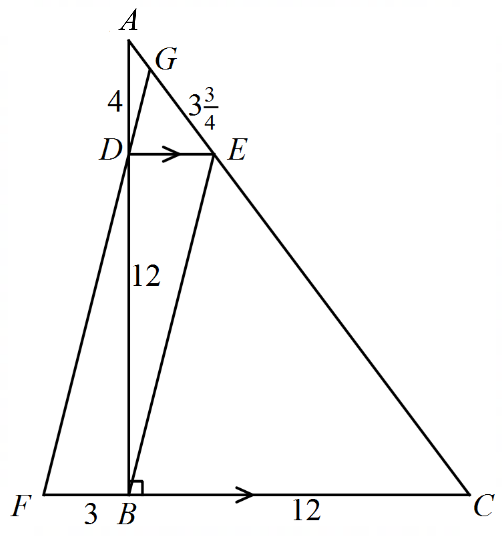
Question 3 (7 marks)

Candidate H



In ΔADE and ΔABC

1. $\hat{A}$ is common
2. $A\hat{E}D = A\hat{C}B$ (corres $\angle$s; $DE \parallel BC$)

$\therefore \Delta ADE \,|||\, \Delta ABC$ (AAA)

$\therefore \dfrac{DE}{BC} = \dfrac{AD}{AB}$ ($\Delta ADE \,|||\, \Delta ABC$)

$\therefore \dfrac{DE}{12} = \dfrac{4}{16}$

$\therefore DE = 3$ units

$\tan D\hat{B}E = \dfrac{3}{12}$

$\therefore D\hat{B}E = 14{,}04°$

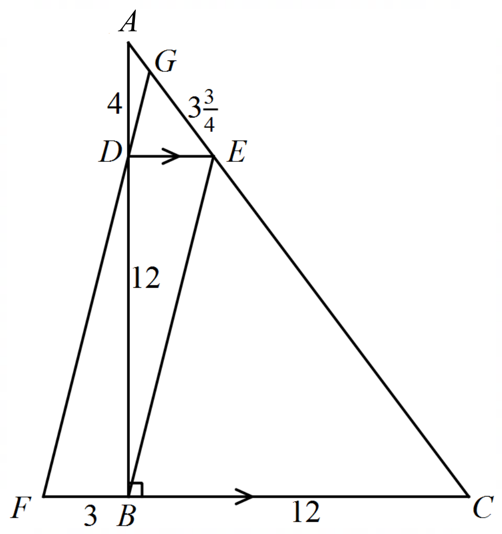
$\tan F\hat{D}B = \dfrac{3}{12}$

$\therefore F\hat{D}B = 14{,}04°$

$\therefore D\hat{B}E = F\hat{D}B$

$\therefore BE \parallel FG$ (alt $\angle$s =)

Candidate I



$\tan D\hat{F}B = \dfrac{12}{3}$

$\therefore D\hat{F}B = 75{,}96°$

$\therefore D\hat{E}B = 75{,}96°$ (opp $\angle$s of parm)

$\therefore E\hat{B}C = 75{,}96°$ (alt $\angle$s; $DE \parallel FC$)

$\therefore E\hat{B}C = D\hat{F}B$

$\therefore BE \parallel FG$ (corres $\angle$s =)

Candidate J

$$\tan \hat{A} = \frac{12}{16}$$

$$\therefore \hat{A} = 36,87°$$

$$\tan 36,87° = \frac{DE}{4}$$

$$\therefore DE = 3 \text{ units}$$

$$\hat{C} = 53,13° \ (\angle \text{ sum of } \Delta\, ABC)$$

$$BE = 3\sqrt{17} \ \text{(Pythag)}$$

$$\frac{\sin B\hat{E}C}{12} = \frac{\sin 53,13°}{3\sqrt{17}}$$

$$\therefore B\hat{E}C = 50,91°$$

$$\therefore E\hat{B}C = 75,96°$$

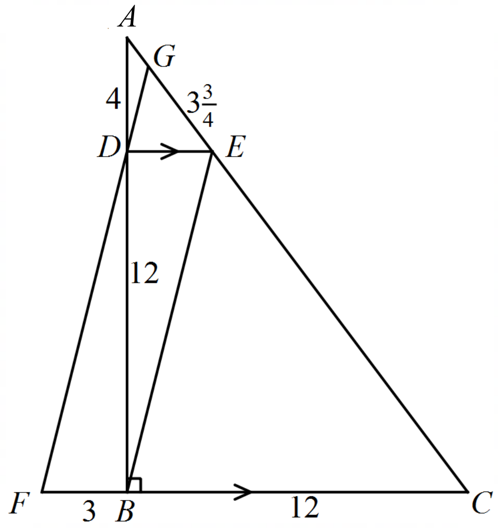
$$EC^2 = \left(3\sqrt{17}\right)^2 + 12^2 - 2\left(3\sqrt{17}\right)(12)\cos 75,96°$$

$$\therefore EC = 15 \text{ units}$$

$$\frac{CB}{BF} = \frac{12}{3} = 4$$

$$\frac{CE}{EG} = \frac{15}{3\frac{3}{4}} = 4$$

$$\therefore BE \parallel FG$$



Candidate K

$$\tan \hat{A} = \frac{12}{16}$$

$$\therefore \hat{A} = 36,87°$$

$$A\hat{D}E = 90° \ (\text{corres } \angle\text{s; } DE \parallel BC)$$

$$\tan 36,87° = \frac{DE}{4}$$

$$\therefore DE = 3 \text{ units}$$

$$DE = FB \text{ and } DE \parallel FB$$

$$\therefore DEBF \text{ is a parm (one pair opp sides = and } \parallel)$$

$$\therefore BE \parallel FG$$