

Rich math exam - Euan Shore
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Question 1

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

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

$$S = \frac{W}{(0.5)(V_{min})^2 \times P \times C_L}$$

$$S = \frac{490332}{(0.5)(200)^2 \times 0.41 \times 0.52}$$

$$= 5.22 \text{ m}^2$$

b.1

$$i.1 \quad \frac{8x-3}{5} = \frac{-5x+6}{-3} =$$

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

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

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

$$x = 39$$

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

$$3 \times 4 \times 2 = 24$$

$$\frac{24(4x-1)}{3} - \frac{24(x)}{4} = \frac{24(4x+3)}{2}$$

$$8(4x-1) - 6(x) = 12(4x+3)$$

$$32x - 8 - 6x = 48x + 36$$

$$32x - 6x - 48x = 36 + 8$$

$$-22x = 44$$

$$x = \frac{44}{22}$$

$$x = 2$$

iii) ~~Flag~~ $2\log(5x+3) = \log(x+1) + \log(x+2)$

$$\log(5x+3)^2 = \log(x+1)(x+2)$$

$$25x^2 + 9 = (x+2)(x+1)$$

$$= x^2 + 2x + 2x + 2$$

$$25x^2 + 9 = x^2 + x + 2x + 2$$

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iii.]

$$2 \log(5x+3) = \log(x+1) + \log(x+2)$$

$$\log(5x+3)^2 = \log(x+1)(x+2)$$

$$(5x+3)(5x+3) = (x+1)(x+2)$$

$$25x^2 + 15x + 15x + 9 = x^2 + x + 2x + 2$$

$$24x^2 + 30x + 9 = 3x + 2$$

$$24x^2 + 27x = 2 - 9$$

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

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

$$x = \frac{-30 \pm \sqrt{30^2 - 4 \times 24 \times -7}}{2 \times 24}$$

115.7

$$x = \frac{-27 \pm \sqrt{27^2 - 4 \times (24) \times (-7)}}{48}$$

$$-0.41$$

$$x = \frac{-27 - \sqrt{27^2 - 4 \times (24) \times (-7)}}{48}$$

$$-0.72$$

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$$\text{iv. } 7^z + 3^{z+2} = 5^{z-1}$$

$$\text{c. } 27R^2 + 24R + 5$$

$$27R^2 + 15R + 9R + 5$$

$$3R \times (9R + 5) + 9R + 5$$

$$(9R + 5) \times (3R + 1)$$

$$\text{ii. } 81a^2 - 144u^2 \rightarrow 9 \times 16$$

$$9(9a^2 - 16u^2)$$

$$9(3a - 4u) \times (3a + 4u)$$

iii)

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cl.7

$$\text{ii.1 } x^2 + 9x + 8 = 0$$
$$(x+8)(x+1) = 0$$

$$x+9=0 \quad \text{or} \quad x-1=0$$
$$x = -8 \quad \quad \quad x = 1$$

$$\text{ii.2 } 12x^2 - 5x - 3 = 0$$

$$\sqrt{} \quad \sqrt{}$$

$$\cancel{12x^2} \quad 4x(3x+1) - 3(3x+1)$$

$$(3x+1)(3x+1) \times (4x-3) = 0$$

$$3x+1=0$$

$$4x-3=0$$

$$x = \frac{-1}{3}$$

$$\text{or} \quad x = \frac{+3}{4}$$

$$\text{iii.1 } 2x^2 + 17x - 30 = 0$$

$$2x^2 + 17x + 30 = 0$$

$$(2x+5)(x+6) = 0$$

$$2x+5=0$$

$$x = \frac{-5}{2}$$

$$\text{or} \quad x+6=0$$

$$x = -6$$

$$\text{iii.2 } x^2 - 256 = 0$$

$$(x-16)(x+16) = 0$$

$$x-16=0$$

or

$$x+16=0$$

$$x = 16$$

$$x = -16$$

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$$e) (x+5)^2 - x^2 - 32 = (x+1)(x+2) - x^2$$

$$x^2 + 10x + 25 - 32 = x^2 + 2x + 2$$

$$10x + 25 - 32 = 2x + 2$$

$$10x - 7 = 2x + 2$$

$$10x - 3x = 7 + 2$$

$$7x = 9$$

$$x = \frac{9}{7}$$

$$x = 1.29$$

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Question Three

1.1 $12x^2 = 31x + 15$

$$\underset{a}{12x^2} - \underset{b}{31x} - \underset{c}{15} = 0$$

$$x = \frac{-131 \pm \sqrt{3^2 - 4(12)(15)}}{2(12)}$$

$$x = 0.42 \quad \text{or} \quad x = -3$$

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b

$$i) \cos x = 0.62$$

$$x = \cos^{-1}(0.62)$$

$$x = 51.68^\circ \quad \text{2dp}$$

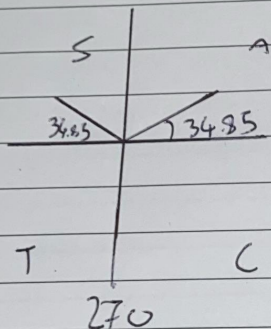
$$360 - 51.68 = 308.32^\circ$$

$$ii) 7 \sin x = 4$$

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

$$x = \sin^{-1}\left(\frac{4}{7}\right)$$

$$x = 34.85^\circ$$



$$x = 180 - 34.85$$
$$x = 145.15^\circ$$

$$iii) -5 \tan x = 4$$

$$\tan x = \frac{4}{5}$$

$$x = \tan^{-1}\left(\frac{4}{5}\right)$$

$$= 38.66^\circ$$

$$x = 180 - 38.66$$
$$= 141.34^\circ$$

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iv.7 $-3 \sin x = -2$

$$\sin x = \frac{-2}{3}$$

$$x = \sin^{-1}\left(\frac{-2}{3}\right)$$

$$= 41.81^\circ$$

$$180 - 41.81$$

$$= 138.19^\circ$$

d