Watch. Practice. Understand. | Lesson 257

Calculus 1 6 Inverses and Logarithmic Functions

Watch the matching video: https://www.youtube.com/watch?v=ICnH-pY7KqU

Practice focus: Exponential and logarithmic equations

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Solve log base 2 of (x - 1) = 3.

02 Solve ln x + ln(x - 2) = ln 3.

03 Solve e^(2x) = 7 exactly.

04 Find the inverse of f(x) = 3e^x + 2.

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Practice focus: Logarithms and their properties

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

05 Evaluate log base 2 of 32 and $\ln(e^3)$.

06 Expand $\ln(x^2\sqrt{y}/z)$, assuming $x, y, z > 0$.

07 Condense $2 \log x - \log 3$, for $x > 0$.

08 Express log base 5 of 17 using natural logarithms.

Worked answers | Lesson 257

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01 Solve log base 2 of (x - 1) = 3.

x - 1 = 2^3 = 8, so x = 9; x > 1 checks.

02 Solve ln x + ln(x - 2) = ln 3.

Domain x > 2. x(x - 2) = 3, so (x - 3)(x + 1) = 0. Only x = 3 is valid.

03 Solve e^(2x) = 7 exactly.

Take ln: 2x = ln 7. Thus x = (ln 7)/2.

04 Find the inverse of f(x) = 3e^x + 2.

Write y = 3e^x + 2; x = ln((y - 2)/3). Inverse: ln((x - 2)/3), domain x > 2.

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05 Evaluate log base 2 of 32 and $\ln(e^3)$.

$2^5 = 32$, so the first value is 5; $\ln(e^3) = 3$.

06 Expand $\ln(x^2\sqrt{y}/z)$, assuming $x, y, z > 0$.

$2 \ln x + (1/2) \ln y - \ln z$, using product, quotient and power rules.

07 Condense $2 \log x - \log 3$, for $x > 0$.

$\log(x^2) - \log 3 = \log(x^2/3)$.

08 Express log base 5 of 17 using natural logarithms.

Change of base: $\ln(17)/\ln(5)$, approximately 1.7604.