

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

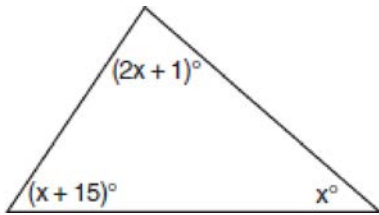
1 In an equilateral triangle, what is the difference between the sum of the exterior angles and the sum of the interior angles?

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 $\angle C$?

3 The angles of triangle ABC are in the ratio of 8:3:4. What is the measure of the *smallest* angle?

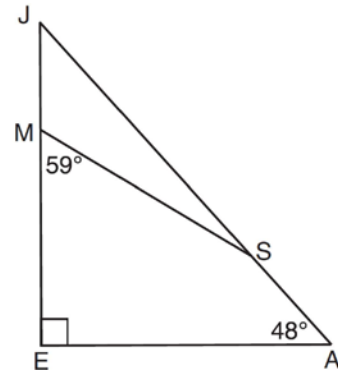
4 The measures of the angles of a triangle are in the ratio 2:3:4. In degrees, the measure of the *largest* angle of the triangle is

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



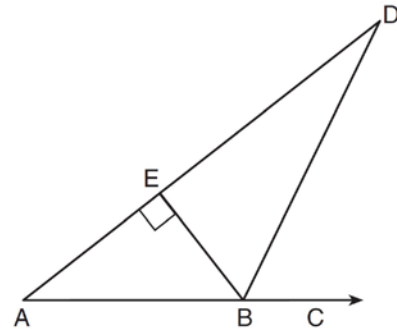
6 In $\triangle ABC$, $m\angle A = x$, $m\angle B = 2x + 2$, and $m\angle C = 3x + 4$. What is the value of x ?

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 $m\angle EMS = 59$.



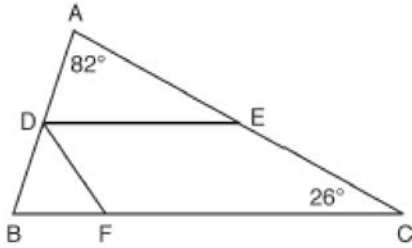
What is $m\angle JSM$?

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



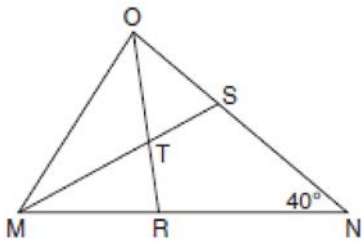
If $m\angle ABE = 52$, what is $m\angle D$?

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



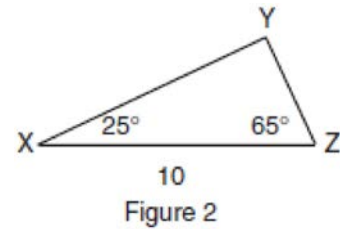
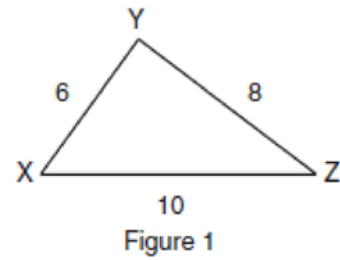
The measure of angle DFB is

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



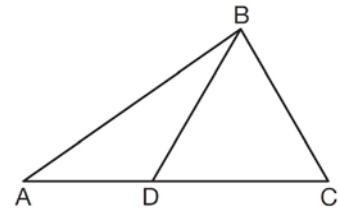
If $m\angle TMR = 28^\circ$, the measure of angle OTS is

- 11 In which of the accompanying figures are segments \overline{XY} and \overline{YZ} perpendicular?



- 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 $\triangle BCD$?

- 14 Triangle PQR has angles in the ratio of $2:3:5$. Which type of triangle is $\triangle PQR$?

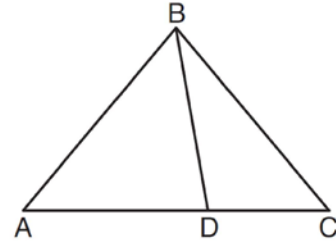
- 15 In $\triangle ABC$, $m\angle A = 3x + 1$, $m\angle B = 4x - 17$, and $m\angle C = 5x - 20$. Which type of triangle is $\triangle ABC$?

- 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 ?

- 17 If the measures of the angles of a triangle are represented by $2x$, $3x - 15$, and $7x + 15$, the triangle is

- 18 If the measures, in degrees, of the three angles of a triangle are x , $x + 10$, and $2x - 6$, the triangle must be

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



Which statement is true?

- 1) $\triangle ABD$ is obtuse.
 - 2) $\triangle ABC$ is isosceles.
 - 3) $m\angle ABD = 80^\circ$
 - 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) $m\angle D = m\angle F$

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

Answer Section

1 ANS:
180°

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

REF: 060909ge

2 ANS:
20° to 40°

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:
36°

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

REF: 011210ge

4 ANS:
80

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

REF: 061404ge

5 ANS:
83

$$\begin{aligned} (2x + 1) + (x + 15) + x &= 180 \\ 4x + 16 &= 180 & 2(41) + 1 &= 83^\circ \\ 4x &= 164 & 41 + 15 &= 56^\circ \\ x &= 41 \end{aligned}$$

REF: 080216a

6 ANS:
29

$$\begin{aligned} x + 2x + 2 + 3x + 4 &= 180 \\ 6x + 6 &= 180 \\ x &= 29 \end{aligned}$$

REF: 011002ge

7 ANS:
17

REF: 081206ge

8 ANS:

26

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

REF: 011314ge

9 ANS:

54°

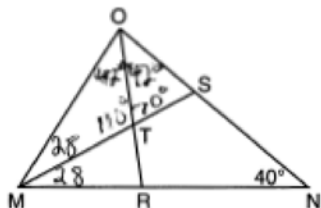
$$\angle B = 180 - (82 + 26) = 72; \quad \angle DEC = 180 - 26 = 154; \quad \angle EDB = 360 - (154 + 26 + 72) = 108; \quad \angle BDF = \frac{108}{2} = 54;$$

$$\angle DFB = 180 - (54 + 72) = 54$$

REF: 061710geo

10 ANS:

70°



REF: 061717geo

11 ANS:

both figure 1 and figure 2

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

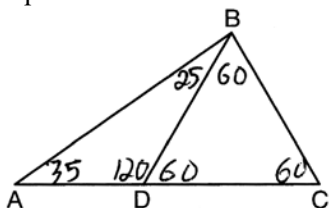
12 ANS: 4

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

REF: 060417a

13 ANS:

equilateral



REF: 011504ge

14 ANS:

right

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

REF: 081119ge

15 ANS:

isosceles

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

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

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

$$x = 18$$

REF: 061308ge

16 ANS:

scalene

$$\begin{aligned} 3y - 10 + y + 40 + 90 &= 180 & C &= 3(15) - 10 = 35 \\ 4y + 120 &= 180 & B &= (15) + 40 = 55 \\ 4y &= 60 & A &= 90 \\ y &= 15 \end{aligned}$$

REF: 010102a

17 ANS:

an isosceles triangle

$$2x + 3x - 15 + 7x + 15 = 180 \quad 2(15) = 30$$

$$12x = 180 \quad 3(15) - 15 = 30$$

$$x = 15 \quad 7(15) + 15 = 120$$

REF: 010722a

18 ANS:

scalene

$$x + x + 10 + 2x - 6 = 180 \quad x = 44$$

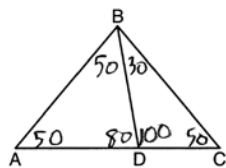
$$4x + 4 = 180 \quad (44) + 10 = 54$$

$$4x = 176 \quad 2(44) - 6 = 82$$

$$x = 44$$

REF: 010810a

19 ANS: 2



REF: 081604geo

20 ANS: 1

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

$$9x = 180$$

$$x = 20$$

REF: 061119ge