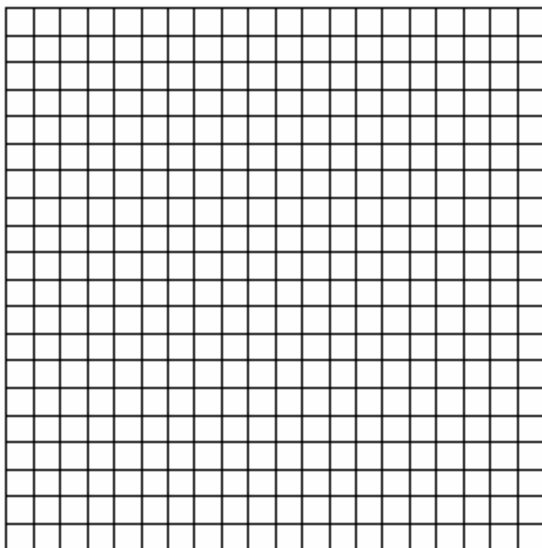


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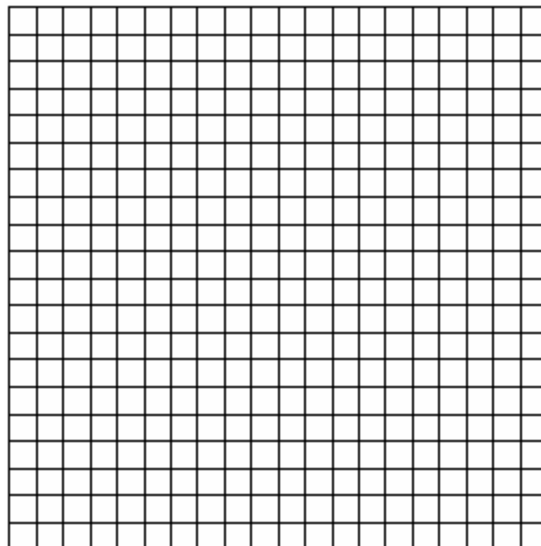
1. 080530b, P.I. A2.A.28

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.



2. fall9927b, P.I. A2.A.54

Sketch the graph of the functions $f(x) = 3^x$ and $g(x) = \log_3 x$. Considering the graphs, describe the relationship between $f(x)$ and $g(x)$. Specify the domain and the range of g .



- [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 incorrect procedure.
-

- [4] Correct graphs, relationship, domain, and range:
 $f(x)$ and $g(x)$ are reflections in the line $y = x$
or $f(x)$ and $g(x)$ are inverses.
and Domain of g : The set of all real numbers such that $x > 0$.
and Range of g : The set of all real numbers.
- [3] Correct graphs and relationship; incorrect domain and/or range.
- or [3] Correct graphs, domain, and range; incorrect relationship.
- or [3] One correct graph; correct relationship, domain, and range.
- [2] Correct graphs; incorrect relationship, and domain and/or range.
- or [2] Incorrect graphs; correct relationship and domain and range.
- or [2] One correct graph and either relationship, or domain and range correct.
- [1] No graphs, or incorrect graph with correct relationship.
- or [1] No graphs, or incorrect graphs with correct domain and range.
- or [1] One correct graph only.
- [0] Response is completely incorrect, irrelevant, or incoherent; or is a correct response that was obtained by an obviously incorrect procedure.
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