Calculus BC Summer Assignment 2
from Kennedy book

Even and Odd functions – A quick refresher.

The names for even and odd functions come from the powers of x. The graph of an even function is symmetric about the y-axis. You can test this by checking if f(x) = f(-x). The graph of an odd function is symmetric about the origin. You can test this by checking to see if f(-x) = -f(x).

Examples:

$f(x) = x^2$	$(-x)^2 = (x)^2$ for all x; even function, symmetry about the y – axis
$f(x) = x^2 + 1$	$(-x)^2 + 1 = x^2 + 1$ for all x; even function, symmetry about the y-axis
$f(x) = x^3 + x$	$(-x)^3 + (-x) = -(x^3 + x)$ for all x; odd function, origin symmetry
$f(x) = x^3 + 2$	$(-x)^3 + 2 \neq -(x^3 + 2) \neq x^3 + 2$, neither odd nor even

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The assignment: (4-60 multiples of 4, 67ab, 68)

4. Write the volume of a sphere v(r) as a function of the sphere's radius

In problems 8, 12, and 16 do the following for the function:

a) find its domain
b) find its range
c) draw its graph
d) determine if the function is even or odd and state any symmetrires as discussed in the refresher above.

8. $y = -\sqrt{-x}$

12. $y = \sqrt[3]{1 - x^2}$

16. $y = x^{2/3}$

For problems 20, 24 and 28 determine if the function is off, even or neither.

20. $y = x + x^2$

24. $y = x + x^3$

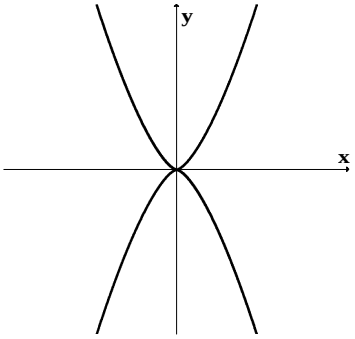
28. $y = \dfrac{1}{x^2 - 1}$

32. Draw the graph of the function then determine its domain and range.

$$f(x)\begin{cases}1, & x<0\\ \sqrt{x}, & x\geq 0\end{cases}$$

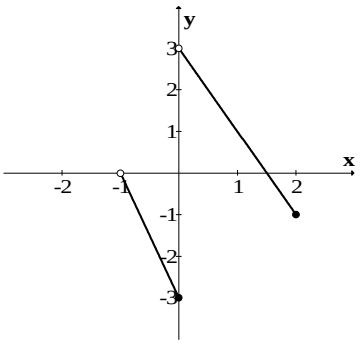
36. For a curve that is symmetric about the x-axis, the point (x, y) must lie on the curve if and only if the point (x, -y) lies on the curve. Explain why a curve that is symmetric about the x-axis is not a graph of a function unless the function is y = 0.

40. Use the vertical line test to determine if the curve is the graph of a function



For problems 41-48 write a piecewise formula for the function.

44.



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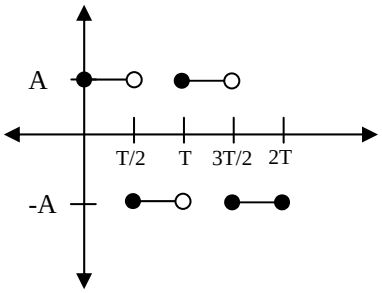


52. Graph f(g(x)) and g(f(x)) and make a conjecture about the domain and range of each function. Then confirm your conjecture by finding the formulas for f(g(x)) and g(f(x)).

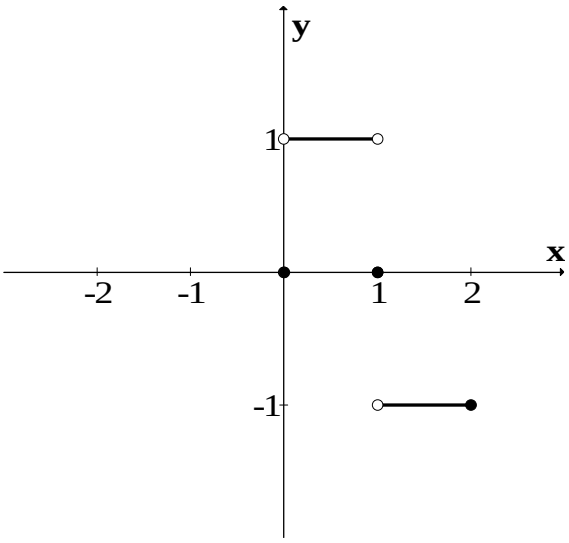
$f(x) = 1 - x^2$ $\qquad$ $g(x) = \sqrt{x}$

56. Use a graph to find the domain and range of the function. Then confirm your results algebraically.

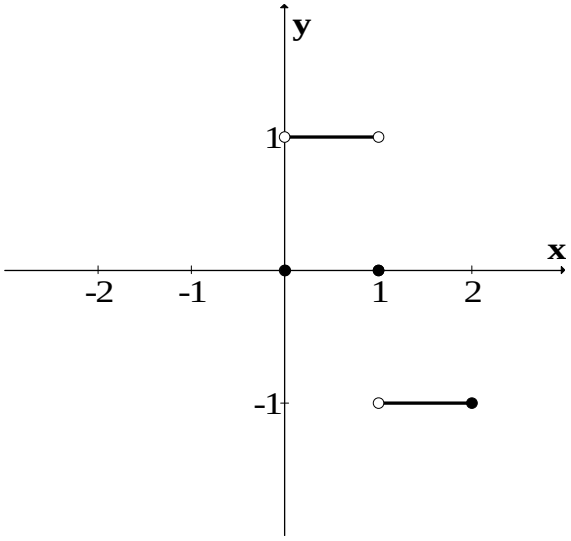
$$f(x) = \frac{2}{\sqrt[4]{9 - x^2}}$$

60. A portion of a function that is defined from x = -2 to x = 2 is graphed below. Graph the remaining part of the function assuming; a) the function is even, and b) the function is odd.

a) assuming even



b) assuming odd



64. The table shows how an initial investment of $10,000 on December 31, 1977, grew over time.

a) Find the power regression equation for the data. Let x = 0 represent 1970, x = 1 represent 1971, etc.

b) Plot the data and graph the regression equation on the same graph.

c) Predict the value of the investment in 2000.

d) Now find the linear regression equation and use it to predict the value of the investment in 2000.

Age (months)	Weight (pounds)
19	22
21	23
24	25
27	28
29	31
31	28
34	32
38	34
43	39

67. Enter $y_1 = \sqrt{x}$, $y_2 = \sqrt{1 - x}$, and $y_3 = y_1 + y_2$ in your graphing calculator.

a) Graph y_3 in [-3, 3] by [-1, 3].

b) Compare the domain of y_3 with the domains of y_1 and y_2.

68. a) Must the product of two even functions always be even? Give your reason for your answer.

b) Can anything be said about the product of two odd funtions? Give reasons for your anwer.