

Биквадратные уравнения

$$1) 25x^4 + 66x^2 - 27 = 0$$

$$2) x^6 + 9x^3 + 8 = 0$$

$$25x^4 + 66x^2 - 27 = 0$$

$$y = x^2$$

$$25y^2 + 66y - 27 = 0;$$

$$\begin{aligned} D/4 = D^* &= (b^2 - 4ac)/4 = b^2/4 - ac = (b/2)^2 - ac = 33^2 - 25 \cdot 27 = \\ &= (3^2 \cdot 11^2) + (25 \cdot 3 \cdot 3^2) = 3^2(11^2 + 25 \cdot 3) = 3^2(121 + 75) = \\ &= 3^2 \cdot 14^2; D^* > 0; \sqrt{D^*} = 3 \cdot 14 = 42; \end{aligned}$$

$$\begin{aligned} y_1 &= (-b - \sqrt{D})/2a = (-b/2 - \sqrt{D}/2)/a = (-b/2 - \sqrt{D/4})/a = (-b/2 - \sqrt{D^*})/a = \\ &= (-66/2 - 42)/25 = -33 - 42/25 = -75/25 = -3; \end{aligned}$$

$$y_2 = (-b/2 + \sqrt{D^*})/a = (-66/2 + 42)/25 = -33 + 42/25 = 9/25;$$

$$x^2 = -3;$$

no solutions

$$x^2 = 9/25;$$

$$x^2 - 9/25 = 0;$$

$$(x - \frac{3}{5})(x + \frac{3}{5}) = 0;$$

$$x_1 = \frac{3}{5}$$

$$x_2 = -\frac{3}{5}$$

Answer: $\frac{3}{5}; -\frac{3}{5}$

$$x^6 + 9x^3 + 8 = 0;$$

$$y = x^3;$$

$$y^2 + 9y + 8 = 0;$$

$$y_1 = -8;$$

$$y_2 = -1;$$

$$x^3 = -8;$$

$$x_1 = -2;$$

$$x^3 = -1;$$

$$x_2 = -1;$$

Answer: $-2; -1$

