

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

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

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

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

$$= 22998.69$$

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

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

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

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

$$-21 = -x$$

$$\frac{-21}{-1} = x$$

$$21 = x$$

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

$$\frac{18x-4}{12} = \frac{24x+18}{12}$$

$$\frac{16x-4}{12} = \frac{3x}{12} = \frac{24+18}{12}$$

$$\frac{16x-4}{12} = \frac{24x+18}{12}$$

$$\frac{13x-4}{12} = \frac{24x+18}{12}$$

$$13x-4 = 24x+18$$

$$11x = 22$$

$$x = 2$$

$$\text{iii)} \quad 2 \log(5x+3) = \log(x+1) + \log(x+2)$$

$$\frac{(5x+3)^2}{25x^2+30x+9} = \frac{(x+1)(x+2)}{x^2+3x+2}$$

$$24x^2 + 27x + 7 = 0$$

$$\frac{-27x \pm \sqrt{27^2 - 4 \times 24 \times 7}}{2 \times 24}$$

$$x = \frac{-27 \pm \sqrt{57}}{48}$$

$$\text{iv)} \quad 7x \times 3^{x+2} = 5^{x-1}$$

$$x \ln(21) + \ln(3^2) = (x-1) \times \ln(5)$$

$$x \ln(21) + \ln(3^2) = x \ln(5) - \ln(5)$$

$$x (\ln(21) - \ln(5)) \times \ln(3^2) = \ln(5)$$

$$x = \frac{\ln(45)}{\ln(21) - \ln(5)}$$

$$\text{c)} \quad 2R^2 + 27R + 5$$

$$\text{i)} \quad 3R(7R+8) + 5$$

$$\text{ii)} \quad 81Q^2 - 144U^2$$

$$\cancel{9R^2 - 12R}$$

$$9Q - 12U(12Q + 12U)$$

$$\text{iii)} \quad tr - ty + ur - uy$$

$$t(r-y) + u(r-y)$$

$$\begin{aligned}
 d) \quad & x^2 + 9x + 8 = 0 \\
 i) \quad & \cancel{x^2 + 9x + 8} \\
 & \cancel{x^2 + x + 8x + 8} = 0 \\
 & x^2 + 8x + x + 8 = 0 \\
 & x(x+1) + 8(x+1) = 0 \\
 & (x+8)(x+1) = 0 \\
 & x = -8, -1
 \end{aligned}$$

$$\begin{aligned}
 ii) \quad & 12x^2 - 5x - 3 = 0 \\
 & 12x^2 + 4x - 9x - 3 = 0 \\
 & 4x(3x+1) - 3(3x+1) = 0 \\
 & (4x-3)(3x+1) = 0 \\
 & x = 3/4, -1/3
 \end{aligned}$$

$$\begin{aligned}
 iii) \quad & 2x^2 + 17x + 30 = 0 \\
 & 2x^2 + 12x + 5x + 30 = 0 \\
 & 2x(x+6) + 5(x+6) = 0 \\
 & (2x+5)(x+6) = 0 \\
 & x = -6, -5/2
 \end{aligned}$$

$$\begin{aligned}
 iv) \quad & x^2 - 256 \\
 & (x-16)(x+16) \\
 & x = 16, -16
 \end{aligned}$$

$$\begin{aligned}
 e) \quad & (x+5)^2 - x^2 - 32 = (x+1)(x+2) - x^2 \\
 & \cancel{x^2 + 10x + 25} - x^2 - 32 = \cancel{x^2 + 3x + 2} - x^2 \\
 & x^2 + 10x + 25 - x^2 - 32 = x^2 + 3x + 2 - x^2 \\
 & 10x - 7 = 3x + 2 \\
 & 7x = 9 \\
 & x = 9/7
 \end{aligned}$$

3)

a) i) $12x^2 = 31x + 15$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

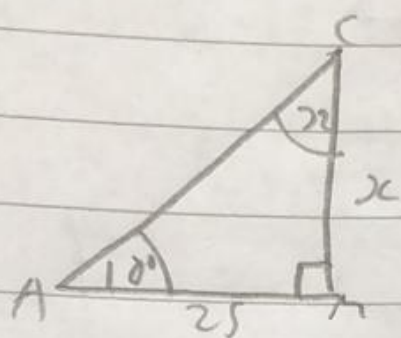
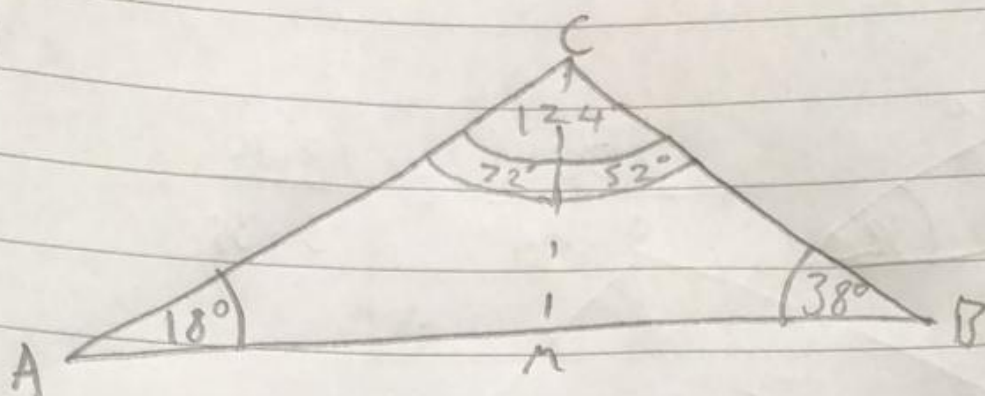
$$\frac{-31x^2 \pm \sqrt{31x^2 - 4x - 15}}{2 \times 12}$$

~~$$\frac{-31 \pm \sqrt{29}}{24}$$~~

$$\frac{31 \pm \sqrt{1801}}{24}$$

$$= 3.06, -0.48$$

e)



$$\sin(18) = \frac{8.12}{AC}$$

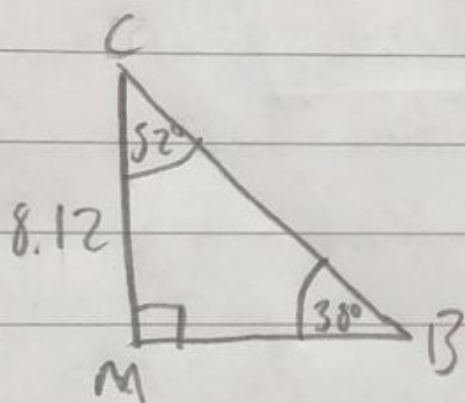
$$AC = \frac{8.12}{\sin(18)}$$

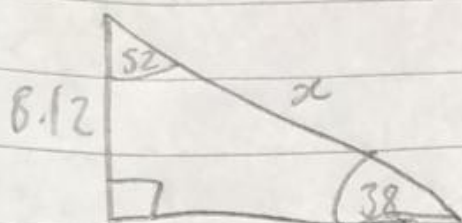
$$\tan(18) = x/25$$

$$AC \approx 28.66 \text{ miles}$$

$$x = 25 \times \tan(18)$$

$$x = 8.18$$





$$\frac{x}{\sin 90} = \frac{8.12}{\sin 38}$$

$$x = \frac{8.12 \times \sin(90)}{\sin 38}$$

$$BC = 13.19$$