

Name Homework Guide ☺

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<p>1. $3^{2x-5} = 3^{x+3}$ same base so set exponents equal to each other</p> $2x - 5 = x + 3$ $\begin{array}{r} -x \\ -x \end{array}$ $x - 5 = 3$ $\begin{array}{r} +5 \\ +5 \end{array}$ $x = 8$	<p>2. $5(3^x) = 405$</p> $x = 4$
<p>3. $4^x - 8 = 56$</p> $\begin{array}{r} +8 \\ +8 \end{array}$ $4^x = 64$ $4^x = 4^3$ $x = 3$	<p>4. $(5^{x-4}) + 8 = 133$</p> $x = 7$
<p>5. $4(2)^{2x} + 2 = 34$</p> $\begin{array}{r} -2 \\ -2 \end{array}$ $\frac{4(2)^{2x}}{4} = \frac{32}{4}$ $2^{2x} = 8$ $2^{2x} = 2^3$ $\frac{2x}{2} = \frac{3}{2}$ $x = \frac{3}{2}$	<p>6. $2^{3x} = \frac{1}{8}$</p> $x = -1$
<p>7. $3^{2x} = \left(\frac{1}{9}\right)^3$</p> $3^{2x} = \left(\frac{1}{3^2}\right)^3$ $3^{2x} = (3^{-2})^3$ $3^{2x} = 3^{-6}$ $\frac{2x}{2} = \frac{-6}{2}$ $x = -3$	<p>8. $\left(\frac{1}{125}\right)^{4x} = 5^3$</p> $x = -\frac{1}{4}$
<p>9. $4^{4x+3} = 16^{x-3}$</p> $4^{4x+3} = (4^2)^{x-3}$ $4x + 3 = 2(x-3)$ $\begin{array}{r} -2x \\ -2x \end{array}$ $4x + 3 = 2x - 6$ $\begin{array}{r} -3 \\ -3 \end{array}$ $2x = -9$ $\frac{2x}{2} = \frac{-9}{2}$ $x = -\frac{9}{2}$	<p>10. $3^{2x+3} = \left(\frac{1}{81}\right)^{x-1}$</p> $x = \frac{1}{6}$



Base^{exponent} = answer

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<p>11. $\log_3(x) = 4$ $3^4 = x$ (Rewrite from log to exponential) $x = 81$</p>	<p>12. $\log_5(x-3) = 2$ $x = 28$</p>		
<p>13. $\log_4(2x) = 3$ $4^3 = 2x$ $64 = \frac{2x}{2}$ $x = 32$</p>	<p>14. $2\log_2(x-3) = 10$ $x = 35$</p>		
<p>15. $\log_3(x+2) = \log_3 12$ (logs with same base go away :) $x+2 = 12$ $-2 \quad -2$ $x = 10$</p>	<p>16. $\log_7(3x) = \log_7(x+20)$ $x = 10$</p>		
<p>17. $\log_3(x^2) = \log_3(2x+3)$ $x^2 = 2x+3$ (Quadratic so move to one side & factor) $-2x-3 \quad -2x-3$ $x^2 - 2x - 3 = 0$ $(x+1)(x-3) = 0$ $x = -1 \text{ \& } x = 3$</p>	<p>18. $\log_2(x^2 + 2x) = \log_2 15$ $x = 3 \text{ \& } x = -5$</p>		
<p>Rewrite in log form: 19. $4^{1.5} = 8$ $\log_4(8) = 1.5$</p>	<p>20. $2^x = 243$ $\log_2(243) = x$</p>	<p>Rewrite in Exp. Form: 21. $\log_x(-16) = 3$ $x^3 = -16$</p>	<p>22. $\log_6(x+y) = 13$ $6^{13} = x+y$</p>
<p>Evaluate 23. $\log_2 8 = x$ $2^x = 8$ $2^x = 2^3$ $x = 3$</p>	<p>24. $\log_3 \frac{1}{27} = x$ $x = -3$</p>	<p>25. $\log_{16} 4 = x$ $16^x = 4$ $(4^2)^x = 4$ $4^{2x} = 4^1$ $2x = 1$ $\frac{2x}{2} = \frac{1}{2}$ $x = \frac{1}{2}$</p>	<p>26. $\log_5 5^{2x}$ $2x$</p>

