

Примеры решений показательных уравнений и неравенств

1) $2^{x^2-x} - 4 = 0;$

$$2^{x^2-x} = 2^2;$$

$$x^2 - x = 2;$$

$$x^2 - x - 2 = 0;$$

$$(x - 2)(x + 1) = 0;$$

$$x = 2; x = -1;$$

Ответ: $\{-1; 2\}$.

2)

$$16^x \leq 0.5 * 8^{2x+3};$$

$$2^{4x} \leq 2^{6x+8};$$

$$y = 2^t \quad (2 > 1) \uparrow;$$

$$4x \leq 6x + 8;$$

$$x \geq 4;$$

Ответ: $[4; \infty)$.

3)

$$0.25^x - 6 * 0.5^x \geq -5;$$

$$0.5^{2x} - 6 * 0.5^x + 5 \geq 0;$$

$$t = 0.5^x;$$

$$t^2 - 6t + 5 \geq 0;$$

$$(t - 1)(t - 5) \geq 0;$$

$$\left[\begin{array}{l} t \leq 1; \\ t > 5: \end{array} \right.$$

$$\left[\begin{array}{l} 0.5^x \leq 0.5^0; \\ 0.5^x \geq 0.5^{\log_{0.5} 5}; \end{array} \right.$$

$$y = 0.5^z (0 < z < 1) \downarrow;$$

$$\left[\begin{array}{l} x \geq 0; \\ x \leq \log_{0.5} 5; \end{array} \right.$$

$$\text{ОТВЕТ: } (-\infty; \log_{0.5} 5] \cup [0; \infty).$$

4)

$$0.5^{\frac{x+1}{x-1}} < 32^{-1};$$

$$0.5^{\frac{x+1}{x-1}} < 0.5^5;$$

$$y = 0.5^t \quad (0 < 0.5 < 1) \downarrow;$$

$$\frac{x+1}{x-1} > 5;$$

$$\frac{x+1-5x+5}{x-1} > 0;$$

$$\frac{4x-6}{x-1} < 0;$$

Ответ: (1; 1.5).

5) $12^{x-2} = 3^{3x} * 2^{6x};$

$$12^{-2} = 3^{2x} * 2^{4x};$$

$$12^{-2} = 12^{2x};$$

$$2x = -2;$$

$$x = -1;$$

ОТВЕТ: -1 .