

Analytical methods (Ach Alkass)

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

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

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

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$$-3x = 34$$

$$x = -11.3$$

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

$$1 + \frac{5}{x} + \frac{6}{x^2} = 0$$

$$x^2 + 5x + 6 = 0$$

$$x^2 + 3x + 2x + 6 = 0$$

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

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

$$x+3 = 0$$

$$x+2 = 0$$

$$x = -3$$
$$x = -2$$

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

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

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

$$15x + 1 = x^2 + 10x + 21$$

$$15x + 1 - x^2 - 10x - 21 = 0$$

$$5x - 20 - x^2 = 0$$