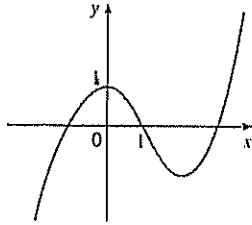
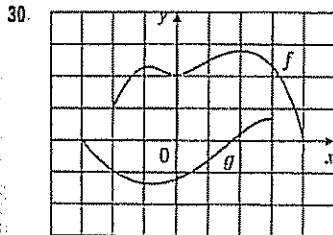
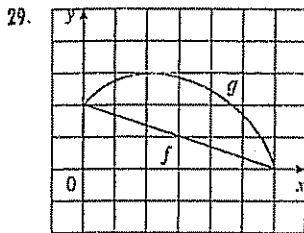


ASSIGNMENT 8 due date: Wednesday, October 17th

27. (a) How is the graph of $y = f(|x|)$ related to the graph of f ?
 (b) Sketch the graph of $y = \sin |x|$
 (c) Sketch the graph of $y = \sqrt{|x|}$
28. Use the given graph of f to sketch the graph of $y = 1/f(x)$. Which features of f are the most important in sketching $y = 1/f(x)$? Explain how they are used.



29-30 III Use graphical addition to sketch the graph of $f + g$



31-32 III Find $f + g$, $f - g$, fg , and f/g and state their domains

31. $f(x) = x^3 + 2x^2$, $g(x) = 3x^2 - 1$
 32. $f(x) = \sqrt{1+x}$, $g(x) = \sqrt{1-x}$

33-34 III Use the graphs of f and g and the method of graphical addition to sketch the graph of $f + g$

33. $f(x) = x$, $g(x) = 1/x$ 34. $f(x) = x^3$, $g(x) = -x^2$

35-40 III Find the functions $f \circ g$, $g \circ f$, $f \circ f$, and $g \circ g$ and their domains

35. $f(x) = 2x^2 - x$, $g(x) = 3x + 2$
 36. $f(x) = 1 - x^3$, $g(x) = 1/x$
 37. $f(x) = \sin x$, $g(x) = 1 - \sqrt{x}$

38. $f(x) = 1 - 3x$, $g(x) = 5x^2 + 3x + 2$

(*) 39. $f(x) = x + \frac{1}{x}$, $g(x) = \frac{x+1}{x+2}$

40. $f(x) = \sqrt{2x+3}$, $g(x) = x^2 + 1$

41-44 III Find $f \circ g \circ h$

41. $f(x) = x + 1$, $g(x) = 2x$, $h(x) = x - 1$

42. $f(x) = 2x - 1$, $g(x) = x^2$, $h(x) = 1 - x$

43. $f(x) = \sqrt{x-1}$, $g(x) = x^2 + 2$, $h(x) = x + 3$

44. $f(x) = \frac{2}{x+1}$, $g(x) = \cos x$, $h(x) = \sqrt{x+3}$

45-50 III Express the function in the form $f \circ g$

45. $F(x) = (x^2 + 1)^{10}$

46. $F(x) = \sin(\sqrt{x})$

47. $G(x) = \frac{x^2}{x^2 + 4}$

48. $G(x) = \frac{1}{x+3}$

49. $u(t) = \sqrt{\cos t}$

50. $u(t) = \frac{\tan t}{1 + \tan t}$

51-53 III Express the function in the form $f \circ g \circ h$

51. $H(x) = 1 - 3^{x^2}$

52. $H(x) = \sqrt[3]{\sqrt{x} - 1}$

53. $H(x) = \sec^2(\sqrt{x})$

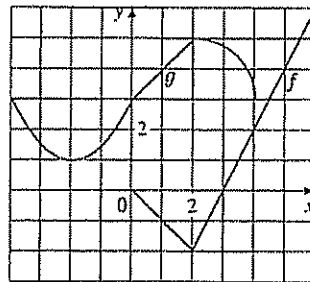
54. Use the table to evaluate each expression

- (a) $f(g(1))$ (b) $g(f(1))$ (c) $f(f(1))$
 (d) $g(g(1))$ (e) $(g \circ f)(3)$ (f) $(f \circ g)(6)$

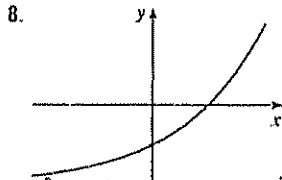
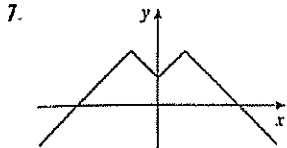
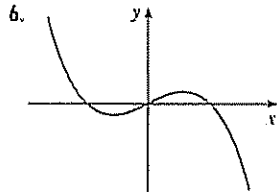
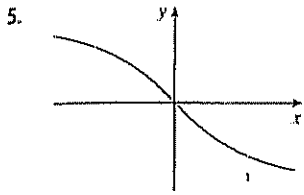
x	1	2	3	4	5	6
$f(x)$	3	1	4	2	2	5
$g(x)$	6	3	2	1	2	3

55. Use the given graphs of f and g to evaluate each expression, or explain why it is undefined

- (a) $f(g(2))$ (b) $g(f(0))$ (c) $(f \circ g)(0)$
 (d) $(g \circ f)(6)$ (e) $(g \circ g)(-2)$ (f) $(f \circ f)(4)$



x	1	2	3	4	5	6
$f(x)$	1	2	4	8	16	32



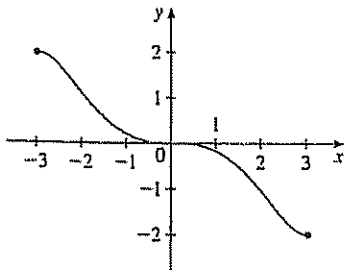
Check if the following function is one-to-one.

9. $f(x) = \frac{1}{2}(x+5)$ 10. $f(x) = 1 + 4x - x^2$
 11. $g(x) = |x|$ 12. $g(x) = \sqrt{x}$
 13. $f(t)$ is the height of a football t seconds after kickoff
 14. $f(t)$ is your height at age t

15-16 Use a graph to decide whether f is one-to-one

15. $f(x) = x^3 - x$ 16. $f(x) = x^3 + x$

17. If f is a one-to-one function such that $f(2) = 9$, what is $f^{-1}(9)$?
 18. Let $f(x) = 3 + x^2 + \tan(\pi x/2)$, where $-1 < x < 1$
 (a) Find $f^{-1}(3)$
 (b) Find $f(f^{-1}(5))$
 19. If $g(x) = 3 + x + e^x$, find $g^{-1}(4)$
 20. The graph of f is given
 (a) Why is f one-to-one?
 (b) State the domain and range of f^{-1}
 (c) Estimate the value of $f^{-1}(1)$



21. The formula $C = \frac{5}{9}(F - 32)$, where $F \geq -459.67$, expresses the Celsius temperature C as a function of the Fahrenheit temperature F . Find a formula for the inverse function and interpret it. What is the domain of the inverse function?

22. In the theory of relativity, the mass of a particle with speed v is

$$m = f(v) = \frac{m_0}{\sqrt{1 - v^2/c^2}}$$

where m_0 is the rest mass of the particle and c is the speed of light in a vacuum. Find the inverse function of f and explain its meaning.

23-28 Find a formula for the inverse of the function

23. $f(x) = \sqrt{10 - 3x}$ 24. $f(x) = \frac{4x - 1}{2x + 3}$

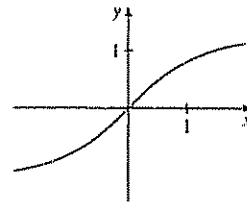
25. $f(x) = e^{x^2}$ 26. $y = 2x^3 + 3$

27. $y = \ln(x + 3)$ 28. $y = \frac{1 + e^x}{1 - e^x}$

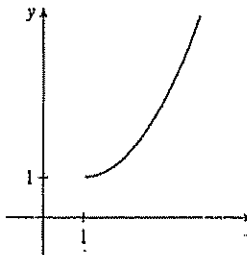
29-30 Find an explicit formula for f^{-1} and use it to graph f^{-1} , f , and the line $y = x$ on the same screen. To check your work, see whether the graphs of f and f^{-1} are reflections about the line

29. $f(x) = 1 - 2/x^2, x > 0$ 30. $f(x) = \sqrt{x^2 + 2x}, x > 0$

31. Use the given graph of f to sketch the graph of f^{-1}



32. Use the given graph of f to sketch the graphs of f^{-1} and $1/f$



33. (a) How is the logarithmic function $y = \log_a x$ defined?
 (b) What is the domain of this function?
 (c) What is the range of this function?
 (d) Sketch the general shape of the graph of the function $y = \log_a x$ if $a > 1$