

Math 31

Worksheet: Why do we care about sequences and series?

Let

$$f(x) = \ln(1+x),$$

$$f_1(x) = x,$$

$$f_2(x) = x - \frac{x^2}{2},$$

$$f_3(x) = x - \frac{x^2}{2} + \frac{x^3}{3},$$

$$f_4(x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4},$$

$$f_5(x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5}.$$

(A) Fill in the following table, taking all values to 5 decimal places.

x	$f_1(x)$	$f_2(x)$	$f_3(x)$	$f_4(x)$	$f_5(x)$	$f(x)$
0.1						
0.5						
1.0						
1.5						
2.0						

(B) Try the same calculations for a few more values of x . For which x does the sequence $f_1(x), f_2(x), \dots$ seem to approach $f(x)$?

x	$f_1(x)$	$f_2(x)$	$f_3(x)$	$f_4(x)$	$f_5(x)$	$f(x)$