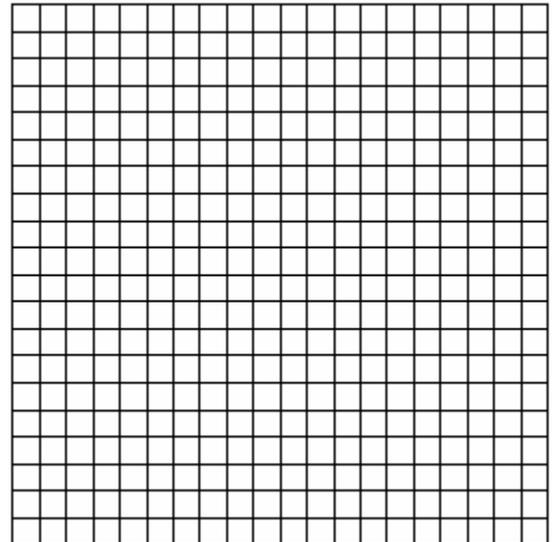


NAME: _____

A2.A.28: Solve a logarithmic equation by rewriting as an exponential equation

1. 010519b, P.I. A2.A.28
If $\log_5 x = 2$, what is the value of \sqrt{x} ?
[A] 5 [B] 25 [C] $2^{\frac{2}{5}}$ [D] $\sqrt{5}$
2. 060623b, P.I. A2.A.28
Solve for x : $\log_2(x+1) = 3$
3. 060925b, P.I. A2.A.28
Solve for x : $\log_8(x+1) = \frac{2}{3}$
4. 010819b, P.I. A2.A.28
If $\log_x 9 = -2$, what is the value of x ?
[A] 81 [B] 3 [C] $\frac{1}{81}$ [D] $\frac{1}{3}$
5. 080209b, P.I. A2.A.28
In the equation $\log_x 4 + \log_x 9 = 2$, x is equal to
[A] 18 [B] $\sqrt{13}$ [C] 6 [D] 6.5
6. 080624b, P.I. A2.A.28
Solve for x : $\log_b 36 - \log_b 2 = \log_b x$
7. 060230b, P.I. A2.A.28
Solve for x : $\log_4(x^2 + 3x) - \log_4(x + 5) = 1$
8. 060833b, P.I. A2.A.28
Solve for x : $\log_3(x^2 - 4) - \log_3(x + 2) = 2$
9. 080720b, P.I. A2.A.28
If $\log_2 a = \log_3 a$, what is the value of a ?
[A] 1 [B] 2 [C] 4 [D] 3
10. 010324b, P.I. A2.A.28
The relationship between the relative size of an earthquake, S , and the measure of the earthquake on the Richter scale, R , is given by the equation $\log S = R$. If an earthquake measured 3.2 on the Richter scale, what was its relative size to the *nearest hundredth*?

11. 060102b, P.I. A2.A.28
The magnitude (R) of an earthquake is related to its intensity (I) by $R = \log\left(\frac{I}{T}\right)$, where T is the threshold below which the earthquake is not noticed. If the intensity is doubled, its magnitude can be represented by
[A] $\log 2 + \log I - \log T$ [B] $\log I - \log T$
[C] $2(\log I - \log T)$ [D] $2 \log I - \log T$
12. 080530b, P.I. A2.A.28
A hotel finds that its total annual revenue and the number of rooms occupied daily by guests can best be modeled by the function $R = 3 \log(n^2 + 10n)$, $n > 0$, where R is the total annual revenue, in millions of dollars, and n is the number of rooms occupied daily by guests. The hotel needs an annual revenue of \$12 million to be profitable. Graph the function on the accompanying grid over the interval $0 < n \leq 100$. Calculate the minimum number of rooms that must be occupied daily to be profitable.



A2.A.28: Solve a logarithmic equation by rewriting as an exponential equation

[1] A

[2] 7, and appropriate work is shown, such as $2^3 = x + 1$.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] $2^3 = x + 1$ is written, but no further correct work is shown.

or [1] 7, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[2] incorrect procedure.

[2] 3, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] $8^{\frac{2}{3}} = x + 1$, but no further correct work is shown.

or [1] 3, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[3] incorrect procedure.

[4] D

[5] C

[2] 18, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] The equation $\log_b \frac{36}{2} = \log_b x$ is

written, but the value of x is not found.

or [1] 18, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[6] incorrect procedure.

[4] 5 and -4, and appropriate work is shown.

[3] Appropriate work is shown, but one computational error is made.

[2] The correct log equation,

$\log_4 \frac{x^2 + 3x}{x + 5} = \log_4 4$, is shown, but no further

work or incorrect work is shown.

[1] One correct logarithmic step is shown,

such as $\log_4 \frac{x^2 + 3x}{x + 5}$.

or [1] 5 and -4, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[7] incorrect procedure.

[6] 11, and appropriate work is shown.

[5] Appropriate work is shown, but one computational error is made.

or [5] The given equation is solved correctly for x , but the extraneous root is not rejected.

[4] Appropriate work is shown, but two or more computational errors are made.

[3] Appropriate work is shown, but one conceptual error is made.

or [3] The equation $x^2 - 9x - 22 = 0$ is written, but no further correct work is shown.

[2] Appropriate work is shown, but one conceptual error and one computational error are made.

or [2] The equation $\frac{x^2 - 4}{x + 2} = 9$ is written, but no further correct work is shown.

[1] The equation $\log_3(x - 2) = 2$ is written, but no further correct work is shown.

or [1] 11, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[8] incorrect procedure.

[9] A

[2] 1,584.89, and appropriate work is shown.

[1] Appropriate work is shown, but one computational or rounding error is made.

or [1] 1,584.89, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[10] incorrect procedure.

[11] A

[4] The function is graphed over the specified interval, and 96, and appropriate work is shown, such as calculating the revenue at 95 and 96 to show that 96 will make the hotel profitable or writing an explanation.

[3] Appropriate work is shown, but one computational, graphing, or rounding error is made.

[2] Appropriate work is shown, but two or more computational, graphing, or rounding errors are made.

or [2] Appropriate work is shown, but one conceptual error is made.

or [2] 96, and appropriate work is shown, but no graph is drawn.

or [2] The function is graphed correctly, but no further correct work is shown.

[1] Appropriate work is shown, but one conceptual error and one computational, graphing, or rounding error are made.

or [1] 96, but no work is shown and no graph is drawn.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[12] incorrect procedure.