❦ *50-pt QUIZ Chapter 5 March 29, 2007* ❧ Answers by :

Where appropriate, show work. Make final answers clear.

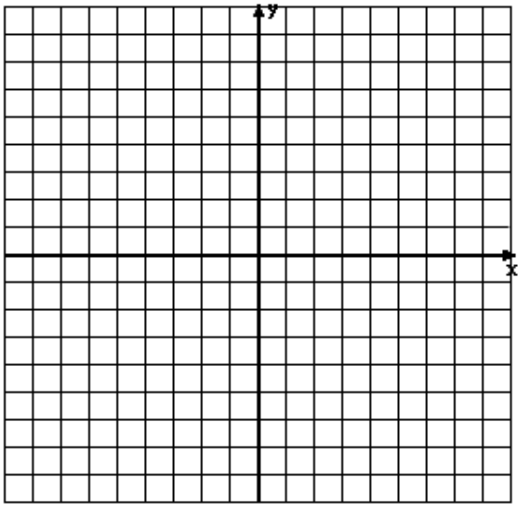
(8) 1. Show that the functions f and g are inverses of each other, by calculating $f \circ g(x)$ and simplifying.
Given: $f(x) = (2x - 3)^3$ and $g(x) = \sqrt[3]{x - 9}$

(10) 2. Showing your work, find $f^{-1}(x)$ for the function given by $f(x) = \dfrac{2x + 1}{x - 3}$

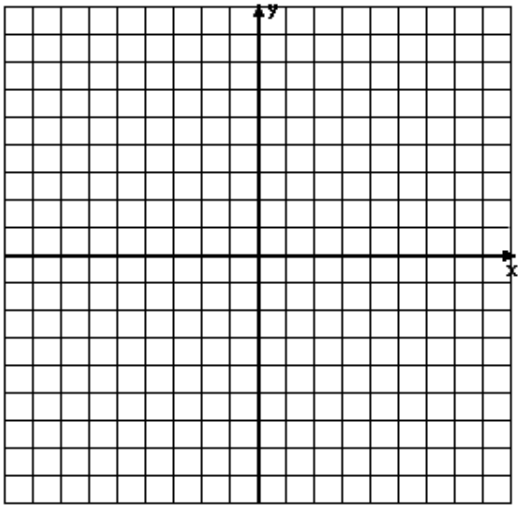
State the following:

Domain f:	Domain f^{-1} :
Range f:	Range f^{-1}:

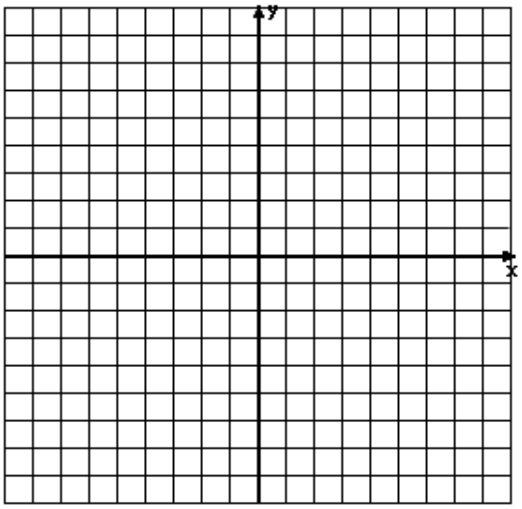
(8) 3. Sketch the graph of $y = 3^x$ at right.
Then sketch the graph of $y = \log_3 x$ on the same set of coordinate axes. What special geometric relationship exists between these two graphs?



(8) 4. Sketch the graph of $f(x) = 2 - \ln(x + 1)$, showing all asymptotes and intercepts.



(8) 5. Sketch the graph of $f(x) = 2 - e^{-x+1}$, showing all asymptotes and intercept.s.



(5) 6. Simplify, showing your work:

$\log_3 27 + \log_3 81 + \log_3 \sqrt{3} + \log_3 1/9 + \log_3 1$

(9) 7. Solve for x: $\ln x + \ln (2x+1) = 0$

(8) 8. Solve for x: $2^{x+1} = 5^{x}$

(10) 9. A population of beetles multiplied from 1200 beetles on May 25 to 3600 beetles on May 27.
What is the rate of population growth per day?
On what day will there be over 100,000 beetles?