

5 Given: Trapezoid ABCD ($\overleftrightarrow{AD} \parallel \overleftrightarrow{BC}$),

$$AD = \frac{1}{4}(BC), \frac{DF}{FC} = \frac{2}{3}$$

Find: $\frac{GE}{GF}$

$$\triangle ADE \sim \triangle CBE$$

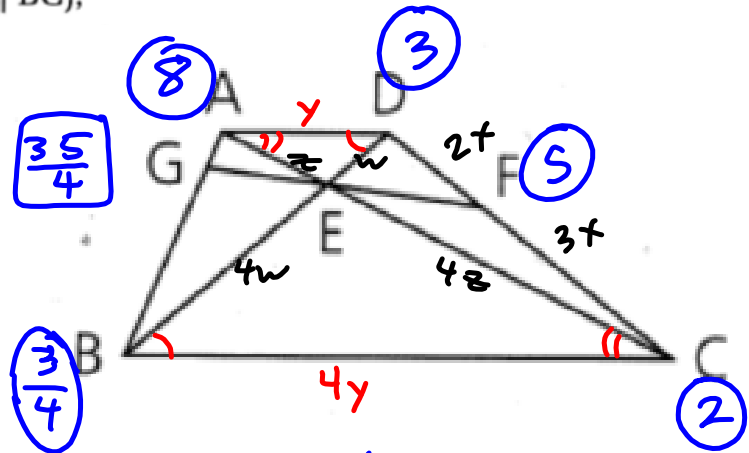
$$\frac{35}{4}$$

$$\frac{35}{4} GE = 5 EF$$

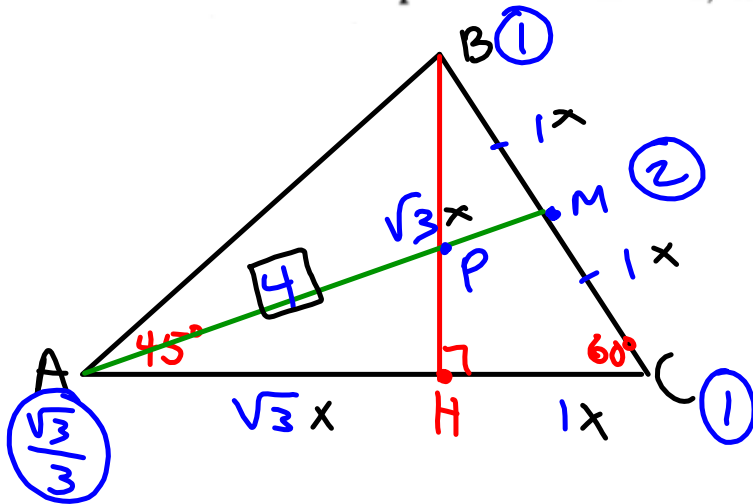
$$\frac{GE}{EF} = \frac{5}{35} \cdot \frac{4}{1}$$

$$= \frac{4}{7}$$

$$\Rightarrow \frac{GE}{GF} = \frac{4}{11}$$



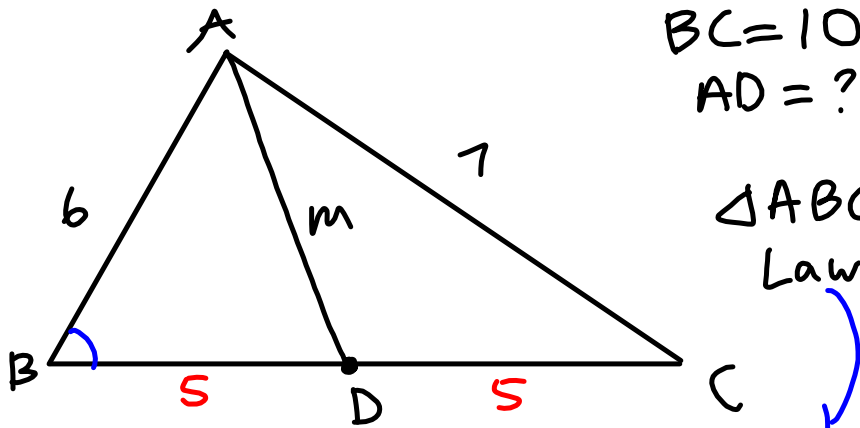
- 4 In a triangle ABC , $\angle A = 45^\circ$, $\angle C = 60^\circ$, and altitude \overline{BH} intersects median \overline{AM} at point P . If $AP = 4$, what is AM ?



$$\frac{\sqrt{3}}{3} \cdot 4 = 2 \cdot MP$$

$$\frac{2\sqrt{3}}{3} = MP$$

$$AM = 4 + \frac{2\sqrt{3}}{3}$$



$\triangle ABC$: SSS so
Law of Cosines

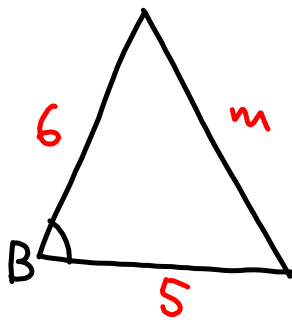
$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac} = \frac{10^2 + 6^2 - 7^2}{2(10)(6)} = \frac{87}{120}$$

$$\cos B = \frac{29}{40}$$

$\triangle ABD$: SAS

$$m^2 = a^2 + c^2 - 2ac \cos B = 5^2 + 6^2 - 2(5)(6)\left(\frac{29}{40}\right)$$



$$m^2 = 61 - \frac{87}{2}$$

$$m^2 = \frac{122}{2} - \frac{87}{2} = \frac{35}{2}$$

$$m = \sqrt{\frac{35}{2}} = \frac{\sqrt{70}}{2}$$

5 Given: Trapezoid ABCD ($\overleftrightarrow{AD} \parallel \overleftrightarrow{BC}$),
 $AD = \frac{1}{4}(BC)$, $\frac{DF}{FC} = \frac{2}{3}$

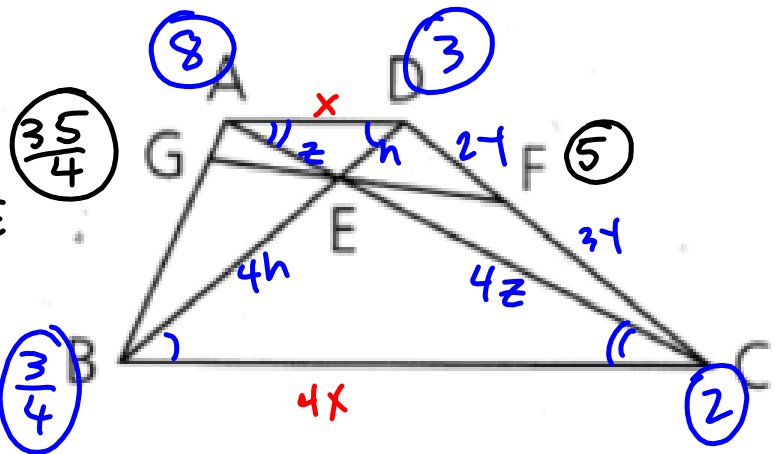
Find: $\frac{GE}{GF}$

$\triangle ADE \sim \triangle CBE$

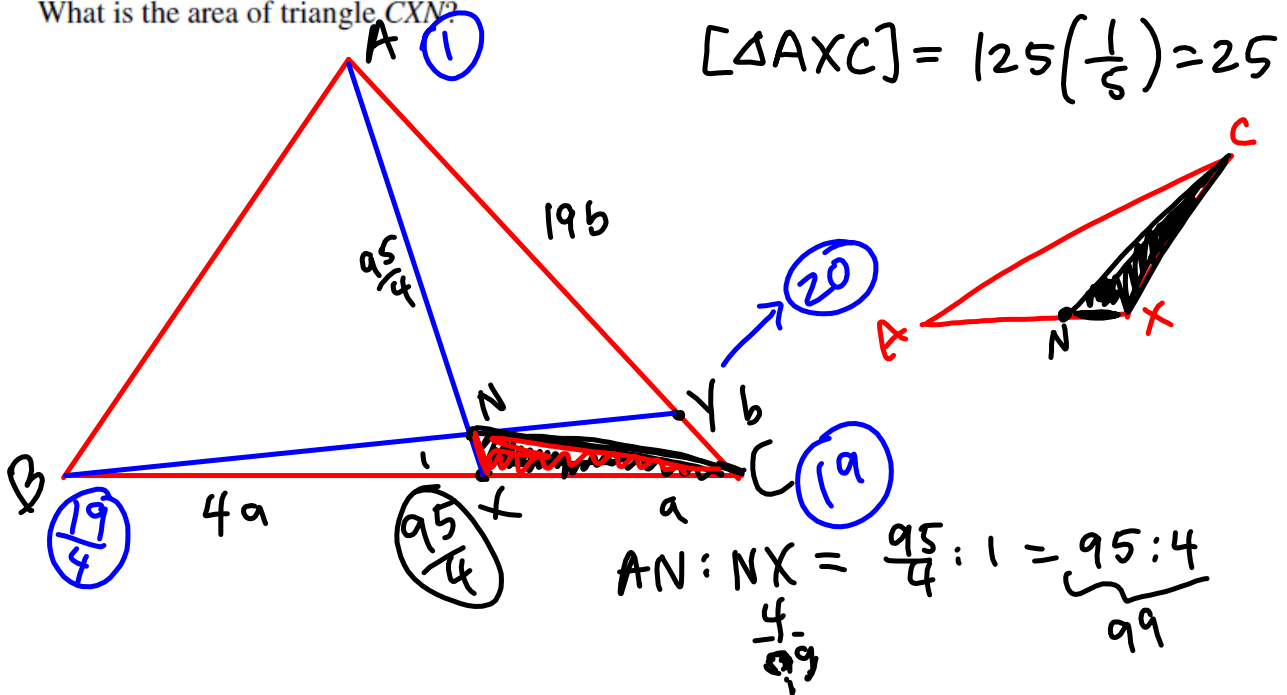
$\frac{35}{4} GE = 5 FE$

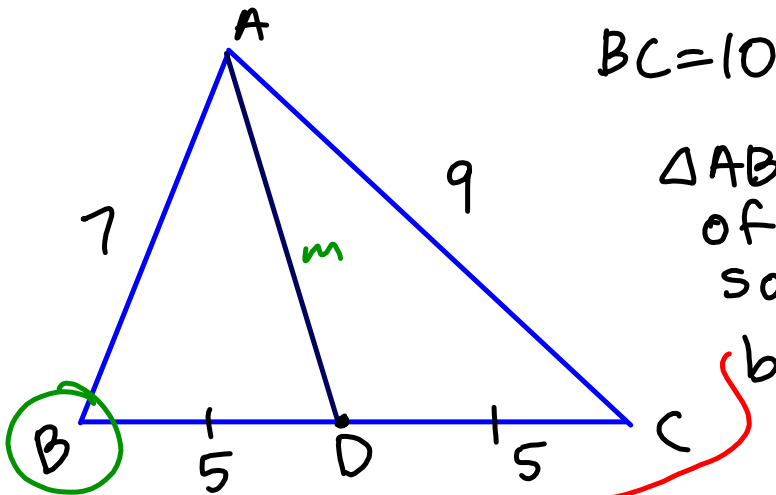
$\frac{GE}{FE} = 5 \cdot \frac{4}{35} = \frac{4}{7}$

$\Rightarrow \frac{GE}{GF} = \frac{4}{11}$



8. The area of triangle ABC is 125. Cevians \overline{BY} and \overline{AX} intersect at N such that $\frac{BX}{CX} = 4$ and $\frac{AY}{CY} = 19$.
 What is the area of triangle CXN ?





$BC = 10$

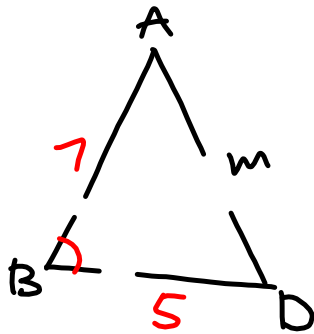
$\triangle ABC$: SSS, so Law of Cosines and solve for $\angle B$.

$b^2 = a^2 + c^2 - 2ac \cos B$

$9^2 = 10^2 + 7^2 - 2(10)(7) \cos B$

leave this alone!

$\frac{81 - 100 - 49}{-2(10)(7)} = \cos B = \frac{-68}{-140} = \frac{17}{35} = \cos B$



Use the Law of Cosines again on $\triangle ABD$

$m^2 = a^2$

$ac \cos B$

$= 7^2 + 49 - 2(5)(7) \frac{17}{35}$

$= 25 + 49 - 1 = 40 = m^2$
 $2\sqrt{10} = m$