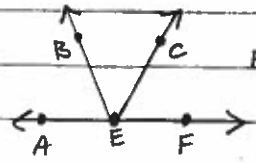
A #14 p. 45-47 Classwork CE #1-9 and Homework WE #1-8, 13-14, 19, 21 Key

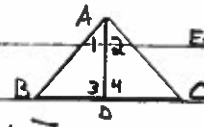
What justifies each statement?



Exs. 1-9

CE
1. $m\angle AEB + m\angle BEC = m\angle AEC$ [∠ Add. Post.]
2. $AE + EF = AF$ [Seg. Add. Post.]
3. $m\angle AEB + m\angle BEF = 180°$ [∠ Add. Post.]
4. If E is the midpoint of $\overline{AF}$, then $\overline{AE} \cong \overline{EF}$. [Def. of midpoint]
5. If E is the midpoint of $\overline{AF}$, then $AE = \frac{1}{2}AF$. [Midpoint Thm]
6. If E is the midpoint of $\overline{AF}$, then $\overleftrightarrow{EC}$ bisects $\overline{AF}$. [Def. of Segment Bisector]
7. If $\overleftrightarrow{EB}$ bisects $\overline{AF}$, then E is the midpoint of $\overline{AF}$. [Def. of Segment Bisector]
8. If $\overleftrightarrow{EB}$ is the bisector of $\angle AEC$, then $m\angle AEB = \frac{1}{2} m\angle AEC$. [∠ Bisector Thm]
9. If $\angle BEC \cong \angle CEF$, then $\overleftrightarrow{EC}$ is the bisector of $\angle BEF$. [Def. of ∠ bisector]

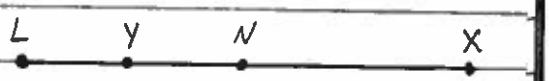
What justifies each statement?



Exs. 1-8

WE
1. If D is the midpoint of $\overline{BC}$, then $\overline{BD} \cong \overline{DC}$. [Def. of midpt]
2. If $\angle 1 \cong \angle 2$, then $\overrightarrow{AD}$ is the bisector of $\angle BAC$. [Def. of ∠ Bisector]
3. If $\overrightarrow{AD}$ bisects $\angle BAC$, then $\angle 1 \cong \angle 2$. [Def. of ∠ Bisector]
4. $m\angle 3 + m\angle 4 = 180°$ [∠ Add. Post.]
5. If $\overline{BD} \cong \overline{DC}$, then D is the midpoint of $\overline{BC}$. [Def. of Midpt]
6. If D is the midpoint of $\overline{BC}$, then $BD = \frac{1}{2}BC$. [Midpt Thm]
7. $m\angle 1 + m\angle 2 = m\angle BAC$. [∠ Add. Post.]
8. $BD + DC = BC$. [Seg. Add. Post.]

13. Given: L(16), X(40), N is the midpt of $\overline{LX}$, Y is the midpt of $\overline{LN}$



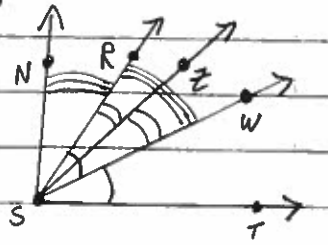
a. $LX = 40 - 16$ [Ruler Post]
$LX = 24$ units
$LN = \frac{1}{2} LX$ [Midpt Thm]
$LN = 12$ units

b. $N\left(\frac{16+40}{2}\right)$
$N\left(\frac{56}{2}\right)$
$N(28)$

c. $LY = \frac{1}{2} LN$ [Midpt Thm]
$LY = 6$ units

d. $Y\left(\frac{16+28}{2}\right) \rightarrow Y\left(\frac{44}{2}\right) \rightarrow Y(22)$

14. Given: $\overrightarrow{SW}$ bisects $\angle RST$, $m\angle RST = 72°$, $\overrightarrow{SZ}$ bisects $\angle RSW$, $\overrightarrow{SR}$ bisects $\angle NSW$



① Mark all $\cong$ ∠s based on def. of ∠ bisector.

② $m\angle RSW = \frac{1}{2} m\angle RST$ [∠ Bisector Thm]
$m\angle RSW = 36°$

③ $m\angle RSZ = \frac{1}{2} m\angle RSW$ [∠ bisector thm]
$m\angle RSZ = 18°$

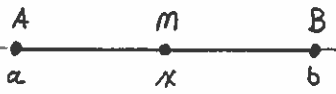
④ $m\angle NSR = m\angle RSW$ [∠ Bisector Thm]
$m\angle NSR = 36°$

⑤ $m\angle NSZ = m\angle NSR + m\angle RSZ$ [∠ Add. Post.]
$m\angle NSZ = 54°$

Key

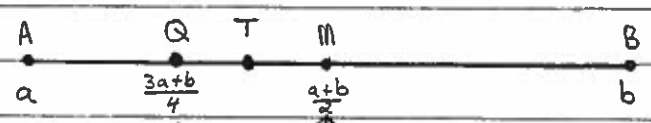
19. Given: A and B have coordinates a and b; $b > a$; midpt M of $\overline{AB}$ has coordinate x.

Prove: $x = \frac{a+b}{2}$



Statements	Reasons
① A, M, and B have coordinates a, x, and b; $b > a$	Given
② $AM = x - a$; $MB = b - x$	Ruler Postulate
③ M is the midpoint of $\overline{AB}$	Given
④ $AM = MB$	Midpoint Thrm
⑤ $x - a = b - x$	Trans. Prop. of =
⑥ $2x = a + b$	Add. Prop. of =
⑦ $x = \frac{a+b}{2}$	Div. Prop. of =

21. M is the midpoint of $\overline{AB}$, Q is the midpoint of $\overline{AM}$, T is the midpoint of $\overline{QM}$. If the coordinates of A and B are a and b, find the coordinates of Q and T in terms of a and b.



① $M\left(\frac{a+b}{2}\right)$

② $Q\left(\frac{a+\frac{a+b}{2}}{2}\right)$

$Q\left(\frac{\frac{2a}{2}+\frac{a+b}{2}}{2}\right)$

$Q\left(\frac{\frac{3a+b}{2}}{2}\right)$

$Q\left(\frac{3a+b}{4}\right)$

③ $T\left(\frac{\frac{3a+b}{4}+\frac{a+b}{2}}{2}\right)$

$T\left(\frac{\frac{3a+b}{4}+\frac{2a+2b}{4}}{2}\right)$

$T\left(\frac{\frac{5a+3b}{4}}{2}\right)$

$T\left(\frac{5a+3b}{8}\right)$