

Sam Castelli

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ALHA4000

10/01/22

iii)  $2 \log(3x+1) = \log(x+3) + \log(x+7)$

$$(3x+1)^2 = (x+3)(x+7)$$

$$(3x+1)(3x+1) = (x+3)(x+7)$$

~~$$9x^2 + 6x + 1 = x^2 + 10x + 21$$~~

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$$A \quad B \quad C$$

$$8x^2 - 4x - 20 = 0$$

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

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(8)(-20)}}{2(8)}$$

$$x = \frac{-(-4) \pm \sqrt{16 + 640}}{16}$$

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Q1

$$i) \frac{3x-1}{5} = \frac{6x+5}{9}$$

$$9(3x-1) = 5(6x+5)$$

$$27x - 9 = 30x + 25$$

$$-9 - 25 = 30x - 27x$$

$$-34 = 3x$$

$$x = \frac{-34}{3}$$

$$x = -11.33$$

$$ii) 1 + \frac{5}{x} = \frac{-6}{x^2}$$

$$1 + \frac{5}{x} = \frac{-6}{x^2} \times x^2$$

$$x^2(1) + x^2\left(\frac{5}{x}\right) = -6$$

$$x^2 + 5x = -6$$

$$(x+3)(x+2) \quad x^2 + 5x + 6 = 0 \quad (2x = 6) \quad (2+3 = 5)$$

$$(x+3) \times (x+2)$$

$$x = -3$$

$$x = -2$$

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Q5)

A)

$$i) Z_1 + Z_2$$

$$(3+7j) + (2-10j)$$

$$5 - 3j$$

$$ii) Z_1 - Z_2$$

$$(3+7j) - (2-10j)$$

$$1 + 17j$$

$$iii) \frac{Z_1}{Z_2}$$

$$\frac{3+7j}{2-10j}$$

$$\frac{1.5 - 0.7j}{1}$$

$$7x^2 - 2x - 11$$

$$7x^2 + 2x + 11 > 0$$

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Q3

i)  $\sin x = 0.67$

$\sin^{-1} 0.67$

$x = 42.07$

$180 - 42.07$

$x = 137.93$

ii)  $\tan^2 x - 7 \tan x + 10 = 0$

Q4

$y = 6x^2 + 12x - 14$

$y = 4x^2 + 3x - 4$

$16x^2 + 12x - 14$

$y = 20x^2 + 14x - 56$  ①

$y = 20x^2 + 15x - 20$  ②

① - ②

$33x - 76 = 0$

$x = \frac{-76}{-33}$

$x = 2.30$

$x = \frac{-76}{-33}$

$x = 0.4$

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b)

i)  $8p^3q^2 - 4p^2q^3 + 2p^3q$

$$2(4p^3q^2 - 2p^2q^3 + p^3q)$$

$$2p^2(4pq^2 - 2q^3 + pq)$$

$$\underline{2p^2q(4pq - 2q^2 + p)}$$

ii)  $x^2 - y^2$

$$(x+x)(x-x) - (y+y)(y-y)$$

$$\underline{(x-y)(x+y)}$$

c)

i)  $x^2 + 12x + 20 = 0$

$$(x+10)(x+2) = 0$$

$$\boxed{x = -10} \quad \boxed{x = -2}$$

ii)  $2x^2 + x - 15 = 0$

$$(x+3)(2x-5) = 0$$

$$\boxed{x = -3} \quad \boxed{x = \frac{5}{2}}$$