1. Expand the logarithmic expression.

   $\log_8 \frac{a}{2}$

   - $\log_8 2 - \log_8 a$
   - $\frac{1\log_8 a}{1\log_8 2}$
   - $\log_8 a - \log_8 2$
   - $-a \log_8 2$

2. Use the Change of Base Formula to evaluate $\log_8 77$.

   - 3.467
   - 1.886
   - 4.344
   - 2.089

3. A company with loud machinery needs to cut its sound intensity to 44% of its original level. By how many decibels would the loudness be reduced? Use the formula $L = 10\log\frac{I}{I_0}$. Round to the nearest hundredth.

   - 3.57 decibels
   - 1.58 decibels
   - 2.52 decibels

- 1.93 decibels

4. Use a table to solve. Round to the nearest hundredth.

   $2^{8x} = 93$

   - 0.82
   - 30.72
   - 3.14
   - 52.31

5. Solve log 2x + log 12 = 3. Round to the nearest hundredth if necessary.

   - 6,000
   - 24,000
   - 166.67
   - 41.67

6. Write the expression as a single natural logarithm.

   $2 \ln x - 5 \ln c$

   - $\ln(x^2 + c^5)$
   - $\ln \frac{x^2}{c^5}$
   - $\ln(x^2 - c^5)$
   - $\ln x^2 c^5$

7. The sales of lawn mowers t years after a particular model is introduced is given by the function $y = 5{,}500 \ln(9t + 4)$, where y is the number of mowers sold. How many mowers will be sold 5 years after a model is introduced? Round the answer to the nearest whole number.

- 21,405 lawn mowers
- 42,937 lawn mowers
- 9,296 lawn mowers
- 20,941 lawn mowers

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Note: For questions 8 through 12, remember to show all of the steps that you use to solve the problem. You can use the comments field to explain your work. Your teacher will review each step of your response to ensure you receive proper credit for your answer.

Write the expression as a single logarithm.

$\log_3 40 - \log_3 10$

9. $\frac{1}{16} = 64^{4x-3}$

10. Solve the logarithmic equation. Round to the nearest ten-thousandth if necessary.

$\log 8x^3 = 4$

11. Solve $\ln(5x + 7) = 8$. Round to the nearest thousandth.

12. Use natural logarithms to solve the equation. Round to the nearest thousandth.

$5e^{2x + 11} = 30$