SLU PreCalculus TEST 1 Fall 2007

NAME: _____Score_____/100
Please print

SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

Questions 1 – 15 are each worth 2 points. Questions 16 – 25 are each worth 5 points. The last three questions combined are worth 20 points.
Circle T or F, whichever is correct.

1. T F Every function has an inverse.
2. T F To verify (prove) that two functions f and f^{-1} are inverses of each other it is necessary to show that both of the following are true:

   $f^{-1} \circ f(x) = x$ for all x in the doamin of f and

   $f \circ f^{-1}(x) = x$ for all x in the domain of f^{-1}
3. T F If the same thing is done to both sides of an equation the resulting equation is equivalent to the original equation.
4. T F A zero of a function is an element of the range.
5. T F The rule for any function is expressed as an equation.
6. T F The product of two functions is a real number.

Fill in each of the blanks to make the statements true.

7. The _____ of a function is the set of all points whose coordinates are (a, f(a)) where a is an element of the domain.
8. The domain of the ln function is _____.
9. The composition of a function f with a function g is a _____ named _____ whose rule is _____

10. Absolute value is defined by _____ = $\begin{cases} \_\_\_\_\_ \\ \\ \_\_\_\_\_ \end{cases}$

11. If a horizontal line may be drawn so that it intersects the graph of a function in more than one point, then the function _____ _____ have an inverse.

12. The graph of a function is the set of all points of the form (a, _____) where a is an element of the domain and _____ is the corresponding range element..

13. The line which passes through (0,5) with slope 14 is the graph of the _____ function whose rule is f(x) = _____

14. The graph of the function whose rule is $f(x) = -3x^2 + 2x - 98$ is a _____ which opens _____.

15. The slope of the line through the points (–3, 2) and (7, –5) is _____

For Problems 16 – 25, Show all necessary work. NO WORK – NO CREDIT
Sentences are good

16. What is the domain of the function whose rule is $f(x) = \dfrac{3x + 4}{\sqrt{x - 5}}$?

17. The rule for a function f is given by the equation $f(x) = \dfrac{x - 3}{2x}$ and the rule for a function g is given by the equation g(x) = x – 2. Determine the rule for the function $f \circ g$.

18. Suppose f and g are functions whose rules are f(x) = x – 3 and $g(x) = \dfrac{1}{x^2}$. Calculate $f \circ g(2)$.

19. Find the inverse of the function whose rule is $f(x) = \dfrac{3}{5}x + \dfrac{7}{4}$.

20. Suppose f and g are functions whose rules are f(x) = 2x – 3 and $g(x) = \dfrac{1}{3}x - 2$.

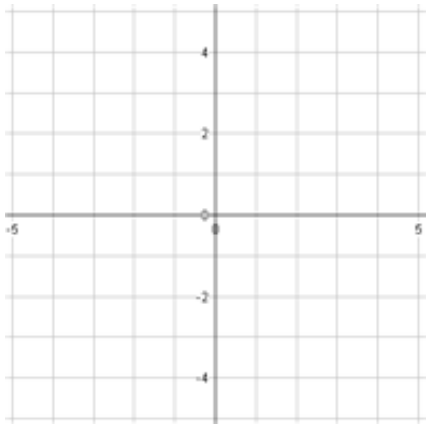
Verify (prove) that f and g are **not** inverses of each other.

21. Find the rule (equation) for the linear function whose graph is perpendicular to the graph of $3x + 4y = 8$ and contains the point (3,5). Use function notation to state the rule.

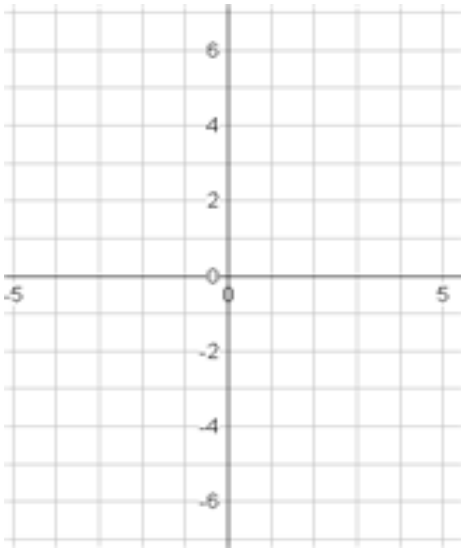
22. Solve the equation $e^{2x-1} = 405$. I want an exact solution –not an approximation –no decimals

23. Solve the equation $\ln(x) - \ln(5) = \ln(2) - \ln(x-3)$

24. Sketch the graph of the function whose rule is $f(x) = \frac{3}{2}x - 3$. Label the x and y intercepts with their coordinates



25. Sketch the graph of the function whose rule is $f(x) = 2x^2 - 5x - 3$
Label the x and y intercepts and the vertex with their coordinates. Factoring helps.

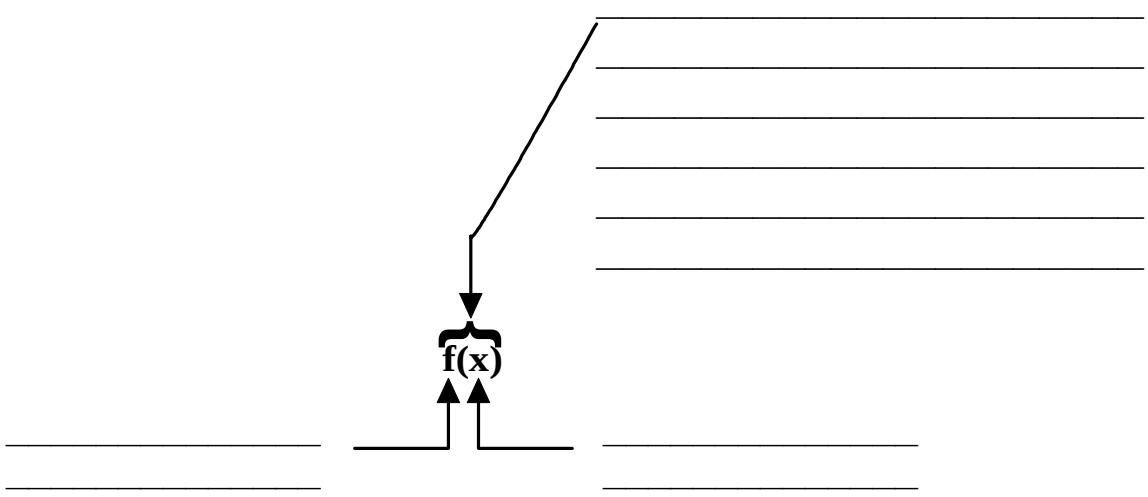


26. (6 points) Fill in the blanks

Definition: A _____ consists of three things

- A set called the _____
- A set called the _____
- A _____ which associates _____ element of the domain with a _____ element of the range.

27. (4 points)



28. (10 points) Rules for functions are given at the top of the page and graphs of functions are given below them. Match the graphs and the rules by writing the letter which identifies a graph in the blank preceding a rule for a function.

a. _____ $f(x) = \frac{1}{x}$

b. _____ f(x) = –3x + 3

c. _____ f(x) = $-x^2$

d. _____ f(x) = 3x + 3

e. _____ f(x) = x^2

f. _____ f(x) = $(x + 2)^2$

g. _____ f(x) = | x | – 3

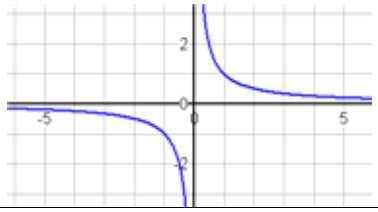
h. _____ f(x) = $\sqrt{x}$

k. _____ x^3

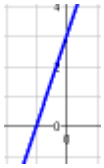
m. _____ $\exp(x) = e^x$

The graphs are shown in blue.

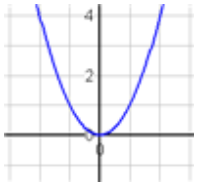
A.



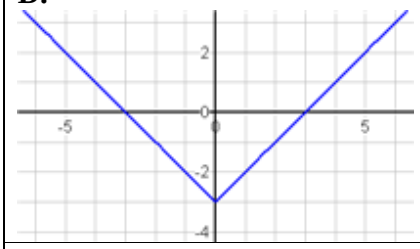
B.



C.

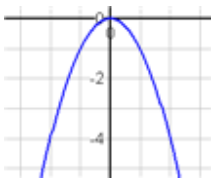


D.



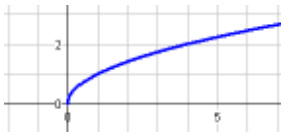
E.

F.

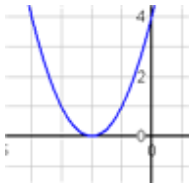


G.

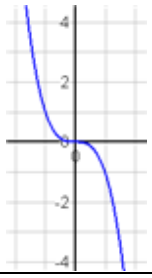
H.



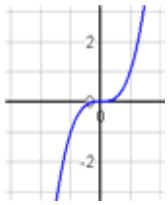
I.



J.



K.



L.