

Name: Key

Date: _____ Per: _____

Solve the exponential equation. Check for extraneous solutions.
Round the result to three decimal places if necessary.

1. $3^{-3x+1} = 3^{x-9}$ $x = 2.5$	2. $9^{2x} = 3^{2x+4}$ $x = 2$
3. $25^{x-4} = 5^{3x+1}$ $x = -9$ $5^{2(x-4)} = 5^{3x+1}$ $2x - 8 = 3x + 1$ $-9 = x$	4. $8^{x-1} = \frac{1}{2}^{2x-1}$ $x = \frac{4}{5}$ $2^{3(x-1)} = 2^{-1(2x-1)}$ $3x - 3 = -2x + 1$ $5x - 3 = 1$ $5x = 4$
5. $216^{2x-1} = 36^{4x+3}$ $x = -4.5$ $6^{3(2x-1)} = 6^{2(4x+3)}$ $6x - 3 = 8x + 6$ $-9 = 2x$	6. $5^x = 12$ $x = 1.544$ $\log_5 12 = x$
7. $4^x - 6 = 4$ $x = 1.661$ $4^x = 10$ $\log_4 10 = x$	8. $3^{4x} = 27$ $x = \frac{3}{4}$
9. $10^{x+2} - 12 = 22$ $x = -4.69$ $10^{x+2} = 34$ $\log 34 = x + 2$ -2	10. $3(2^{x+6}) = 17$ $x = -3.497$ $2^{x+6} = \frac{17}{3}$ $\log_2 \left(\frac{17}{3}\right) = x + 6$ $x = \frac{\log \frac{17}{3}}{\log 2} - 6$
11. $9^{x-5} + 4 = 15$ $x = 6.091$ $9^{x-5} = 11$ $\log_9 11 = x - 5$ $x = \frac{\log 11}{\log 9} + 5$	12. $\frac{2}{3}(\quad) - 5 = -2$ $x = .362$ $\frac{3}{2} \cdot \frac{2}{3} (4^{3x}) = 3 \cdot \frac{3}{2}$ $4^{3x} = \frac{9}{2}$ $\log_4 \left(\frac{9}{2}\right) = \frac{3x}{3}$

Solve the logarithmic equation. Check for extraneous solutions. Round the result to three decimal places if necessary.

<p>13. $\log_7(5-x) = \log_7 3x$ $x = 514$</p>	<p>14. $\log_5(7-2x) = \log_5(3x-3)$ $x = 2$</p> $7-2x = 3x-3$ $7 = 5x-3$ $10 = 5x$ $\frac{10}{5} = \frac{5x}{5}$
<p>15. $\log x = 3$ $x = 1000$</p>	<p>16. $\log_4 2x = 6$ $x = 2048$</p>
<p>17. $\log_2(3x-2) = 8$ $x = 86$</p>	<p>18. $7 - \log_3 8x = 2$ $x = 30.375$</p> $-7 \quad -7$ $\frac{-\log_3 8x - 5}{\log_3 8x = 5}$ $3^5 = 8x$ $\frac{3^5}{8} = \frac{8x}{8}$
<p>19. $2\log_7(1-2x) = \frac{12}{2}$ $x = -58.824$</p> $\log_7(1-2x) = 6$ $7^6 = 1-2x$ $117,649 = 1-2x$ $\frac{-1}{-2} = \frac{-1}{-2}$	<p>20. $\log_{10} 7x = 1$ $x = 1017$ $\text{or } 1.429$</p> $10^1 = 7x$
<p>21. $4 + \log_9(3x-6) = 6$ $x = 29$</p> $\log_9(3x-6) = 2$ $9^2 = 3x-6$ $81 = 3x-6$ $87 = 3x$	<p>22. $\log_2 2x + \log_2 x = 5$ $x = 4$</p> $\log_2 2x^2 = 5$ $2^5 = 2x^2 \quad 16 = x^2$ $32 = 2x^2 \quad 4, \cancel{x} = x$
<p>23. $\log_6(2x-6) + \log_6 x = 2$ $x = 6$</p> $\log_6(2x^2-6x) = 2$ $6^2 = 2x^2-6x$ $0 = 2x^2-6x-36$ $2(x^2-3x-18)$ $2(x-6)(x+3)$ $6, \cancel{x}$	<p>24. $\log_4(x-3) + \log_4(3x-7) = 2$ $x = 5$</p> $\log_4(3x^2-16x+21) = 2$ $4^2 = 3x^2-16x+21-16$ $0 = 3x^2-16x+5$ $(3x-1)(x-5)$

$x = 5, \cancel{x}$