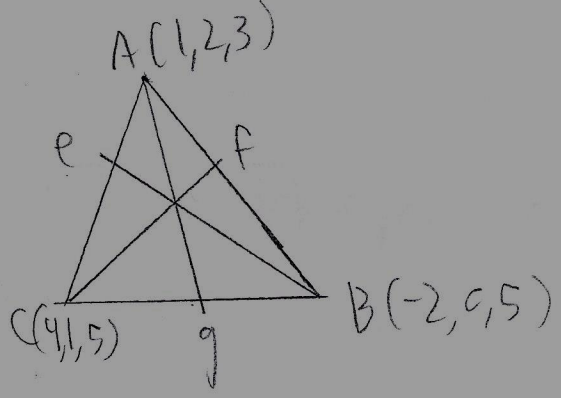
MATH 073 Exam #1 Sumeeth Guda

(1)



e = midpoint AC = $\left(\frac{4+1}{2}, \frac{2+1}{2}, \frac{3+5}{2}\right)$

$= \left(\frac{5}{2}, \frac{3}{2}, 4\right)$

f = midpoint AB = $\left(\frac{1-2}{2}, \frac{2}{2}, \frac{3+5}{2}\right)$

$= \left(-\frac{1}{2}, 1, 4\right)$

g = midpoint BC = $\left(\frac{4-2}{2}, \frac{1}{2}, \frac{5+5}{2}\right)$

$\left(1, \frac{1}{2}, 5\right)$

$|\text{median eB}| = \sqrt{\left(\frac{5}{2}+2\right)^2+\left(\frac{3}{2}\right)^2+(5-4)^2}$

$= \sqrt{\left(\frac{9}{2}\right)^2+\left(\frac{3}{2}\right)^2+1} = \sqrt{\frac{81}{4}+\frac{9}{4}+1} = \sqrt{\frac{90}{4}+1} = \boxed{\frac{\sqrt{94}}{2}}$

$|\text{median gA}| = \sqrt{(1-4)^2+\left(2-\frac{1}{2}\right)^2+(3-5)^2} = \sqrt{\frac{9}{4}+4} = \sqrt{\frac{25}{4}} = \boxed{\frac{5}{2}}$

$|\text{median fC}| = \sqrt{\left(4+\frac{1}{2}\right)^2+(1-1)^2+(5-4)^2} = \sqrt{\frac{81}{4}+1} = \boxed{\frac{\sqrt{85}}{2}}$

(2) $2i - j + 2k = \langle 2, -1, 2\rangle$ $\quad |2,-1,2| = \sqrt{4+1+4} = \sqrt{9} = 3$

$\frac{1}{3}\langle 2, -1, 2\rangle = \boxed{\left\langle \frac{2}{3}, -\frac{1}{3}, \frac{2}{3}\right\rangle}$