$$log_{\frac{1}{\sqrt{2}}}\left(4\sqrt[3]{32}\right) = log_{2^{-\frac{1}{2}}}2^{\frac{11}{3}} = -2 \cdot \frac{11}{3} = -\frac{22}{3} = -7\frac{1}{3}$$

$$49^{log_7 3+1} = 49^{log_7 3+log_7 7} = 49^{log_7 21} = 7^{2log_7 21}$$
$$= 7^{log_7 21^2} = 21^2 = 441$$

$$log_2^2 x + 4log_2(2x) - 9 = 0$$

ОДЗ x>0

$$log_2^2 x + 4log_2 x + 4log_2 2 - 9 = 0$$

$$log_2^2 x + 4log_2 x + 4 - 9 = 0$$

$$log_2^2 x + 4log_2 x - 5 = 0$$

Введем замену переменной $log_2 x = t$

$$t^2 + 4t - 5 = 0$$

$$D = 16 + 20 = 36$$

$$t_1 = \frac{-4+6}{2} = 1$$

$t_2 = \frac{-4-6}{2} = -5$

Вернемся к замене переменной $log_2 x = 1$

$$x_1 = 2^1 = 2$$

$$log_2 x = -5$$

$$x_2 = 2^{-5} = \frac{1}{32}$$

$$log_3(2x+1) + log_3(x-3) = 2$$

ОДЗ. $\begin{cases} 2x+1>0 \\ x-3>0 \end{cases}$ <=> $\begin{cases} 2x>-1 \\ x>3 \end{cases}$ <=> $\begin{cases} x>-\frac{1}{2} \\ x>3 \end{cases}$

ОДЗ: $x > 3$

$$log_3((2x+1)(x-3)) = 2$$

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

$$2x^2 - 5x - 3 = 9$$

$$2x^2 - 5x - 12 = 0$$

$$D = 25 + 96 = 121$$

$$x_1 = \frac{5 + 11}{4} = 4$$

$x_2 = \frac{5-11}{4} = -1{,}5$ не удовлетворяет ОДЗ

Ответ x=4