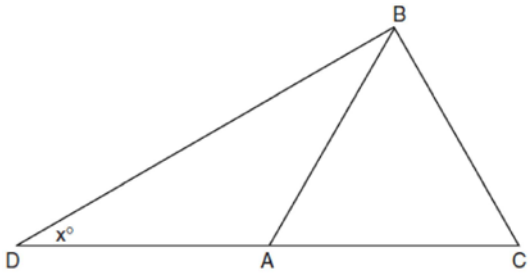
Name: _____

11 Which phrase does *not* describe a triangle?
1) acute scalene
2) isosceles right
3) equilateral equiangular
4) obtuse right

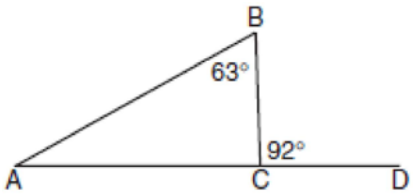
12 A billboard on level ground is supported by a brace, as shown in the accompanying diagram. The measure of angle A is 15° greater than twice the measure of angle B. Determine the measure of angle A and the measure of angle B.



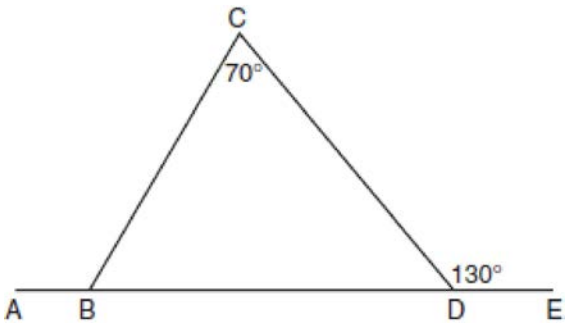
13 In the accompanying diagram of $\triangle BCD$, $\triangle ABC$ is an equilateral triangle and $AD = AB$. What is the value of x, in degrees?



14 Triangle ABC, with side $\overline{AC}$ extended to D, is shown in the accompanying diagram. If $m\angle ABC = 63$ and $m\angle BCD = 92$, what is $m\angle BAC$?

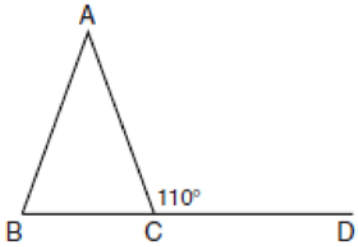


15 In the accompanying diagram of $\triangle BCD$, $m\angle C = 70$, $m\angle CDE = 130$, and side $\overline{BD}$ is extended to A and to E. Find $m\angle CBA$.



16 In $\triangle ABC$, the measure of $\angle B$ is 21 less than four times the measure of $\angle A$, and the measure of $\angle C$ is 1 more than five times the measure of $\angle A$. Find the measure, in degrees, of each angle of $\triangle ABC$.

17 In the accompanying diagram of isosceles triangle ABC, $\overline{AB} \cong \overline{AC}$, and exterior angle $ACD = 110°$. What is $m\angle BAC$?



G.CO.C.10: Interior and Exterior Angles of Triangles 3
Answer Section

1 ANS: 3
Because the sides of the triangle in Figure 1 are 6, 8 and 10, which is a multiple of a Pythagorean triple, the triangle is a right triangle. The side with a length of 10 is longest and is the hypotenuse. Angle *Y* is a right angle because it is opposite the hypotenuse. Therefore segments *XY* and *YZ* are perpendicular in Figure 1. In Figure 2, the sum of the two angles equals 90°, so the third angle, *Y*, must equal 90°. Therefore segments *XY* and *YZ* are perpendicular in Figure 2.

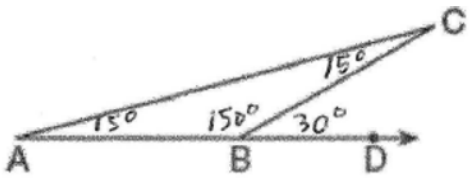
REF: 010119a

2 ANS: 2
If $m\angle CBD = 145$, then $m\angle CBA = 35$ because the angles are supplementary. Since the measure of the three interior angles must equal 180, $m\angle CAB = 70$ $(35+75+70=180)$.

REF: 069912a

3 ANS: 3 REF: spring9810a

4 ANS: 1



REF: 010613a

5 ANS: 4
$(2x + 1) + (x + 15) + x = 180$
$4x + 16 = 180$ $2(41) + 1 = 83°$
$4x = 164$ $41 + 15 = 56°$
$x = 41$

REF: 080216a

6 ANS: 4
Because angle *E* is a right angle, the sum of $b° + c°$ equals 90°. The sum of $a° + b°$ equals 180° and the sum of $c° + d°$ equals 180° because the angles are supplementary. If $a° + b° + c° + d°$ equals 360°, and $b° + c°$ equals 90°, then $a° + d°$ equals 270°.

REF: 010216a

7 ANS: 3
If $m\angle CHF = 20$, then $m\angle EHG = 20$ because they are vertical angles. If $m\angle DIG = 60$, then $m\angle EIH = 60$ because they are vertical angles. Because the sum of the interior angles equals 180º, $m\angle HEI = 100$ $(20 + 60 + 100 = 180)$.

REF: 060606a

8 ANS: 1

$3y-10+y+40+90=180$

$4y+120=180$

$4y=60$

$y=15$

$C=3(15)-10=35$

$B=(15)+40=55$

$A=90$

REF: 010102a

9 ANS: 4

$x+x+10+2x-6=180$

$4x+4=180$

$4x=176$

$x=44$

$x=44$

$(44)+10=54$

$2(44)-6=82$

REF: 010810a

10 ANS: 1

$2x+3x-15+7x+15=180$

$12x=180$

$x=15$

$2(15)=30$

$3(15)-15=30$

$7(15)+15=120$

REF: 010722a

11 ANS: 4

If a triangle has a right angle, neither of the other angles can be obtuse.

REF: 060417a

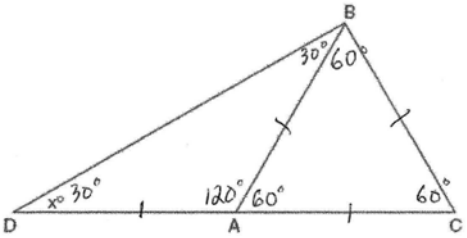
12 ANS:

$m\angle A=65$ and $m\angle B=25$. $(2B+15)+B+90=180$, $3B=75$, $B=25$. $A+B+C=180$, $A+25+90=180$, $A=65$

REF: 080837a

13 ANS:

30.



REF: 080221a

14 ANS:
29. If $m\angle BCD = 92$, then $m\angle BCA = 88$ because the angles are supplementary. Since the measure of the three interior angles must equal 180, $m\angle BAC = 29$ $(88+63+29=180)$.

REF: 080121a

15 ANS:
120. If $m\angle CDE = 130$, then $m\angle CDB = 50$ because the angles are supplementary. Since the measure of the three interior angles must equal 180, $m\angle CBD = 60$ $(50+70+60=180)$. Therefore $m\angle CBA = 120$ because the angles are supplementary.

REF: 060431a

16 ANS:
$m\angle A = 20, m\angle B = 59, m\angle C = 101$.

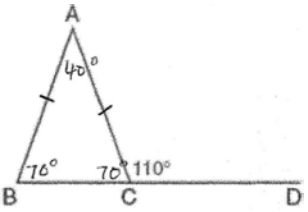
$m\angle A = x$
$m\angle B = 4x - 21$.
$m\angle C = 5x + 1$

$x + (4x - 21) + (5x + 1) = 180$
$10x - 20 = 180$.
$x = 20$

$m\angle A = x = 20°$
$m\angle B = 4(20) - 21 = 59°$
$m\angle C = 5(20) + 1 = 101°$

REF: 010538a

17 ANS:
40.



REF: 080734a