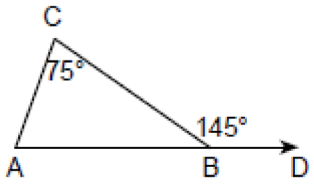
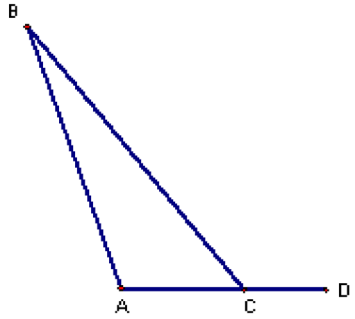
G.G.32: Exterior Angle Theorem 2: Investigate, justify, and apply theorems about geometric inequalities, using the exterior angle theorem

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



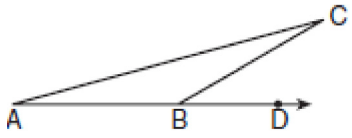
What is $m\angle CAB$?
1) 35
2) 70
3) 110
4) 220

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



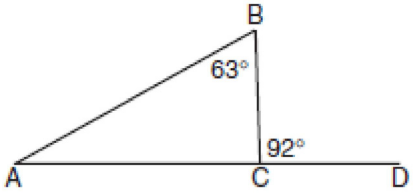
1) 50
2) 70
3) 110
4) 150

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

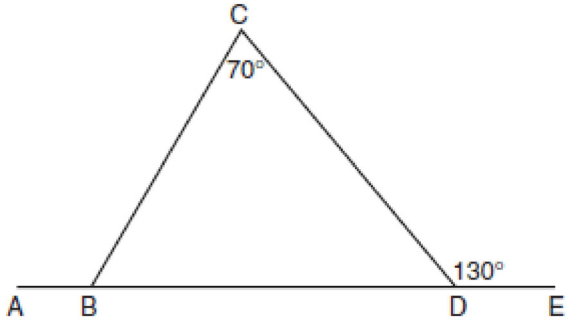


What is the measure of $\angle A$?
1) 15°
2) 30°
3) 75°
4) 150°

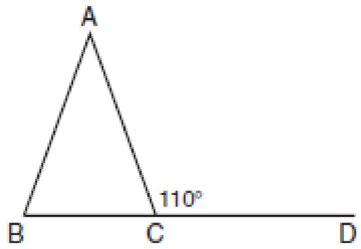
4 Triangle ABC, with side $\overline{AC}$ extended to D, is shown in the accompanying diagram. If $m\angle ABC = 63$ and $m\angle BCD = 92$, what is $m\angle BAC$?



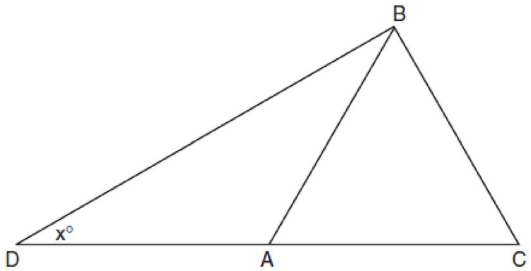
5 In the accompanying diagram of $\triangle BCD$, $m\angle C = 70$, $m\angle CDE = 130$, and side $\overline{BD}$ is extended to A and to E. Find $m\angle CBA$.



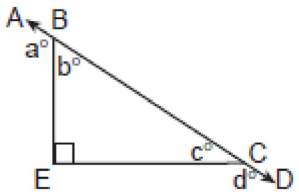
6 In the accompanying diagram of isosceles triangle ABC, $\overline{AB} \cong \overline{AC}$, and exterior angle $ACD = 110°$. What is $m\angle BAC$?



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



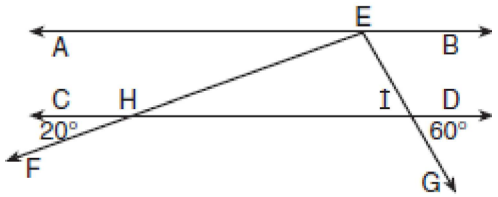
8 In the accompanying diagram, $\overleftrightarrow{ABCD}$ is a straight line, and angle E in triangle BEC is a right angle.



What does $a° + d°$ equal?

1) 135°
2) 160°
3) 180°
4) 270°

9 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 $m\angle CHF = 20$ and $m\angle DIG = 60$, what is $m\angle HEI$?

1) 60
2) 80
3) 100
4) 120

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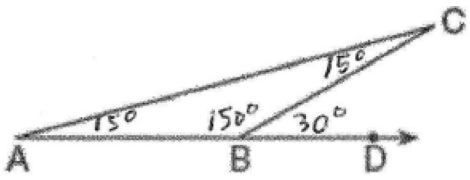
Answer Section

1 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

2 ANS: 3 REF: spring9810a

3 ANS: 1



REF: 010613a

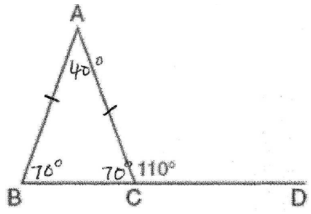
4 ANS:
29. If $m\angle BCD = 92$, then $m\angle BCA = 88$ because the angles are supplementary. Since the measure of the three interior angles must equal 180, $m\angle BAC = 29$ $(88+63+29=180)$.

REF: 080121a

5 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

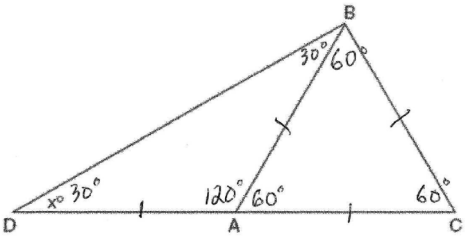
6 ANS:



40.

REF: 080734a

7 ANS:



30.

REF: 080221a

8 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

9 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