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Intro to Calculus
Homework 6[1]

Goals

I can:
- Solve function equations or inequalities.
- Determine if a function is odd or even graphically or algebraically.
- Create a function to represent an area, perimeter, or volume problem.

1. The entire graph of the function g is shown below. Each grid line is 1 unit apart. Use this graph to answer the questions that follow. Approximate where necessary.

   Find all of the values of x such that:

   a. $g(x) = -g(-3)$.

   b. $g(x) = 2g(-1)$.

   c. $g(x+3) = g(2)$.

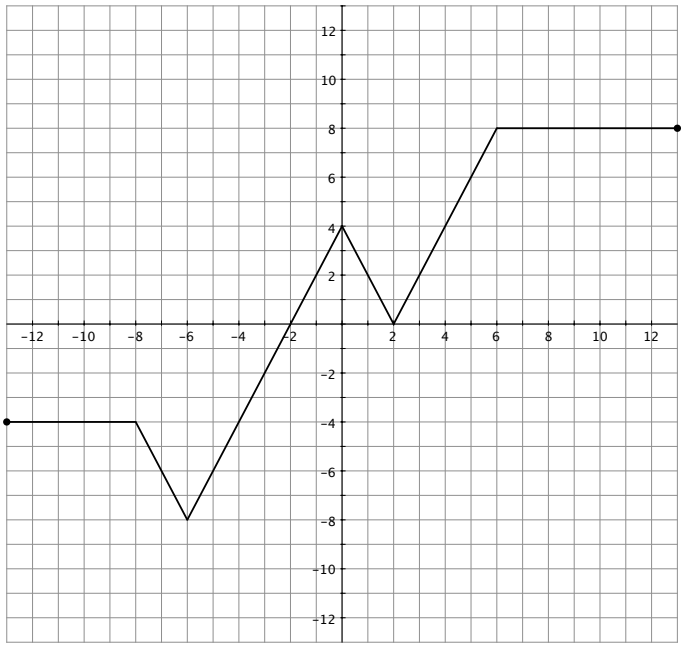
   d. $g(x) \le 2g(1)$.

   e. $g(x-2) = g(x+2)$.

   f. $g(x-1) = g(x+1)$.

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

   h. $g(x) = -g(-x)$.



2. Sketch an example of the graph of an:
   a. even function b. odd function.

3. Geometrically, what has to be true about the graph of a function which is:
   a. even b. odd

4. Algebraically what has to be true about a function which is:
   a. even b. odd

5. Determine algebraically whether the following functions are even, odd, or neither. Check with your grapher.

   a. $f(x) = (x^2+1)(x^4-2x^2-7)$

   b. $g(x) = \dfrac{\sqrt{x^2+4}}{x}$

   c. $h(x) = x^3 - 2x + 5$

   d. $j(x) = \dfrac{x^3+2}{x^2+1}$

   e. $k(x) = (x^3-x)(x^4+3x^2-2)$

   f. $l(x) = \sqrt[3]{x^4+5x^2}$

   g. $m(x) = \dfrac{x^3-4x}{x^3(x^2+6)}$

   h. $n(x) = x\sqrt[3]{x^5-2x}$

[1] This work is based on material from Prof. Scott Farrand, CSU Sacramento

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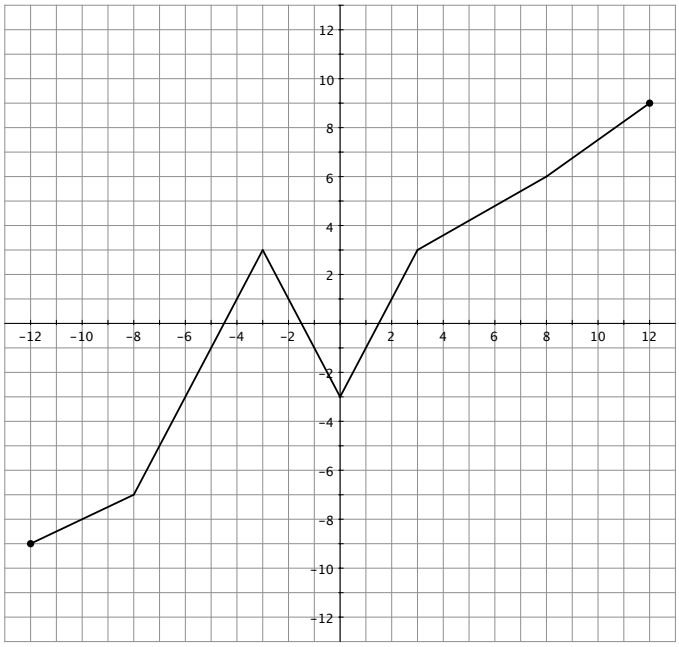
6. The entire graph of the function *g* is shown below. Each grid line is 1 unit apart. Use this graph to answer the questions that follow. Approximate where necessary.

   Find all of the values of *x* such that:



   a. $g(x) = g(1)$

   b. $g(x) \le g(-6)$

   c. $g(x) = g(-x)$

   d. $g(x) = -g(-x)$

   e. $g(x) = g(x+2)$

   f. $g(x+6) = g(x)$

   g. $g(x) = g(x+5)$

   h. $g(x+5) = g(x)+3$

   i. $g(x+9) = g(x)+2$

   j. $g(x-3) = g(x+3)$

7. If $12{,}000\,\text{cm}^2$ of material is available to make a box with a square base and an open top, find the volume of the box as a function of the width of the base of the box.

8. A box with a square base (sides of length *x*) and an open top must have a volume of $32{,}000\ \text{cm}^3$. Express the surface area as a function of the height of the box.

9. A rectangular region of 7,000 square feet is to be fenced in on three sides with fencing which costs $3.75 per linear foot and on the fourth side with fencing costing $2.00 per linear foot. Express the cost of the fence as a function of the length *x* of the fourth side.

10. A triangle has vertices $(0,0)$, $(3,4)$, and $(-1,x)$. Express the perimeter of the triangle as a function of *x*. Verify your equation by showing that when $x = 4$ the perimeter is approximately 13.1.

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11. Find the location of all of the points which are 4 units from the origin and equidistant from both the *x*-axis and *y*-axis

12. Write an equation or inequality involving absolute value for each of the following. Express the solution set using interval notation (where appropriate).
    a. The distance between a point and -5 is at least 7 units.
    b. The point x is right in the middle of -2 and -4.
    c. A point is closer to 12 than it is to -2.
    d. The distance from a point and 2 is at most 10 units.
    e. The distance from a 3 and a point is not more than 7.
    f. A point is farther than 6 units from π.

13. Write an English sentence about points on the number line for each of the following. Make you sentence as "normal" sounding as possible. In other words, avoid literal translation of the math symbols if possible.

    a. $|x-3|=8$ b. $|x-3|\le 8$ c. $|x-3|>8$ d. $|x-3|>|3-x|$

Selected Answers (Unverified!)

1a. $x=-1,1,3$,

1d. $(-\infty,4)$

1g. $[-2,2]$

5a. f(x) is an even function.

5d. j(x) is neither an odd nor an even function.

5e. k(x) is an odd function.

6b. x=[-12, -6] U [0]

6f. x = [-6, -3]

11. $\left(\pm 2\sqrt{2},\pm 2\sqrt{2}\right)$