

MATH 1100-A 2008 Quiz 11  
Sections 4.8 and 4.9 Jan. 6, 2009

1. (3 pts) Use Newton's method to find the root of

$$x^5 + 2 = 0$$

You are given  $x_1 = -2$ . Find  $x_2$  and  $x_3$ . Give your answers to four decimal places.

*Solution:*

$$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)}$$

where  $f(x) = x^5 + 2$  and  $f'(x) = 5x^4$ . Therefore

$$\begin{aligned} x_2 &= -2 - \frac{(-2)^5 + 2}{5(-2)^4} \\ &= -1.625 \end{aligned}$$

Similarly,

$$\begin{aligned} x_3 &= -1.625 - \frac{(-1.625)^5 + 2}{5(-1.625)^4} \\ &= -1.3574. \end{aligned}$$

□

2. (2 pts) If  $f'(x) = 2x - \frac{1}{x}$  and  $f(1) = 2$ , find  $f(x)$ .

*Solution:*  $f(x) = x^2 - \ln(x) + C$ .

$$f(1) = 1 - 0 + C = 2$$

Therefore  $C = 1$  and  $f(x) = x^2 - \ln(x) + 1$ .

□