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

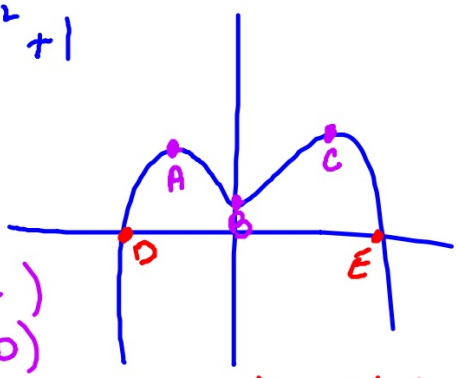
e.) incr. decr. incr. decr.

A B C

x-coord of rel. max/min

Incr: $(-\infty, A) \cup (B, C)$

Decr: $(A, B) \cup (C, \infty)$



a.) end behavior

$x \to -\infty \quad y \to -\infty$

$x \to \infty \quad y \to -\infty$

x-int. f.) neg. pos. neg.

D E

pos: (D, E)

neg: $(-\infty, D) \cup (E, \infty)$

10a.) $f(x) = -x^{3} + 2x^{2} - 4$

neg

odd

$\uparrow\downarrow$

$x \to -\infty \quad y \to \infty$

$x \to \infty \quad y \to -\infty$

Graphing Polynomial Functions

Directions:

a) Find the real zeros. Determine whether the graph will cross or bounce at each zero.

b) Find the y-intercept.

c) State the degree and the max number of turning points

d) State the end behvior

e) Determine if the function is even/odd or neither

f) Sketch the function.

(2) $f(x) = x^3 - 4x$

a.) $0 = x(x-2)(x+2)$

$x = 0, 2, -2$ (cross)

b.) $f(0) = 0$

c.) degree: 3

max: 2

d.) $\downarrow\uparrow$

$x \to -\infty \quad y \to -\infty$

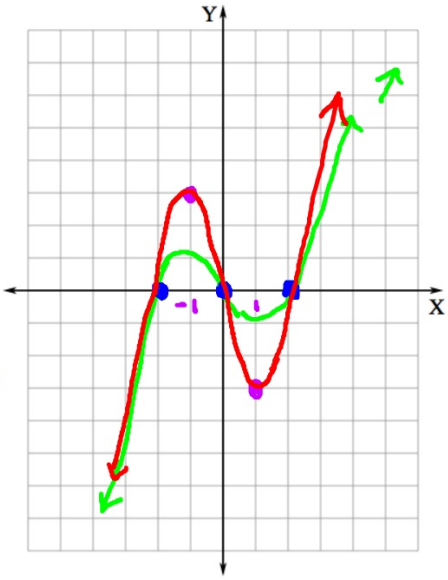
$x \to \infty \quad y \to \infty$

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

odd

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

x	$f(x)$
1	-3
-1	3



Directions:

a) Find the real zeros. Determine whether the graph will cross or bounce at each zero.

b) Find the y-intercept.

c) State the degree and the max number of turning points

d) State the end behvior

e) Determine if the function is even/odd or neither

f) Sketch the function.

4) $h(x) = \overset{q}{x^4} - 2x^3 - 3x^2 + 2x + \overset{p}{2}$ $\quad \frac{p}{q}: \pm 1, \pm 2$

$0 = x^4 - 2x^3 - 3x^2 + 2x + 2$

$$\begin{array}{r|rrrrr} 1 & 1 & -2 & -3 & 2 & 2 \\ & & 1 & -1 & -4 & -2 \\ \hline & 1 & -1 & -4 & -2 & 0 \end{array}$$

$x^3 - x^2 - 4x - 2 = 0$

$$\begin{array}{r|rrrr} -1 & 1 & -1 & -4 & -2 \\ & & -1 & 2 & 2 \\ \hline & 1 & -2 & -2 & 0 \end{array}$$

$x^2 - 2x - 2 = 0$

$x = \frac{2 \pm \sqrt{4+8}}{2}$

$x = \frac{2 \pm \sqrt{12}}{2}$

$x = \frac{2}{2} \pm \frac{2\sqrt{3}}{2}$

$x = 1 \pm \sqrt{3}$

a.) $x = 1, -1, 1+\sqrt{3}, 1-\sqrt{3}$

b.) $h(0) = 2$

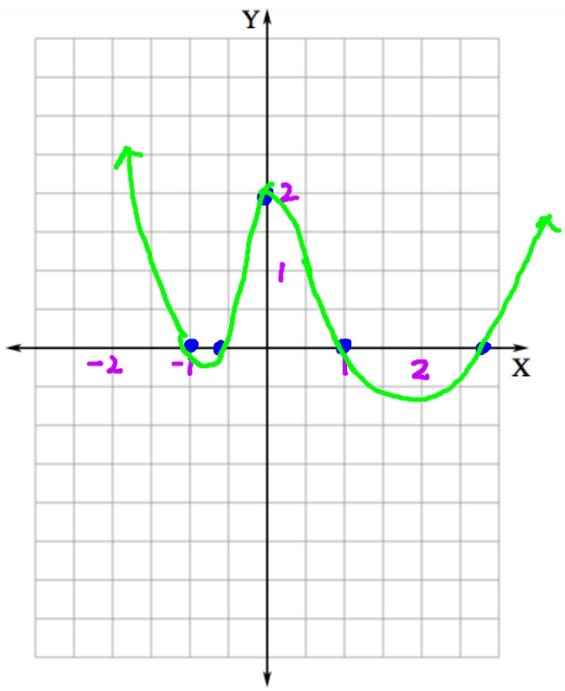
c.) degree: 4 max: 3

d.) $\uparrow\uparrow$

$x \to -\infty \quad y \to \infty$

$x \to \infty \quad y \to \infty$

e.) neither



$x = 1, -1, 1+\sqrt{3}, 1-\sqrt{3}$

$1.7 \quad 1.7$

$2.7 \quad -0.7$

$y = 2$

x	$f(x)$
2	-6

$\sqrt{1} = 1$

$\sqrt{3} = 1.7$

$\sqrt{4} = 2$

Directions:

a) Find the real zeros. Determine whether the graph will cross or bounce at each zero.

b) Find the y-intercept.

c) State the degree and the max number of turning points

d) State the end behvior

e) Determine if the function is even/odd or neither

f) Sketch the function.

6 $g(x)=6x^2-3x^3$

a.) $0=3x^2(2-x)$

$x=0$ bounce

$x=2$ cross

b.) $g(0)=0$

c.) degree: 3

max: 2

d.) $\uparrow\downarrow$

$x\to-\infty$ $y\to\infty$

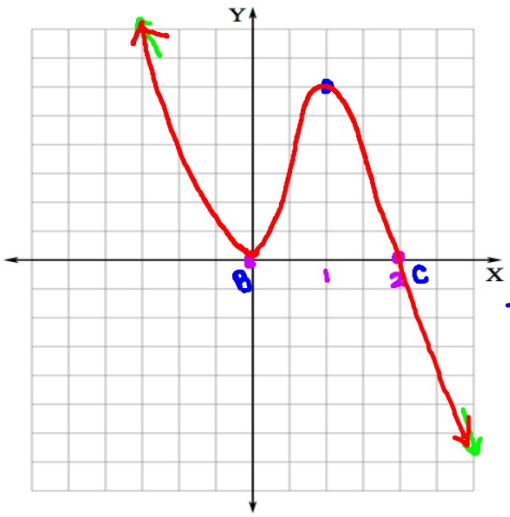
$x\to\infty$ $y\to-\infty$

e.) $f(-x)=$

$=6(-x)^2-3(-x)^3$

$=6x^2+3x^3$

neither



x	y
1	3