

Name: ANSWER KEY

Math 1410: Quiz 2

Please show all your work for computations, and write your final answers in the boxes.

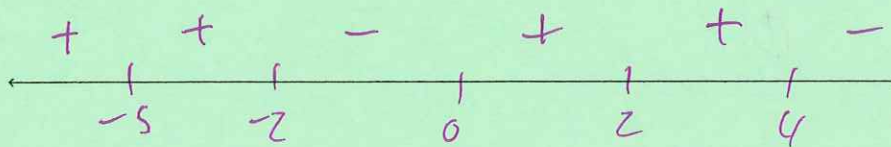
3pts

1. Consider the polynomial function

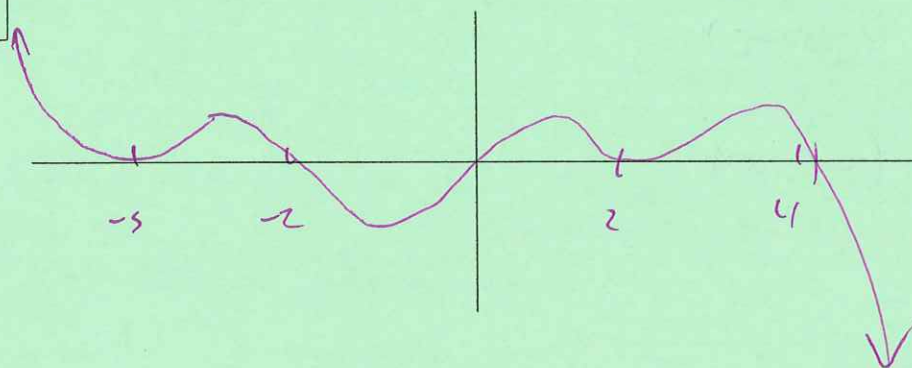
$$p(x) = -(x+5)^2(x+2)x^3(x-2)^2(x-4).$$

Determine the zeroes of p and their multiplicities. Write a sign diagram for p and use this to sketch a graph. Your graph should make clear the function's end behavior, where its zeroes are, and where it is positive or negative.

zero	mult.
-5	2
-2	1
0	3
2	2
4	1



$\lim_{x \rightarrow -\infty} -x^9$
 \uparrow
 \downarrow



2pts

2. Find all x -intercepts and y -intercepts of the function $f(x) = -(x+2)^3 - 1$. [Hint: Remember that intercepts are *points*, so you should write both the x - and y -coordinates.]

x -intercept(s):
 $(-3, 0)$

y -intercept(s):
 $(0, -9)$

$$y: f(0) = -(2)^3 - 1$$

$$= -8 - 1$$

$$= -9$$

$$x: -(x+2)^3 - 1 = 0$$

$$-(x+2)^3 = 1$$

$$(x+2)^3 = -1$$

$$x+2 = \sqrt[3]{-1} = -1$$

$$x = -3$$

20pts

3. Consider the same function $f(x) = -(x+2)^3 - 1$. Determine its domain and range. On what intervals is it increasing? Decreasing? Concave up? Concave down? [Hint: You might find it useful to first sketch a graph of f .]

domain
 $(-\infty, \infty)$

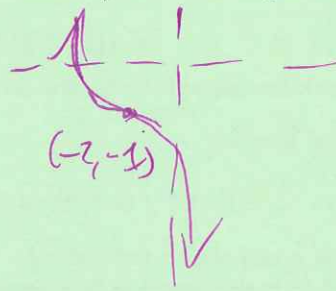
range
 $(-\infty, \infty)$

increasing
 \emptyset

decreasing
 $(-\infty, \infty)$

concave up
 $(-\infty, -2)$

concave down
 $(-2, \infty)$



20pts

4. What is the domain of the following function?

$$g(t) = t^4(2t - 1)(\pi t^2 + 4) + \sqrt{2t + 3}$$

domain
 $[-\frac{3}{2}, \infty)$

domain is $2t + 3 \geq 0$
 $2t \geq -3$
 $t \geq -\frac{3}{2}$