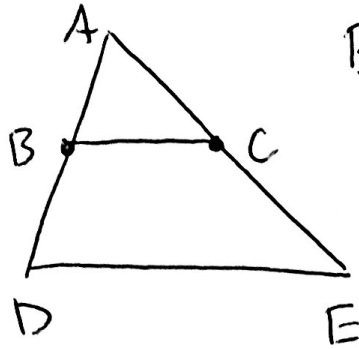
Notes 4-4

Midsegment

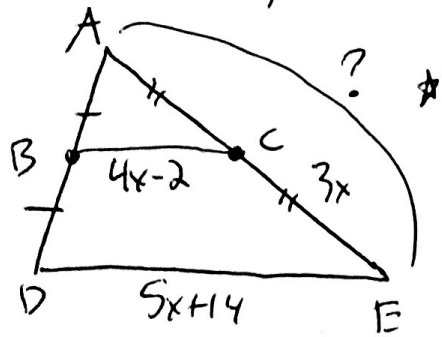


B is mdpt of $\overline{AD}$
C is mdpt of $\overline{AE}$

* when 2 mdpts are connected, the segment is called a midsegment and it has 2 useful properties
  * Its length is ½ of the opp side of the Δ
    ($BC = \frac{1}{2} DE$)
  * It is ∥ to the opp side of the Δ
    ($\overline{BC} \parallel \overline{DE}$)
    → This creates corr ∠'s and cons int ∠'s

* The 2 Δ's that are created are ~ w/ a SF = 1:2
  ($\Delta ABC \sim \Delta ADE$)

Ex: If $BC = 4x-2$, $DE = 5x+14$, and $CE = 3x$, find AE



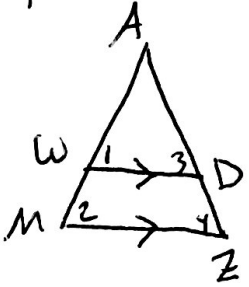
* $\overline{BC}$ is a mdsgmt, connects 2 mdpts

$2(4x-2) = 5x+14$ (mdsgmt ½ opp side)
$8x - 4 = 5x + 14$
$3x = 18$
$x = 6$

$AE = 2 \cdot CE$
$3(6) = 18 \cdot 2 = \boxed{36}$

ll segments/lines cutting figures

* When a ll segment or line cuts ~~through~~ through a figure, it does so in a proportional way (b/c of ~ figures)



* There are 2 ~ Δ's in this picture
  ΔAWD ~ ΔAMZ
  * we know this b/c ∠1 ≅ ∠2 and ∠3 ≅ ∠4 b/c they are corr ∠s with ll lines.
  * $\overline{WD}$ is not a mdsgmt b/c it does not connect 2 mdpts.

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* Using the diagram above: AD = ~~x-1~~ AZ = x+1 AW = x+2
  AM = x+5

~ Δ's so corr sides must have = S.F.

$$\frac{AD}{AZ} = \frac{AW}{AM}$$

~~$\frac{x-1}{x+1}$~~ $= \frac{x+2}{x+5}$

Find WM

$(x-1)(x+5) = (x+1)(x+2)$

$x^2 - 1x + 5x - 5 = x^2 + 2x + 1x + 2$

$x^2 + 4x - 5 = x^2 + 3x + 2$

$-x^2 - 3x + 5 \quad -x^2 - 3x + 5$

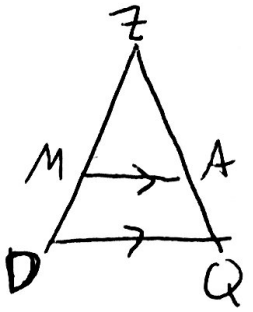
$x = 7$

$AM = 7 + 5 = 12$

$AW = 7 + 2 = 9$

$3 = WM$

Be Careful* (use sides of ~ Δ's)



ZA = 14
AQ = 7
DQ = 24
Find AM

$\frac{14}{x} = \frac{x}{24}$

21

$336 = 21x$

$x = 16$

* not right b/c 7 is not side of Δ need ZQ = 14+7 = 21