

7-ая степень

$$V[7](12+x) / x + V[7](12+x) / 12 = 64/3 V[7](x)$$

$$[12V[7](12+x) + x V[7](12+x)] / 12x = 64/3 V[7](x)$$

$$[12V[7](12+x) + x V[7](12+x)] / 12x - 4x \cdot 64 V[7](x) / 12x = 0$$

$$[12V[7](12+x) + x V[7](12+x) - 4x \cdot 64 V[7](x)] / 12x = 0$$
$$x \neq 0$$

$$(12 + x) V[7](12+x) - 2^8 \cdot x^{(8/7)} = 0$$

$$(12 + x)^{(8/7)} = 2^8 \cdot x^{(8/7)} \quad | \quad ^{(7/8)}$$

$$(12 + x) = \pm x \cdot 2^7$$

$$x = 12 / (\pm 128 - 1)$$

Ответ: 12 / (+- 128 - 1)

домножение на сопряжённое

$$[V(x-1) + V(x+1) + 2] / [V(x-1) + V(x+1)] = V(x^2 - 1)$$

$$[V(x-1) + V(x+1) + 2][V(x-1) - V(x+1)] / [V(x-1) + V(x+1)][V(x-1) - V(x+1)] = V(x^2 - 1)$$

$$[V(x-1) + V(x+1) + 2][V(x-1) - V(x+1)] / [(x-1) - (x+1)] = V(x^2 - 1)$$

$$[V(x-1) + V(x+1) + 2][V(x-1) - V(x+1)] / [-2] = V(x^2 - 1)$$

$$[-2 + 2 \cdot (V(x-1) - V(x+1))] / [-2] = V(x^2 - 1)$$

$$[1 - (V(x-1) - V(x+1))] = V(x^2 - 1)$$

$$1 - V(x-1) + V(x+1) = V(x^2 - 1)$$

$$V(x+1) - V(x-1) = V(x^2 - 1) - 1$$

$$x+1 + x-1 - 2V(x^2 - 1) = x^2 - 1 + 1 - 2V(x^2 - 1)$$

$$2x = x^2$$

$$x=0 \quad x=2$$

ПРОВЕРКА

0 отпадает,

x=2 подставляем

$$(1 + \sqrt{3} + 2) / (1 + \sqrt{3}) = ? = V(3)$$

$$(1 + \sqrt{3} + 2)(1 - \sqrt{3}) / (1 + \sqrt{3})(1 - \sqrt{3}) = ? = V(3)$$

$$1 + \sqrt{3} + 2 - \sqrt{3} - 3 - 2\sqrt{3} / -2 = -2\sqrt{3} / -2 = \sqrt{3}$$

ОТВЕТ: 2

неполная замена

$$(3-x)V[3]((3-x)/(x-1)) + (x-1)V[3]((x-1)/(3-x)) = 2$$

$$V[3]((3-x)/(x-1)) = t \quad t \neq 0$$

$$(3-x)^t + (x-1)/t - 2 = 0$$

$$(3-x)^{t^2} - 2t + (x-1) = 0 \quad \text{решаем как квадратное по } t$$

$$D/4 = 1 - (3-x)(x-1) = 1 - 3x + x^2 + 3 - x = x^2 - 4x + 4 =$$

$$= (x-2)^2$$

$$V(D/4) = x-2$$

$$t_1 = (1 + x-2) / (3-x) = (x-1) / (3-x)$$

$$t_2 = (1 - x + 2) / (3-x) = 1$$

$$V[3]((3-x)/(x-1)) = 1$$

$$(3-x)/(x-1) = 1$$

$$x=2$$

$$V[3]((3-x)/(x-1)) = (x-1) / (3-x)$$

$$(3-x)/(x-1) = u$$

$$V[3]u = 1/u$$

$$u^{(4/3)} = 1$$

$$u=1$$

$$x=2$$

проверка не нужна, т.к. корни нечётной степени

Ответ: 2