

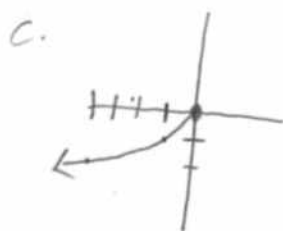
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## Calc BC Assignment 2

4.  $V(r) = \frac{4}{3} \pi r^3$

8.  $y = -\sqrt{-x}$  a. domain  $x \leq 0$

b. range  $y \leq 0$



d. neither odd nor even

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

a. domain:  $-\infty < x < \infty$

b. range:  $y \leq 1$

d.  $f(-x) = f(x)$  even  
y-axis symmetry

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

a. domain:  $-\infty < x < \infty$

b. range:  $y \geq 0$

d.  $f(-x) = f(x)$  even  
y-axis symmetry

20.

$$y = x + x^2$$

$$\begin{aligned} f(-x) &= -x + (-x)^2 \\ &= -x + x^2 \neq x + x^2 \end{aligned}$$

Neither odd nor even

24

$$y = x + x^3$$

$$\begin{aligned} f(-x) &= -x + (-x)^3 \\ &= -x - x^3 = -f(x) \end{aligned}$$

odd

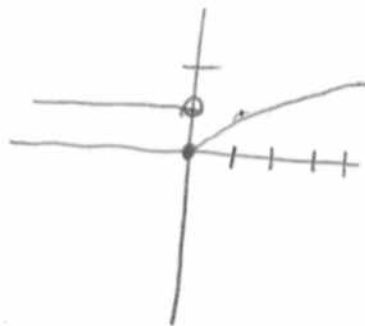
28.

$$y = \frac{1}{x^2 - 1} \quad f(-x) = \frac{1}{(-x)^2 - 1} = \frac{1}{x^2 - 1}$$

$$\begin{aligned} f(-x) &= f(x) \\ \text{even} \end{aligned}$$

32.

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



$$\text{Domain: } -\infty < x < \infty$$

$$\text{Range: } y \geq 0$$

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36.

For a curve to be a function each  $f(x)$  must be unique:

$$f(x) \neq f(x+a) \text{ for all } a.$$

If a function is symmetric about the  $x$  axis  $f(x) = -f(x)$  this is not a function except  $y = 0$

40.

The curve fails the vertical line test thus is not a function

44.

$$f(x) = \begin{cases} -3x - 3, & -1 < x \leq 0 \\ -2x + 3, & 0 < x \leq 2 \end{cases}$$

48.

$$f(x) = \begin{cases} A & 0 \leq x < \frac{T}{2} \\ -A & \frac{T}{2} \leq x < T \\ A & T \leq x < \frac{3T}{2} \\ -A & \frac{3T}{2} \leq x \leq 2T \end{cases}$$

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52.

$$f(x) = 1 - x^2$$

$$g(x) = \sqrt{x}$$

x	g(x)	f(g(x))
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0	0	1
---	---	---

1	1	0
---	---	---

4	2	-3
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9	3	-8
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f(g(x)) domain

$$x \geq 0$$

Range

$$y \leq 1$$



$$\begin{aligned} f(g(x)) &= 1 - (\sqrt{x})^2 \\ &= 1 - x \end{aligned}$$

x	f(x)	g(f(x))
---	------	---------

0	1	
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$$g(f(x)) = \sqrt{1 - x^2}$$



Domain  $-1 < x < 1$

Range  $0 < y < 1$

56.

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

From Graphing Utility  
Domain:  $-3 < x < 3$

Range:  $y \geq 1.155$

$$9 - x^2 > 0$$

$$9 > x^2$$

$$x^2 < 9$$

Range:  $|x| < 3$

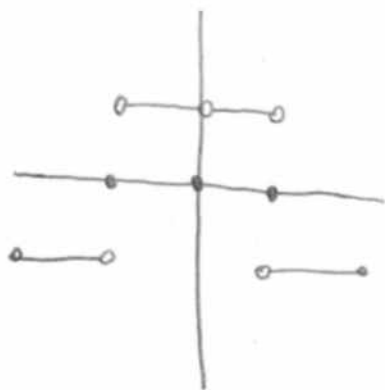
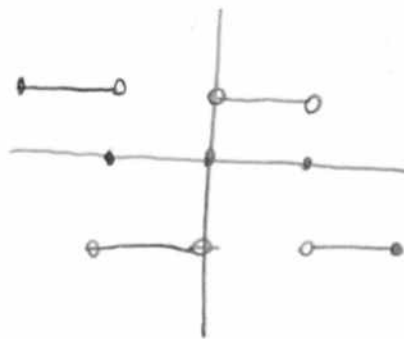
$$-3 < x < 3$$

Domain:  $y \geq \frac{2}{\sqrt{9}} = \frac{2}{3}$

$$y \geq \frac{2}{3}$$

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60.

Even  $f(-x) = f(x)$ odd  $f(-x) = -f(x)$ 

64.

Skip Problem  $\rightarrow$  wrong data

67.

$$y_1 = \sqrt{x}$$

$$y_2 = \sqrt{1-x}$$

$$y_3 = y_1 + y_2$$

a)



b)

$y_3$  has the domain of the union of the domains of  $y_1$  and  $y_2$

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68. a) Yes - the product of two even functions will always be even b/c when you multiply you add the exponents and the sum of all of the combinations of exponents will always be even.

b) the product of two odd functions is an even function because the sum of two odd numbers is an even number

$$f(x)$$

$$f(-x) = -f(x)$$

$$g(x)$$

$$g(-x) = -g(x)$$

$$f(-x)g(-x) = f(x)g(x)$$