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Analytical Methods (ACHA4000)

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● Question 1

a) $V_{\min} = \sqrt{\frac{W}{S} \times \frac{2}{P} \times \frac{1}{C_L}}$

$$V_{\min}^2 = \frac{W}{S} \times \frac{2}{P} \times \frac{1}{C_L}$$

$$\frac{V_{\min}^2 \times P \times C_L}{2 \times 1} = \frac{W}{S}$$

$$\frac{V_{\min}^2 \times P \times C_L}{2 \times 1 \times W} = S$$

$$S = \frac{200^2 \times 0.41 \times 0.52}{2 \times 1 \times 490332}$$

$$S = 8.70 \times 10^{-3} \text{ m}^2$$

b) i) $\frac{8x-3}{5} = \frac{-5x+6}{-3}$

$$-3(8x-3) = 5(-5x+6)$$

$$-24x+9 = -25x+30$$

$$-24x+25x = 30-9$$

$$x = \underline{\underline{21}}$$

ii) $\frac{(4x-1)}{3} - \frac{x}{4} = \frac{(4x+3)}{2}$

$$\frac{(4x-1)}{3} \times 12 - \frac{x}{4} \times 12 = \frac{(4x+3)}{2} \times 12$$

$$16x-4-3x = 6(4x+3)$$

$$16x-3x-24x = 18+4$$

$$-11x = 22$$

$$x = \underline{\underline{-2}}$$