x	$f(x)$
-1	5
2	-4
3	-6
5	-11

1. The continuous function $f(x)$ is **odd** and decreasing with selected values shown in the table above. Use the table to find the following. odd function $\Rightarrow f(-x) = -f(x)$

a) $f(-2) = -f(2) = 4$

b) $f(1) = f\big(-(-1)\big) = -f(-1) = -5$

c) If $f(x) = 11$ then $x = -5$
$f(-5) = -f(5) = 11$

d) Find the average rate of change of $f(x)$ over the interval $-3 \le x \le 5$.

$$\text{AROC} = \frac{f(5) - f(-3)}{5 - (-3)} = \frac{-11 - \big(-f(3)\big)}{8} = \frac{-11 - \big(-(-6)\big)}{8} = \frac{-11 - 6}{8} = -\frac{17}{8}$$

x	$g(x)$
-5	-9
-2	-7
-1	c
a	7
5	b

2. The continuous function $g(x)$ is **odd** and increasing with selected values shown in the table above.

a) Find the values of a and b.

$g(-2) = -7 \Rightarrow g(2) = -(-7) = 7 \Rightarrow a = 2$ $\quad$ $g(-5) = -9 \Rightarrow g(5) = -(-9) = 9 \Rightarrow b = 9$

b) If the average rate of change of $g(x)$ over the interval $[-1, 5]$ is 2 find the value of c.

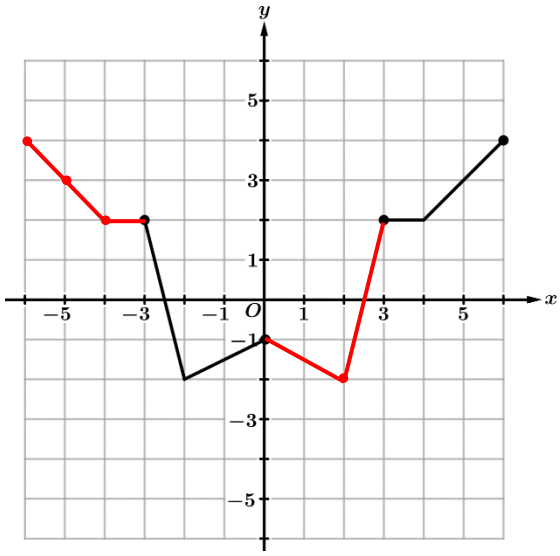
$$\text{AROC} = \frac{g(5) - g(-1)}{5 - (-1)} = \frac{9 - c}{6} = 2 \Rightarrow 9 - c = 12 \Rightarrow c = -3$$

x	-4	-2	-1	1	b	4
$h(x)$	a	8	$a+b$	c	8	7

3. Let $h(x)$ be an **even** function with selected values shown in the table above. Find the values of a, b, and c.

odd function $\Rightarrow h(-x) = h(x)$ $\quad h(-4) = h(4) = 7 = a$ $\quad h(-2) = 8 = h(b) \Rightarrow b = 2$

$h(-1) = h(1) \Rightarrow a + b = c \Rightarrow c = 9$



Graph of k

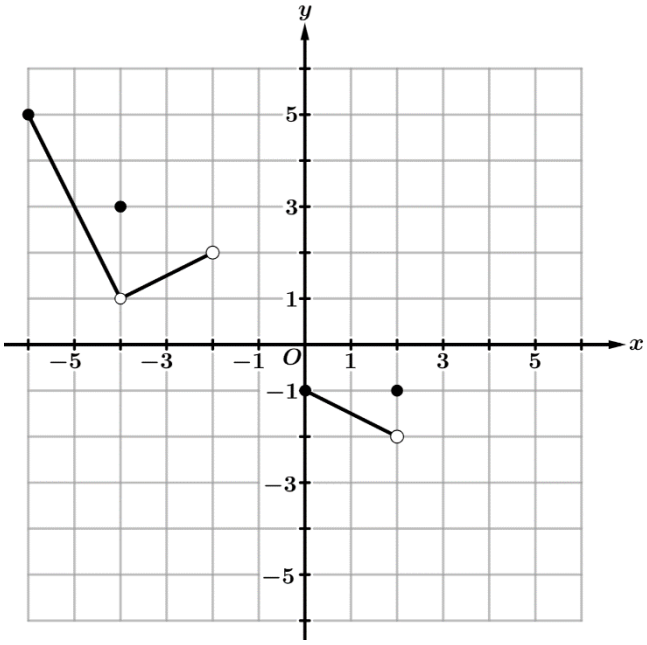
4. The function k is an **even** function with domain $-6 \le x \le 6$. A portion of the graph of k is shown above with the portions from $-6 \le x \le -3$ and $0 \le x \le 3$ missing from the graph. Use the graph to find the following.

a) $k(-5) = k(5) = 3$ $\quad$ b) $k(-4) = k(4) = 2$ $\quad$ c) $k(2) = k(-2) = -2$

d) Find the average rate of change of k over the interval $[-6, 6]$.

$$\text{AROC} = \frac{k(6) - k(-6)}{6 - (-6)} = \frac{k(6) - k(6)}{12} = \frac{0}{12} = 0$$

e) On the graph above, draw the missing portions for the graph of k.



Graph of g

5. The function g is an **odd** function with domain $-6 \le x \le 6$. A portion of the graph of g is shown above with parts of the graph missing. Use the graph to find the following.

a) $g(5) = -g(-5) = -3$

b) $g(-1) = -g(1) = -\left(-\frac{3}{2}\right) = \frac{3}{2}$

c) $g(-2) = -g(2) = -(-1) = 1$

d) $g(4) = -g(-4) = -3$

$f(x) = x^2 + 3x$ $\quad h(x) = 3x - 5$ $\quad k(x) = x^3 + x^2 + 7x$ $\quad p(x) = x^5 + 4x^3$

6. Equations for the functions f, h, k, and p are shown above. Use these equations to determine if the following functions are even, odd, or neither. Show the work that leads to your answer.

a) $y = f(x) - h(x) = (x^2 + 3x) - (3x - 5) = x^2 + 5$
$f(x) - h(x)$ is even because $(-a)^2 + 5 = a^2 + 5$

b) $y = k(x) - f(x) = (x^3 + x^2 + 7x) - (x^2 + 3x)$
$y = x^3 + 4x \Rightarrow (-a)^3 + 4(-a) = -a^3 - 4a$
$= -(a^3 + 4a) \Rightarrow$ odd

c) $y = p(x) - 10x = x^5 + 4x^3 - 10x$
$(-a)^5 + 4(-a)^3 - 10(-a) = -a^5 - 4a^3 + 10a$
$= -(a^5 + 4a^3 - 10a) \Rightarrow$ odd

d) $y = p(x) + f(x) = x^5 + 4x^3 + x^2 + 3x$
$(-a)^5 + 4(-a)^3 + (-a)^2 + 3(-a)$
$= -a^5 - 4a^3 + a^2 - 3a \neq -(a^5 + 4a^3 + a^2 + 3a)$ or
$= (a^5 + 4a^3 + a^2 + 3a) \Rightarrow$ neither