

Please read directions carefully. Raise your hand if you are not sure what a problem is asking. You must explain your work thoroughly and unambiguously to receive full credit on questions or parts of questions designated as **Work and Answer**.

A calculator will be necessary on this quiz!

The following formula may be useful:

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

Multiple Choice. (8 points) Circle the letter of the best answer.

Consider the function $f(x) = x^5 - 4x^2 + 1$, whose derivative is $f'(x) = 5x^4 - 8x$. Use the information in the table to answer the questions below.

1. To use Newton's Method to approximate the **negative** root of $f(x) = x^5 - 4x^2 + 1$, it is best to use $x_1 =$

- (a) -3 (c) -1
 (b) -2 (d) 0

2. $f(x)$ has a root between 1 and 2. Using Newton's Method with $x_1 = 2$, the second approximation is $x_2 =$

- (a) $\frac{29}{17}$ (c) $\frac{55}{32}$
 (b) $\frac{111}{64}$ (d) $\frac{4}{3}$

x	$f(x)$	$f'(x)$
-3	-278	429
-2	-47	96
-1	-4	13
0	1	0
1	-2	-3
2	17	64
3	208	381

Work and Answer. (12 points) You must show all relevant work to receive full credit. You may use the back if you need more room.

Using Newton's Method, compute the root of $f(x) = x^3 + x + 1$ accurate to 2 decimal places. Use the initial guess $x_1 = -\frac{3}{4}$.

If you are careful, you should not need more than four iterations to get this accuracy. You may use the table below if it is helpful.

n	x_n	$f(x_n)$	$f'(x_n)$
1	$-\frac{3}{4}$		
2			
3			
4			