

COLLEGE ALGEBRA

NAME: Jeffrey Aybar
 Class Time: 11:30 Date: 3/25/08

GPS # 33 4.1 **POLYNOMIAL FUNCTIONS**

Useful Guidelines:
 To Graph a Polynomial function, $f(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0, a_n \neq 0$

- * Step 1: Find the x -intercepts, if any (by solving the equation $f(x) = 0$), and the y -intercepts, $f(0)$.
- * Step 2: Determine whether the graph crosses (when r is a zero of odd multiplicity) or touches (when r is a zero of even multiplicity) the x -axis at each x -intercept.
- * Step 3: Check the end behavior: For large $|x|$, the graph of f behaves like the graph of $f(x) = a_n x^n$.
- * Step 4: Determine the degree of $f = n$ and the maximum number of turning points on the graph of $f = n - 1$.
- * Step 5: Use the x -intercept(s) to find the intervals on which f is above the x -axis and the intervals on which f is below the x -axis. [Hint: pick a point between the zeros.]
- * Step 6: Plot the points and connect them with a smooth and continuous curve.

[r is called a (real) zero of f , or root of f when $f(r) = 0$]

*no
no
Guid
info!*

$$f(x) = (x-2)^2(x+4) = 0$$

(a) Find the x -intercepts and the y -intercepts of the above polynomial function f .

y -int: $f(0) = 16$ $(0, 16)$ $(x-2)^2 = 0$ or $(x+4) = 0$
 x -int: $(-4, 0)$ $(2, 0)$

(b) Determine whether the graph touches or crosses the x -axis at each x -intercept.

At $x=2$, the graph touches, because the zero (x -int) has an even multiplicity.
 At $x=-4$ the graph crosses, the zero has an odd mult.

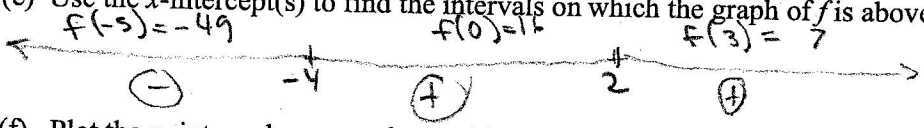
(c) Check end behavior: Find the power function that the graph of f resembles for large values of $|x|$.

It will $y = x^3$ for large value of $|x|$ resemble

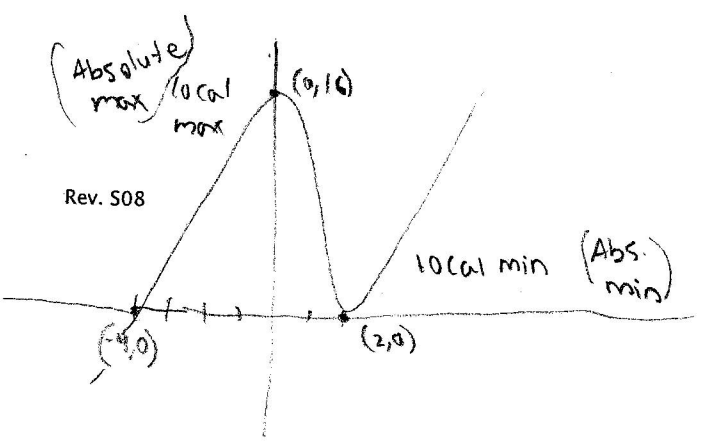
(d) Determine the maximum number of turning points of the graph of f .

Since $n=3$, the max. number of turning points $n-1 = 3-1 = 2$

(e) Use the x -intercept(s) to find the intervals on which the graph of f is above and below the x -axis.



(f) Plot the points and connect them with a smooth and continuous curve.



Rev. S08

<http://faculty.valenciac.edu/ashaw/>