Name: _____

G.CO.C.10: Interior and Exterior Angles of Triangles 1a

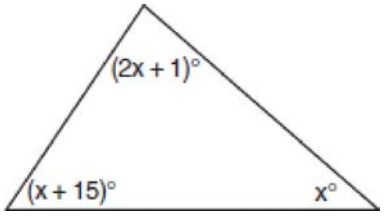
1 In an equilateral triangle, what is the difference between the sum of the exterior angles and the sum of the interior angles?
1) 180°
2) 120°
3) 90°
4) 60°

2 Juliann plans on drawing $\triangle ABC$, where the measure of $\angle A$ can range from 50° to 60° and the measure of $\angle B$ can range from 90° to 100°. Given these conditions, what is the correct range of measures possible for $\angle C$?
1) 20° to 40°
2) 30° to 50°
3) 80° to 90°
4) 120° to 130°

3 The angles of triangle ABC are in the ratio of 8 : 3 : 4. What is the measure of the *smallest* angle?
1) 12º
2) 24º
3) 36º
4) 72º

4 The measures of the angles of a triangle are in the ratio 2 : 3 : 4. In degrees, the measure of the *largest* angle of the triangle is
1) 20
2) 40
3) 80
4) 100

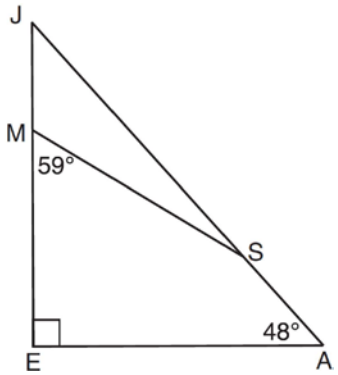
5 What is the measure of the largest angle in the accompanying triangle?



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

6 In $\triangle ABC$, $m\angle A = x$, $m\angle B = 2x + 2$, and $m\angle C = 3x + 4$. What is the value of x?
1) 29
2) 31
3) 59
4) 61

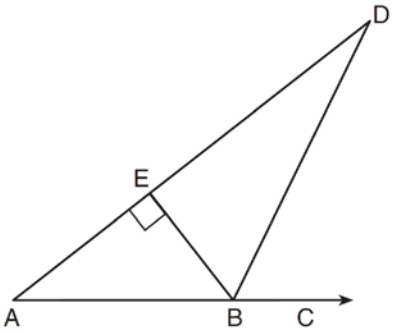
7 In the diagram of $\triangle JEA$ below, $m\angle JEA = 90$ and $m\angle EAJ = 48$. Line segment MS connects points M and S on the triangle, such that $m\angle EMS = 59$.



What is $m\angle JSM$?
1) 163
2) 121
3) 42
4) 17

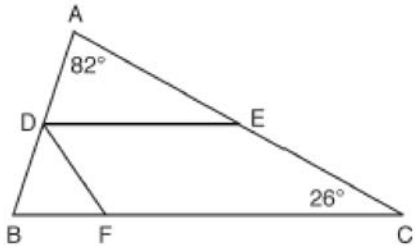
Name: _____

8 The diagram below shows $\triangle ABD$, with $\overrightarrow{ABC}$, $\overline{BE} \perp \overline{AD}$, and $\angle EBD \cong \angle CBD$.



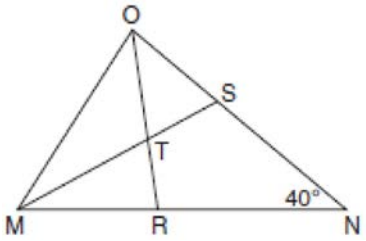
If $m\angle ABE = 52$, what is $m\angle D$?
1) 26
2) 38
3) 52
4) 64

9 In the diagram below, $\overline{DE}$ divides $\overline{AB}$ and $\overline{AC}$ proportionally, $m\angle C = 26°$, $m\angle A = 82°$, and $\overline{DF}$ bisects $\angle BDE$.



The measure of angle DFB is
1) 36°
2) 54°
3) 72°
4) 82°

10 In the diagram below of triangle MNO, $\angle M$ and $\angle O$ are bisected by $\overline{MS}$ and $\overline{OR}$, respectively. Segments MS and OR intersect at T, and $m\angle N = 40°$.



If $m\angle TMR = 28°$, the measure of angle OTS is
1) 40º
2) 50º
3) 60º
4) 70º

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

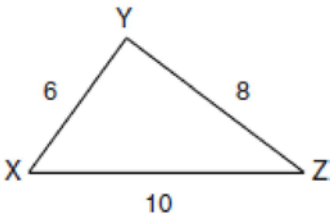


Figure 1

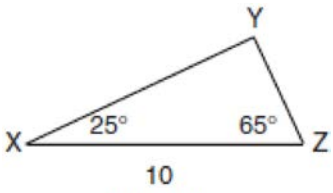


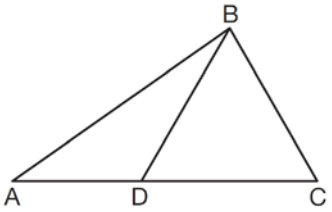
Figure 2

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

Name: _____

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

13 In the diagram of $\triangle ABC$ below, $\overline{BD}$ is drawn to side $\overline{AC}$.



If $m\angle A = 35$, $m\angle ABD = 25$, and $m\angle C = 60$, which type of triangle is $\triangle BCD$?
1) equilateral
2) scalene
3) obtuse
4) right

14 Triangle PQR has angles in the ratio of $2:3:5$. Which type of triangle is $\triangle PQR$?
1) acute
2) isosceles
3) obtuse
4) right

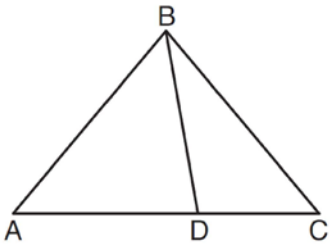
15 In $\triangle ABC$, $m\angle A = 3x + 1$, $m\angle B = 4x - 17$, and $m\angle C = 5x - 20$. Which type of triangle is $\triangle ABC$?
1) right
2) scalene
3) isosceles
4) equilateral

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

17 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

18 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

19 In the diagram below, $m\angle BDC = 100°$, $m\angle A = 50°$, and $m\angle DBC = 30°$.



Which statement is true?
1) $\triangle ABD$ is obtuse.
2) $\triangle ABC$ is isosceles.
3) $m\angle ABD = 80°$
4) $\triangle ABD$ is scalene.

20 In $\triangle DEF$, $m\angle D = 3x + 5$, $m\angle E = 4x - 15$, and $m\angle F = 2x + 10$. Which statement is true?
1) $DF = FE$
2) $DE = FE$
3) $m\angle E = m\angle F$
4) $m\angle D = m\angle F$

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Answer Section

1 ANS: 1
In an equilateral triangle, each interior angle is 60° and each exterior angle is 120° (180° - 120°). The sum of the three interior angles is 180° and the sum of the three exterior angles is 360°.

REF: 060909ge

2 ANS: 1
If $\angle A$ is at minimum (50°) and $\angle B$ is at minimum (90°), $\angle C$ is at maximum of 40° (180° - (50° + 90°)). If $\angle A$ is at maximum (60°) and $\angle B$ is at maximum (100°), $\angle C$ is at minimum of 20° (180° - (60° + 100°)).

REF: 060901ge

3 ANS: 3
$\frac{3}{8+3+4} \times 180 = 36$

REF: 011210ge

4 ANS: 3
$\frac{4}{2+3+4} \times 180 = 80$

REF: 061404ge

5 ANS: 4
$(2x+1)+(x+15)+x=180$

$4x+16=180 \quad 2(41)+1=83°$

$4x=164 \quad 41+15=56°$

$x=41$

REF: 080216a

6 ANS: 1
$x+2x+2+3x+4=180$

$6x+6=180$

$x=29$

REF: 011002ge

7 ANS: 4 REF: 081206ge

8 ANS: 1
$\frac{180-52}{2}=64. \quad 180-(90+64)=26$

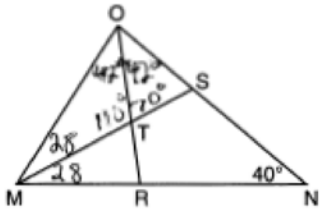
REF: 011314ge

9 ANS: 2

$\angle B = 180 - (82 + 26) = 72$; $\angle DEC = 180 - 26 = 154$; $\angle EDB = 360 - (154 + 26 + 72) = 108$; $\angle BDF = \frac{108}{2} = 54$; $\angle DFB = 180 - (54 + 72) = 54$

REF: 061710geo

10 ANS: 4



REF: 061717geo

11 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.

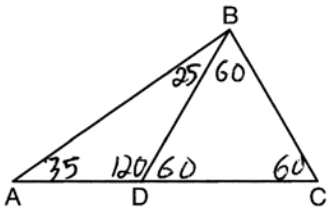
REF: 010119a

12 ANS: 4

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

REF: 060417a

13 ANS: 1



REF: 011504ge

14 ANS: 4

$\frac{5}{2+3+5} \times 180 = 90$

REF: 081119ge

15 ANS: 3

$3x + 1 + 4x - 17 + 5x - 20 = 180$. $3(18) + 1 = 55$

$12x - 36 = 180$ $4(18) - 17 = 55$

$12x = 216$ $5(18) - 20 = 70$

$x = 18$

REF: 061308ge

16 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

17 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

18 ANS: 4

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

$4x + 4 = 180$

$4x = 176$

$x = 44$

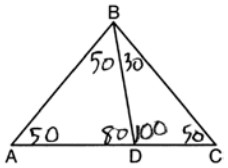
$x = 44$

$(44) + 10 = 54$

$2(44) - 6 = 82$

REF: 010810a

19 ANS: 2



REF: 081604geo

20 ANS: 1

$3x + 5 + 4x - 15 + 2x + 10 = 180$. $m\angle D = 3(20) + 5 = 65$. $m\angle E = 4(20) - 15 = 65$.

$9x = 180$

$x = 20$

REF: 061119ge