

WebAssign

Homework 5: Growth (Chapter 10) (Homework)

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MAT104, section 050VA016, Summer 1 2014

Instructor: FRANOTIS STALLWORTH

Current Score : - / 30

Due : Monday, August 4 2014 09:00 AM EDT

1. -/2 pointsSmithNM12 10.1.012.

Write the equations in logarithmic form.

(a) $216 = 6^3$

(b) $36 = \left(\frac{1}{6}\right)^{-2}$

(c) $a = b^c$

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2. -/2 pointsSmithNM12 10.1.013.

Use the definition of logarithm to simplify each expression.

(a) $\log_{10} 10$

(b) $\log_{10} 10,000$

(c) $\log_{10} 10^{-5}$

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3. -/2 pointsSmithNM12 10.1.019.

Solve each exponential equation. Give the exact value for x .

(a) $7^x = \frac{1}{49}$

$x =$

(b) $3^x = 6$

$x =$

(c) $8^x = 6.5$

$x =$

(d) $3^x = 4$

$x =$

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4. -/2 pointsSmithNM12 10.1.026.

Evaluate the given expressions (to two decimal places).

(a) $\log 17.3$

(b) $\log_2 8$

(c) $\log_2 1$

(d) $\log 0.044$

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5. -/2 pointsSmithNM12 10.1.030.

Write each expression in terms of common logarithms, and then give a calculator approximation (correct to four decimal places).

(a) $\log_8 10$

exact value

approximation

(b) $\log_6 315$

exact value

approximation

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6. -/2 pointsSmithNM12 10.2.023.

Find a simplified value for x by inspection. Do not use a calculator.

(a) $\log_6 36 = x$

$x =$

(b) $\log_2 256 = x$

$x =$

(c) $\log_3 27 = x$

$x =$

(d) $\log_4 256 = x$

$x =$

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7. -/2 pointsSmithNM12 10.2.029.

Contract the expressions. That is, use the properties of logarithms to write each expression as a single logarithm with a coefficient of 1.

(a) $\ln 3 - 2 \ln 8 + \ln 16$

(b) $\ln 3 - 2 \ln(2 + 10)$

(c) $\ln 3 - 2(\ln 4 + \ln 8)$

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8. -/2 pointsSmithNM12 10.2.035.

An advertising agency conducted a survey and found that the number of units sold, N , is related to the amount a spent on advertising (in dollars) by the following formula:

$$N = 2,500 + 100 \ln a \quad (a \geq 1)$$

How many units are sold after spending \$1,000? (Round your answer to the nearest whole number.)

units

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9. -/2 pointsSmithNM12 10.2.041.

Solve the equations by finding the exact solution.

(a) $4 = x - 4$

$x =$

(b) $4 \ln e = \ln \frac{\sqrt{7}}{x} - 4 \ln e$

$x =$

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10. -/2 pointsSmithNM12 10.2.051.

Solve the equation by finding the exact solution.

$\ln x - \ln 2 = 12$

$x =$

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11. -/2 pointsSmithNM12 10.2.058.

The "learning curve" describes the rate at which a person learns certain tasks. If a person sets a goal of typing N words per minute (wpm), the length of time t (in days) to achieve this goal is given by

$$t = -62.5 \ln \left(1 - \frac{N}{80} \right)$$

(a) According to this formula, what is the maximum number of words per minute? (Round your answer to the nearest whole number.)

wpm

(b) Solve for N .

$N =$

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12. -/2 pointsSmithNM12 10.3.009.

Find the number of decibels for the power of the sound given. Round to the nearest decibel.

A rocket engine, 2.46×10^{-5} watts/cm²

dB

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13. -/2 pointsSmithNM12 10.3.017.CMI.

A seismograph 300 km from the epicenter of an earthquake recorded a maximum amplitude of 5.1×10^2 μm . Find this earthquake's magnitude. (Round your answer to one decimal place.)

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14. -/2 pointsSmithNM12 10.3.029.CMI.

An artifact was found and tested for its carbon-14 content. If 73% of the original carbon-14 was still present, what is its probable age (to the nearest 100 years)? (Carbon-14 has a half-life of 5,730 years.)

 yr

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15. -/2 pointsSmithNM12 10.3.038.

The atmospheric pressure P in pounds per square inch (psi) is given by

$$P = 14.7 e^{-0.21 a}$$

where a is the altitude above sea level (in miles). If a city has an atmospheric pressure of 12.33 psi, what is its altitude? (Recall that 1 mi = 5,280 ft. Round your answer to the nearest foot.)

 ft

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