

8-21-17

Betweenness of Points

one point is between
2 others and all 3 are
collinear.

- ① If D is between A and B
with $AB=24$ and $AD=15$, what
is BD ? 9 cm



Here's
how I
would do
every
problem

$$\begin{array}{r} AD + DB = AB \\ \downarrow \quad \downarrow \\ 15 + DB = 24 \\ \underline{-15 \quad -15} \\ DB = 9 \end{array}$$

- ② If C is between AX and
 $AC = 2n+4$, $CX = 4n-1$, and
 $AX = 33$, what is AC?



$$\begin{array}{r} AC + CX = AX \\ \downarrow \quad \downarrow \\ 2n+4 + 4n-1 = 33 \end{array}$$

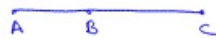
$$\begin{array}{r} 6n+3 = 33 \\ \underline{-3 \quad -3} \end{array}$$

$$\frac{6n}{6} = \frac{30}{6}$$

$$n = 5$$

$$\begin{aligned} \text{Now, } AC &= 2n+4 \\ &= 2 \cdot 5 + 4 \\ &= 14 \end{aligned}$$

- ③ If B is between A and C with
 $AB = 2n+1$, $BC = 3n+7$, and
 $AC = n+16$, what is BC?



$$\begin{array}{r} AB + BC = AC \\ \downarrow \quad \downarrow \\ 2n+1 + 3n+7 = n+16 \end{array}$$


$$\begin{array}{r} 5n+8 = n+16 \\ \underline{-n \quad -n} \end{array}$$

$$\begin{array}{r} 4n+8 = 16 \\ \underline{-8 \quad -8} \end{array}$$

$$\begin{array}{r} 4n = 8 \\ n = 2 \end{array}$$

$$\begin{aligned} BC &= 3 \cdot n + 7 \\ &= 3 \cdot 2 + 7 \\ &= 13 \end{aligned}$$

- ④ IF N is between A and X
 With $AN = 2n + 1$, $NX = 5n - 4$, and
 $AX = n + 27$, what is AN ?



$$AN + NX = AX$$

$$\downarrow \quad \downarrow \quad \downarrow$$

$$2n + 1 + 5n - 4 = n + 27$$

$$7n - 3 = n + 27$$

$$\begin{array}{r} -n \quad -n \\ \hline 6n - 3 = 27 \\ +3 \quad +3 \\ \hline 6n = 30 \\ \frac{6n}{6} = \frac{30}{6} \\ n = 5 \end{array}$$

$$AN = 2 \cdot n + 1$$

$$= 2 \cdot 5 + 1$$

$$= 11$$

- ⑤ C is between N and T .
 IF $NC = 10$, $NT = 40$, and $CT = 3n - 6$,
 what is CT ?



$$NC + CT = NT$$

$$\downarrow$$

$$10 + 3n - 6 = 40$$

$$3n + 4 = 40$$

$$\begin{array}{r} -4 \quad -4 \\ \hline 3n = 36 \\ \frac{3n}{3} = \frac{36}{3} \\ n = 12 \end{array}$$

$$\frac{3n}{3} = \frac{36}{3}$$

$$n = 12$$

$$CT = 3n - 6$$

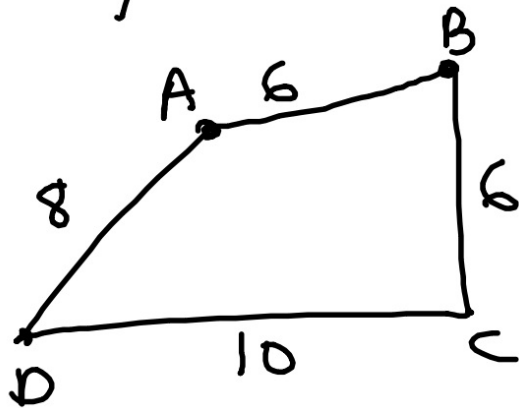
$$= 3 \cdot 12 - 6$$

$$= 30$$

← Should notice the
 $CT = 30$
 at this
 point

Congruent means 2 things
(shapes, lengths, etc.) that are
the same.

Symbol is \cong



$$AB \cong BC$$

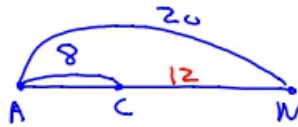
8-21-17 6th Geo

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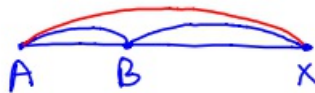
- ① If C is between A and N
with $AC = 8$ and $AN = 20$,
what is CN ?



Best way
to always
do these
problems

$$\begin{array}{r} AC + CN = AN \\ \downarrow \quad \quad \downarrow \\ 8 + CN = 20 \\ \underline{-8 \quad -8} \\ CN = 12 \end{array}$$

- ② B is between A and X. If
 $AB = 4n + 1$, $BX = n + 3$, and $AX = 44$.
What is AB ?



$$\begin{array}{r} AB + BX = AX \\ \downarrow \quad \downarrow \quad \downarrow \\ 4n + 1 + n + 3 = 44 \\ 5n + 4 = 44 \\ \underline{-4 \quad -4} \\ 5n = 40 \\ n = 8 \end{array}$$

$$\begin{array}{l} AB = 4 \cdot n + 1 \\ 4 \cdot 8 + 1 \\ 33 \end{array}$$

- ③ B is between A and C.
 $AB = 2n+1$, $BC = 3n-2$, and
 $AC = 14$. Find AB .



$$AB + BC = AC$$

$$\downarrow \quad \downarrow \quad \downarrow$$

$$2n+1 + 3n-2 = 14$$

$$5n-1 = 14$$

$$\frac{\quad}{+1 \quad +1}$$

$$5n = 15$$

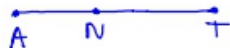
$$n = 3$$

$$AB = 2n+1$$

$$= 2 \cdot 3 + 1$$

$$= 7$$

- ④ N is between A and T.
 If $AN = 2n$, $NT = 6n+1$, and
 $AT = 7n+11$, what is NT ?



$$AN + NT = AT$$

$$\downarrow \quad \downarrow \quad \downarrow$$

$$2n + 6n+1 = 7n+11$$

$$8n+1 = 7n+11$$

$$\frac{\quad}{-7n \quad -7n}$$

$$n+1 = 11$$

$$\frac{\quad}{-1 \quad -1}$$

$$n = 10$$

$$NT = 6n+1$$

$$6 \cdot 10 + 1$$

$$61$$

- ⑤ If A is between C and T
 with $AT = n+28$, $CT = 8n+1$,
 and $CA = 5n+3$, what is CT ?



$$CA + AT = CT$$

$$\downarrow \quad \downarrow \quad \downarrow$$

$$5n+3 + n+28 = 8n+1$$

$$6n+31 = 8n+1$$

$$\frac{\quad}{-6n \quad -6n}$$

$$31 = 2n+1$$

$$\frac{\quad}{-1 \quad -1}$$

$$30 = 2n$$

$$n = 15$$

$$CT = 8n+1$$

$$8 \cdot 15 + 1$$

$$= 121$$

$$\begin{array}{l} 15 \\ 15 \\ 15 \\ 15 \\ 15 \\ 15 \end{array} \begin{array}{l} 30 \\ 30 \\ 30 \\ 30 \\ 30 \\ 30 \end{array}$$