Directions: Solve for x.Check for extraneous solutions when necessary.

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1. $5^{x-4} = 25^{x-6}$

$5^{x-4} = 5^{2(x-6)}$

$x-4 = 2x-12$

$8 = x$

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2. $7^{3x+4} = 49^{2x+1}$

$7^{3x+4} = 7^{2(2x+1)}$

$3x+4 = 4x+2$

$2 = x$

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3. $8^{x-1} = 32^{3x-2}$

$2^{3(x-1)} = 2^{5(3x-2)}$

$3x-3 = 15x-10$

$7 = 12x$

$x = 7/12$

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4. $27^{4x-1} = 9^{3x+8}$

$3^{3(4x-1)} = 3^{2(3x+8)}$

$12x-3 = 6x+16$

$6x = 19$

$x = 19/6$

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5. $4^{2x-5} = 64^{3x}$

$4^{2x-5} = 4^{3(3x)}$

$2x-5 = 9x$

$-5 = 7x$

$x = -5/7$

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6. $3^{3x-7} = 81^{12-3x}$

$3^{3x-7} = 3^{4(12-3x)}$

$3x-7 = 48-12x$

$15x = 55$

$x = {}^{11}/3$

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7. $36^{5x+2} = \left(\frac{1}{6}\right)^{11-x}$

$6^{2(5x+2)} = 6^{-1(11-x)}$

$10x+4 = -11+x$

$9x = -15$

$x = -5/3$

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8. $10^{3x-10} = \left(\frac{1}{100}\right)^{6x-1}$

$10^{3x-10} = 10^{-2(6x-1)}$

$3x-10 = -12x+2$

$15x = 12$

$x = 4/5$

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9. $25^{10x+8} = \left(\frac{1}{125}\right)^{4-2x}$

$5^{2(10x+8)} = 5^{-3(4-2x)}$

$20x+16 = -12+6x$

$14x = -28$

$x = -2$

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10. $\log_5(5x+9) = \log_5 6x$

$5x+9 = 6x$

$9 = x$

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11. $\log_5(2x-7) = \log_5(3x-9)$

$2x-7 = 3x-9$

$2 = x$

check
$\log_5 -3$ no solution

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12. $\log(12x-11) = \log(3x+13)$

$12x-11 = 3x+13$

$9x = 24$

$x = 8/3$

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13. $\log_3(18x+7) = \log_3(3x+38)$

$18x+7 = 3x+38$

$15x = 31$

$x = 31/15$

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14. $\log_6(3x-10) = \log_6(14-5x)$

$3x-10 = 14-5x$

$8x = 24$

$x = 3$

check
$\log_6 (-1)$ no solution

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15. $\log_8(5-12x) = \log_8(6x-1)$

$5-12x = 6x-1$

$6 = 18x$

$x = 1/3$