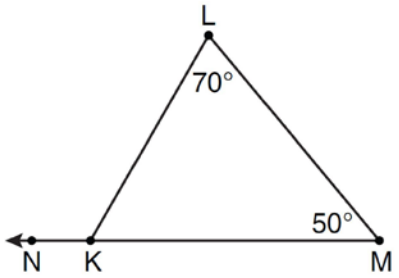
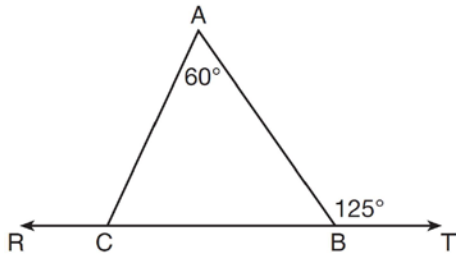
G.CO.C.10: Exterior Angle Theorem 1

1 In the diagram of $\triangle KLM$ below, $m\angle L = 70$, $m\angle M = 50$, and $\overline{MK}$ is extended through N.



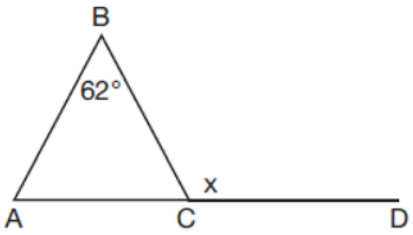
What is the measure of $\angle LKN$?
1) 60°
2) 120°
3) 180°
4) 300°

2 In the diagram below, $\overleftrightarrow{RCBT}$ and $\triangle ABC$ are shown with $m\angle A = 60$ and $m\angle ABT = 125$.



What is $m\angle ACR$?
1) 125
2) 115
3) 65
4) 55

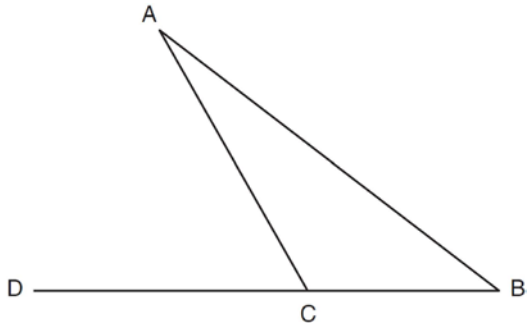
3 Given $\triangle ABC$ with $m\angle B = 62°$ and side $\overline{AC}$ extended to D, as shown below.



Which value of x makes $\overline{AB} \cong \overline{CB}$?
1) 59°
2) 62°
3) 118°
4) 121°

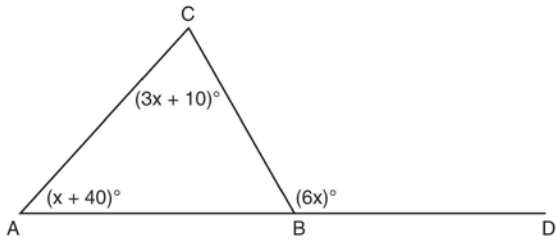
4 In $\triangle FGH$, $m\angle F = 42$ and an exterior angle at vertex H has a measure of 104. What is $m\angle G$?
1) 34
2) 62
3) 76
4) 146

5 In the diagram below of $\triangle ABC$, side $\overline{BC}$ is extended to point D, $m\angle A = x$, $m\angle B = 2x + 15$, and $m\angle ACD = 5x + 5$.



What is $m\angle B$?
1) 5
2) 20
3) 25
4) 55

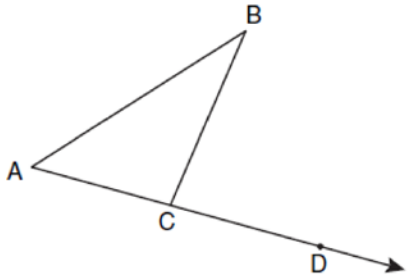
6 In the diagram of $\triangle ABC$ below, $\overline{AB}$ is extended to point D.



If $m\angle CAB = x + 40$, $m\angle ACB = 3x + 10$, $m\angle CBD = 6x$, what is $m\angle CAB$?

1) 13
2) 25
3) 53
4) 65

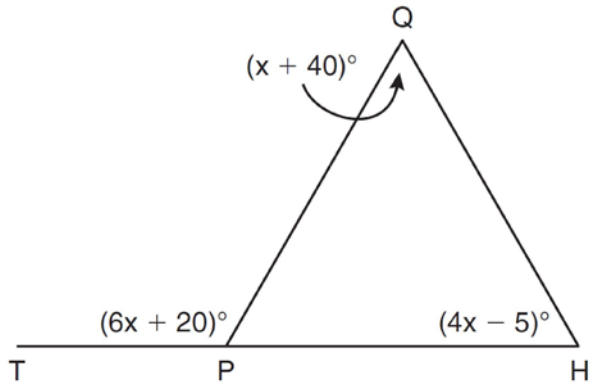
7 In the diagram below, $\triangle ABC$ is shown with $\overline{AC}$ extended through point D.



If $m\angle BCD = 6x + 2$, $m\angle BAC = 3x + 15$, and $m\angle ABC = 2x - 1$, what is the value of x?

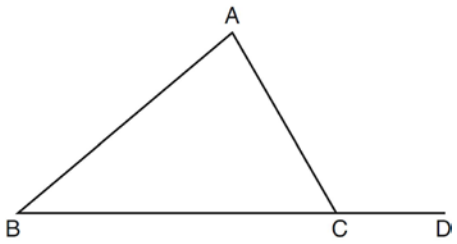
1) 12
2) $14\frac{10}{11}$
3) 16
4) $18\frac{1}{9}$

8 In the diagram below of $\triangle HQP$, side $\overline{HP}$ is extended through P to T, $m\angle QPT = 6x + 20$, $m\angle HQP = x + 40$, and $m\angle PHQ = 4x - 5$. Find $m\angle QPT$.



(Not drawn to scale)

9 In the diagram below of $\triangle ABC$, $\overline{BC}$ is extended to D.

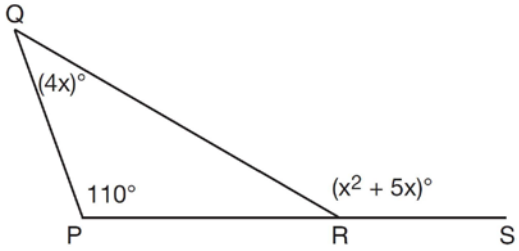


(Not drawn to scale)

If $m\angle A = x^2 - 6x$, $m\angle B = 2x - 3$, and $m\angle ACD = 9x + 27$, what is the value of x?

1) 10
2) 2
3) 3
4) 15

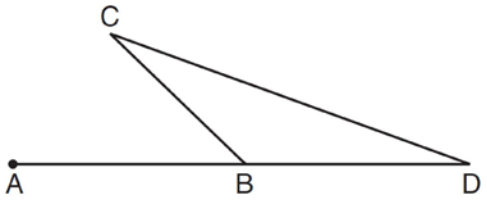
10 In the diagram of $\triangle PQR$ shown below, $\overline{PR}$ is extended to S, $m\angle P = 110$, $m\angle Q = 4x$, and $m\angle QRS = x^2 + 5x$.



What is $m\angle Q$?
1) 44
2) 40
3) 11
4) 10

11 In $\triangle ABC$, $m\angle CAB = 2x$ and $m\angle ACB = x + 30$. If $\overline{AB}$ is extended through point B to point D, $m\angle CBD = 5x - 50$. What is the value of x?
1) 25
2) 30
3) 40
4) 46

12 In the diagram below of $\triangle BCD$, side $\overline{DB}$ is extended to point A.



Which statement must be true?
1) $m\angle C > m\angle D$
2) $m\angle ABC < m\angle D$
3) $m\angle ABC > m\angle C$
4) $m\angle ABC > m\angle C + m\angle D$

13 Side $\overline{PQ}$ of $\triangle PQR$ is extended through Q to point T. Which statement is *not* always true?
1) $m\angle RQT > m\angle R$
2) $m\angle RQT > m\angle P$
3) $m\angle RQT = m\angle P + m\angle R$
4) $m\angle RQT > m\angle PQR$

14 In $\triangle ABC$, an exterior angle at C measures 50º. If $m\angle A > 30$. which inequality must be true?
1) $m\angle B < 20$
2) $m\angle B > 20$
3) $m\angle BCA < 130$
4) $m\angle BCA > 130$

15 In all isosceles triangles, the exterior angle of a base angle must always be
1) a right angle
2) an acute angle
3) an obtuse angle
4) equal to the vertex angle

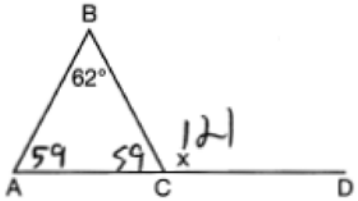
G.CO.C.10: Exterior Angle Theorem 1
Answer Section

1 ANS: 2 REF: 061107ge

2 ANS: 2
$m\angle ABC = 55$, so $m\angle ACR = 60 + 55 = 115$

REF: 011414ge

3 ANS: 4



REF: 081711geo

4 ANS: 2 REF: 011206ge

5 ANS: 3
$x + 2x + 15 = 5x + 15$ $2(5) + 15 = 25$

$3x + 15 = 5x + 5$

$10 = 2x$

$5 = x$

REF: 011127ge

6 ANS: 4
$6x = x + 40 + 3x + 10$. $m\angle CAB = 25 + 40 = 65$

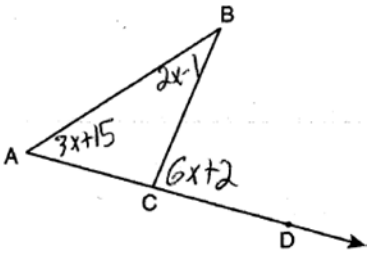
$6x = 4x + 50$

$2x = 50$

$x = 25$

REF: 081310ge

7 ANS: 1



$3x + 15 + 2x - 1 = 6x + 2$

$5x + 14 = 6x + 2$

$x = 12$

REF: 011021ge

8 ANS:
110. $6x + 20 = x + 40 + 4x - 5$

$6x + 20 = 5x + 35$

$x = 15$

$6((15) + 20 = 110$

REF: 081031ge

9 ANS: 4

$x^2 - 6x + 2x - 3 = 9x + 27$

$x^2 - 4x - 3 = 9x + 27$

$x^2 - 13x - 30 = 0$

$(x - 15)(x + 2) = 0$

$x = 15, -2$

REF: 061225ge

10 ANS: 2

$x^2 + 5x = 4x + 110$ $\text{m}\angle Q = 4(10) = 40$

$x^2 + x - 110 = 0$

$(x + 11)(x - 10) = 0$

$10 = x$

REF: 061425ge

11 ANS: 3

$2x + x + 30 = 5x - 50$

$80 = 2x$

$x = 40$

REF: 011615ge

12 ANS: 3 REF: 081111ge

13 ANS: 4

(4) is not true if $\angle PQR$ is obtuse.

REF: 060924ge

14 ANS: 1

$\text{m}\angle A + \text{m}\angle B = 50$

$30.1 + \text{m}\angle B = 50$

$\text{m}\angle B = 19.9$

REF: 081424ge

15 ANS: 3 REF: 061508ge