

March 18th

$$2^x + 1 = \sqrt{3(1 - 2^{x-1})}$$

$$(2^x + 1)^2 = 3(1 - 2^{x-1})$$

Hence

$$2^{2x} + 2 \times 2^x + 1 = 3(1 - 2^{x-1})$$

Therefore

$$2^{2x} + 2 \times 2^x + 3 \times 2^{x-1} - 2 = 0$$

Giving

$$2^{2x} + 2 \times 2^x + \frac{3}{2} \times 2^x - 2 = 0$$

Therefore

$$2^{2x} + \frac{7}{2} \times 2^x - 2 = 0 \quad (\text{which is a quadratic in } 2^x)$$

Solving for 2^x gives

$$2^x = \frac{1}{2} \quad \text{or} \quad 2^x = -4 \quad (\text{which has no solution})$$

Hence

$$\mathbf{x = -1}$$