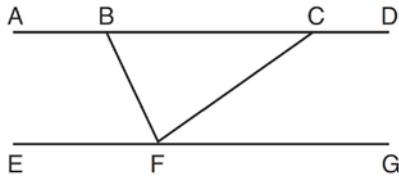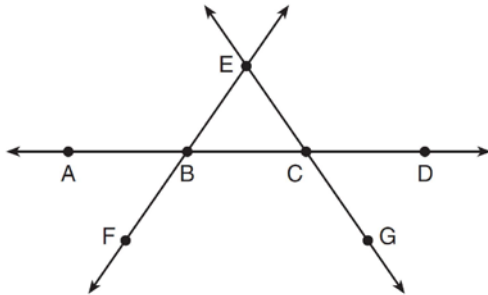## G.CO.C.9: Lines and Angles 1

1 Steve drew line segments $ABCD$, EFG, BF, and CF as shown in the diagram below. Scalene $\triangle BFC$ is formed.

Which statement will allow Steve to prove $\overline{ABCD} \parallel \overline{EFG}$?
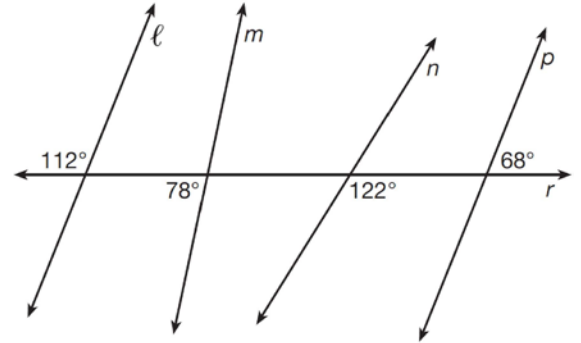1) $\angle CFG \cong \angle FCB$
2) $\angle ABF \cong \angle BFC$
3) $\angle EFB \cong \angle CFB$
4) $\angle CBF \cong \angle GFC$

2 In the diagram below, $\overleftrightarrow{FE}$ bisects $\overline{AC}$ at B, and $\overleftrightarrow{GE}$ bisects $\overline{BD}$ at C.

Which statement is always true?
1) $\overline{AB} \cong \overline{DC}$
2) $\overline{FB} \cong \overline{EB}$
3) $\overleftrightarrow{BD}$ bisects $\overline{GE}$ at C.
4) $\overleftrightarrow{AC}$ bisects $\overline{FE}$ at B.

3 In the diagram below, lines ℓ, m, n, and p intersect line r.
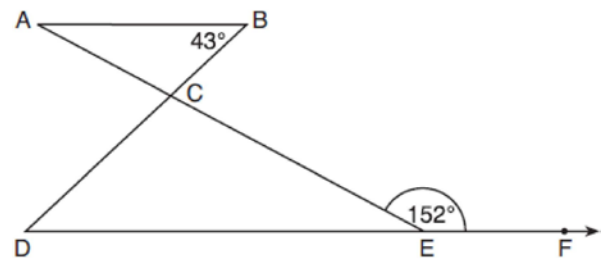

Which statement is true?
1) $\ell \parallel n$
2) $\ell \parallel p$
3) $m \parallel p$
4) $m \parallel n$

4 Segment CD is the perpendicular bisector of $\overline{AB}$ at E. Which pair of segments does *not* have to be congruent?
1) $\overline{AD}, \overline{BD}$
2) $\overline{AC}, \overline{BC}$
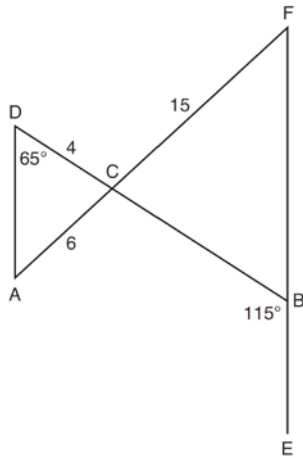3) $\overline{AE}, \overline{BE}$
4) $\overline{DE}, \overline{CE}$

5 In the diagram below, $\overline{AB} \parallel \overrightarrow{DEF}$, $\overline{AE}$ and $\overline{BD}$ intersect at C, m$\angle B = 43°$, and m$\angle CEF = 152°$.

Which statement is true?
1) m$\angle D = 28°$
2) m$\angle A = 43°$
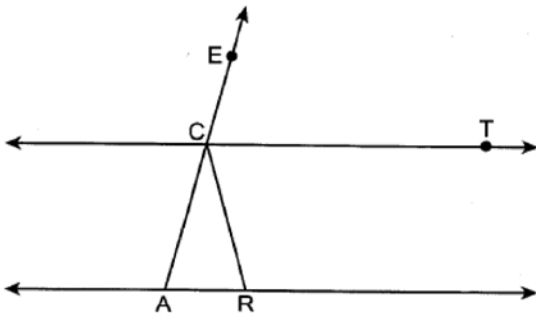3) m$\angle ACD = 71°$
4) m$\angle BCE = 109°$

6 In the diagram below, $\overline{DB}$ and $\overline{AF}$ intersect at point C, and $\overline{AD}$ and $\overline{FBE}$ are drawn.

If $AC = 6$, $DC = 4$, $FC = 15$, $m\angle D = 65°$, and $m\angle CBE = 115°$, what is the length of $\overline{CB}$?
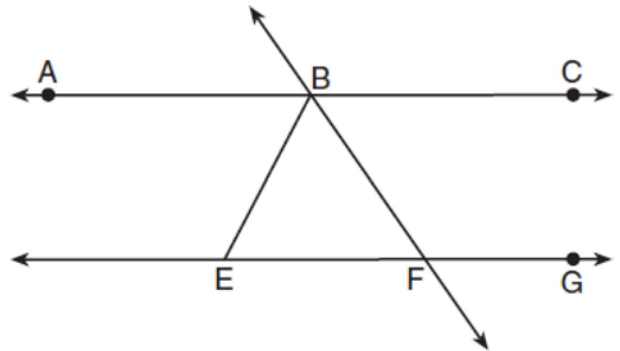1) 10
2) 12
3) 17
4) 22.5

7 In the diagram below, $\overleftrightarrow{CT} \parallel \overleftrightarrow{AR}$, and $\overrightarrow{ACE}$ and $\overline{RC}$ are drawn such that $\overline{AC} \cong \overline{RC}$.

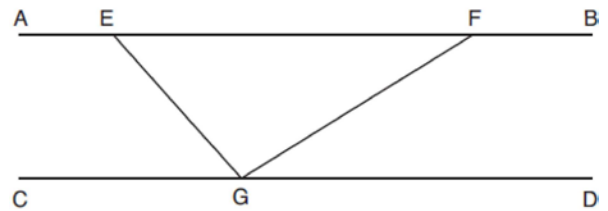If $m\angle ECT = 75°$, what is $m\angle ACR$?
1) 30°
2) 60°
3) 75°
4) 105°

8 As shown in the diagram below, $\overleftrightarrow{ABC} \parallel \overleftrightarrow{EFG}$ and $\overline{BF} \cong \overline{EF}$.

If $m\angle CBF = 42.5°$, then $m\angle EBF$ is
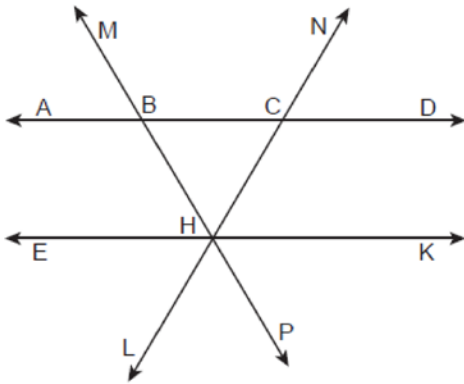1) 42.5°
2) 68.75°
3) 95°
4) 137.5°

9 In the diagram below, $\overline{AEFB} \parallel \overline{CGD}$, and $\overline{GE}$ and $\overline{GF}$ are drawn.

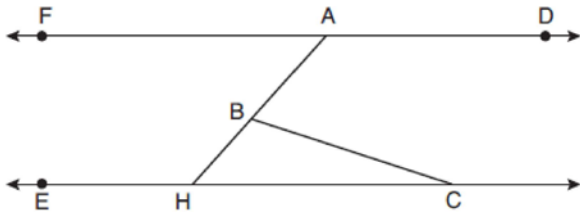If $m\angle EFG = 32°$ and $m\angle AEG = 137°$, what is $m\angle EGF$?
1) 11°
2) 43°
3) 75°
4) 105°

10 In the diagram below, $\overleftrightarrow{ABCD} \parallel \overleftrightarrow{EHK}$, and $\overleftrightarrow{MBHP}$ and $\overleftrightarrow{NCHL}$ are drawn such that $\overline{BC} \cong \overline{BH}$.
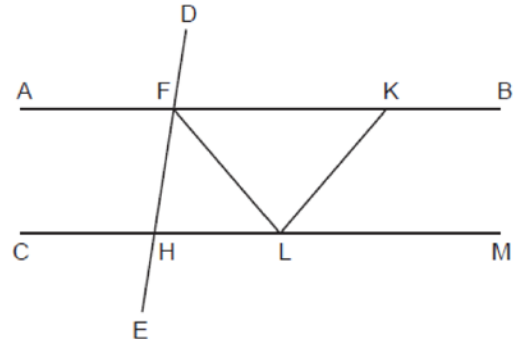
If m$\angle NCD = 62°$, what is m$\angle PHK$?
1)   118°
2)   68°
3)   62°
4)   56°

11 In the diagram below, $\overline{FAD} \parallel \overline{EHC}$, and $\overline{ABH}$ and $\overline{BC}$ are drawn.
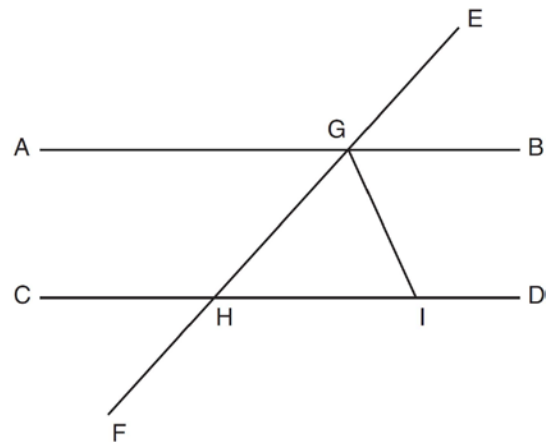
If m$\angle FAB = 48°$ and m$\angle ECB = 18°$, what is m$\angle ABC$?
1)   18°
2)   48°
3)   66°
4)   114°

12 In the diagram below, $\overline{AFKB} \parallel \overline{CHLM}$, $\overline{FH} \cong \overline{LH}$, $\overline{FL} \cong \overline{KL}$, and $\overline{LF}$ bisects $\angle HFK$.

Which statement is always true?
1) $2(m\angle HLF) = m\angle CHE$
2) $2(m\angle FLK) = m\angle LKB$
3) $m\angle AFD = m\angle BKL$
4) $m\angle DFK = m\angle KLF$

13 In the diagram below, $\overline{EF}$ intersects $\overline{AB}$ and $\overline{CD}$ at G and H, respectively, and $\overline{GI}$ is drawn such that $GH \cong IH$.

If m$\angle EGB = 50°$ and m$\angle DIG = 115°$, explain why $\overline{AB} \parallel \overline{CD}$.

3

G.CO.C.9: Lines and Angles 1
Answer Section

1 ANS: 1
   Alternate interior angles

   REF: 061517geo
2 ANS: 1   REF: 011606geo
3 ANS: 2   REF: 081601geo
4 ANS: 4   REF: 081611geo
5 ANS: 3   REF: 061802geo
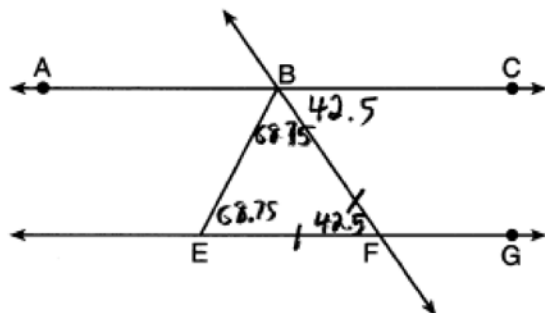6 ANS: 1

   $$\frac{f}{4} = \frac{15}{6}$$

   $f = 10$

   REF: 061617geo
7 ANS: 1
   $180 - 2(75) = 30$

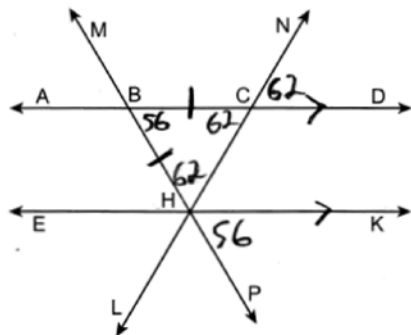   REF: 082407geo
8 ANS: 2

   REF: 011818geo
9 ANS: 4   REF: 081801geo
10 ANS: 4

   REF: 012421geo

11 ANS: 3
$180 - (48 + 66) = 180 - 114 = 66$

REF: 012001geo

12 ANS: 4   REF: 062318geo

13 ANS:
Since linear angles are supplementary, m$\angle GIH = 65°$. Since $\overline{GH} \cong \overline{IH}$, m$\angle GHI = 50°$ $(180 - (65 + 65))$. Since $\angle EGB \cong \angle GHI$, the corresponding angles formed by the transversal and lines are congruent and $\overline{AB} \parallel \overline{CD}$.

REF: 061532geo