

Chapter 4/9 Worksheet

Section 4.1/9.1

1. Use Taylor approximations to do the following (note that $a = 0$ in each case):

a) $f(x) = \sqrt{4+x}$

i) Use $p_1(x)$ to find an approximate value for $\sqrt{4.1}$

ii) Use $p_2(x)$ to find an approximate value for $\sqrt{4.1}$

iii) Use a calculator to determine the error for the values in (i) and (ii).

b) $f(x) = \ln(2-x)$

i) Use $p_1(x)$ to find an approximate value for $\ln(15/8)$

ii) Use $p_2(x)$ to find an approximate value for $\ln(15/8)$

iii) Use a calculator to determine the error for the values in (i) and (ii).

c) $f(x) = \sin(\frac{\pi}{4} + x)$

i) Use $p_1(x)$ to find an approximate value for $\sin(5\pi/16)$

ii) Use $p_2(x)$ to find an approximate value for $\sin(5\pi/16)$

iii) Use a calculator to determine the error for the values in (i) and (ii).

d) $f(x) = \tan^{-1}(x)$

i) Use $p_1(x)$ to find an approximate value for $\tan^{-1}(1/10)$

ii) Use $p_2(x)$ to find an approximate value for $\tan^{-1}(1/10)$

iii) Use a calculator to determine the error for the values in (i) and (ii).

e) $f(x) = \frac{1}{1+e^x}$

i) Use $p_1(x)$ to find an approximate value for $\frac{1}{1+e^{1/10}}$

ii) Use $p_2(x)$ to find an approximate value for $\frac{1}{1+e^{1/10}}$

iii) Use a calculator to determine the error for the values in (i) and (ii).

2. In the following, you need to determine a function $f(x)$, a center point a , and the resulting linear Taylor polynomial $p_1(x)$ to find an approximate value of the given quantity.

a) $\sqrt{9.1}$

b) $8.1^{1/3}$

c) $\ln(1.1)$

d) $\tan(5\pi/16)$

Section 4.4/9.4

77. The information needed for this problem is given in the text (problem 77).

d) Assuming k is close to zero, approximate the integrand using a quadratic Taylor polynomial. Use this to find the resulting approximation for the period.

e) Does increasing the initial angle increase or decrease the period?