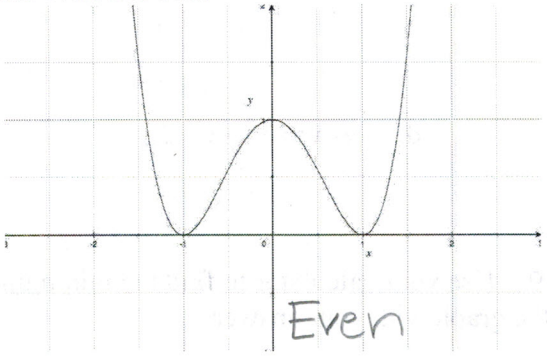
3.3 Practice Problems

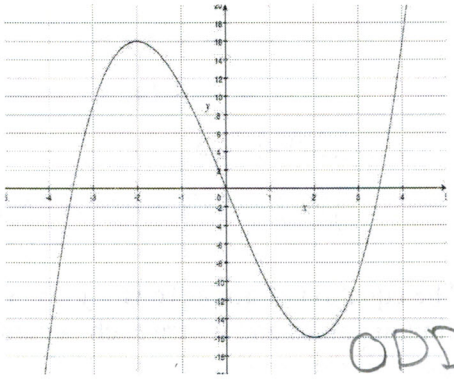
1. Determine whether each graph given is the graph of an even function, an odd function, or a function that is neither even nor odd.

a.



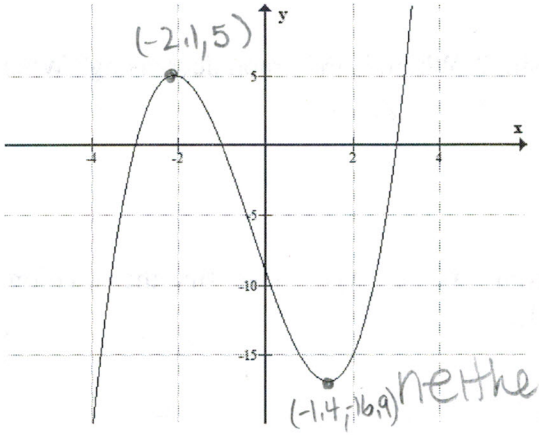
Even

b.



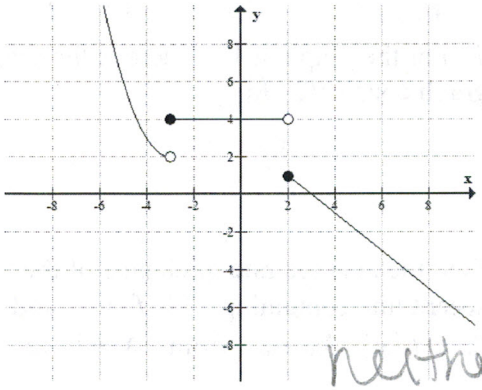
ODD

c.



neither

d.



neither

2. For the graphs 1a, 1b, and 1d where is the graph increasing? Where is the graph decreasing? Where is the graph constant?

1a. Increasing: $(-1,0) \cup (1,\infty)$
Decreasing: $(-\infty,-1) \cup (0,1)$
Constant: None

1b. INC: $(-\infty,-2) \cup (2,\infty)$
DEC: $(-2,2)$
Constant: None

1d. INC: None
DEC: $(-\infty,-3) \cup (2,\infty)$
Constant: $(-3,2)$

3. For the graphs 1a and 1b at what value(s) of x, if any, does f have a local maximum? List the local maximum values.

1a. local max of 1 at $x=0$

1b. local max of 16 at $x=-2$

4. For the graphs 1a and 1b at what value(s) of x, if any, does f have a local minimum? List the local minimum values.

1a. local min of 0 at $x=-1$
local min of 0 at $x=1$

1b. local min of -16 at $x=2$

5. Determine whether each function is even, odd, or neither.

a. $f(x)=x^3-x$

$f(-x)=(-x)^3-(-x)$
$=-x^3+x$
$=-f(x)$ odd

b. $h(x)=x^2+3$

$h(-x)=(-x)^2+3$
$=x^2+3$
$=h(x)$ even

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

$g(-x)=|-x|+3=|x|+3$
even

d. $g(x)=x^2-x+2$

$g(-x)=(-x)^2-(-x)+2$
$=x^2+x+2$ neither

6. The equation of graph 1c is $y=x^3+x^2-9x-9$. Use your calculator to find the minimum and maximum values and where each occurs. Label the graph with your answers.

min of -16.9 at $x=1.4$
max of 5.0 at $x=-2.1$

7. For the graph in 1c, where is the graph increasing? Where is the graph decreasing? Where is the graph constant? INC $(-\infty,-2.1)\cup(1.4,\infty)$
DEC $(-2.1,1.4)$

Find the average rate of change of the function from x_1 to x_2. Then find the equation of the secant line containing $(1,f(1))$ and $(2,f(2))$.

8. $f(x)=3x^2+2$ from $x_1=1$ to $x_2=2$

$f(1)=3(1)^2+2$
$=3+2$
$=5$

$f(2)=3(2)^2+2$
$=3(4)+2$
$=14$

$ARC=\frac{f(2)-f(1)}{2-1}$
$=\frac{14-5}{1}$
$=9$

Secant line
$y-5=9(x-1)$
$y-5=9x-9$
$+5 \quad +5$
$y=9x-4$

Find the average rate of change of the function from x_1 to x_2. Then find the equation of the secant line containing $(2,f(2))$ and $(3,f(3))$.

9. $f(x)=3x^2+2$ from $x_1=2$ to $x_2=3$

$f(2)=14$

$f(3)=3(3)^2+2$
$=3(9)+2$
$=27+2$
$=29$

$ARC=\frac{f(3)-f(2)}{3-2}$
$=\frac{29-14}{1}$
$=\frac{15}{1}$
$=15$

Secant line
$y-14=15(x-2)$
$y-14=15x-30$
$+14 \quad +14$
$y=15x-16$