+1/w 2.

§ 10.2

Qu 40

$1 + x + x^2 + x^3 + \cdots$ is a geometric series.

$\therefore \quad 1 + x + x^2 + \cdots = \frac{1}{1-x} = 5.$

$\Rightarrow \quad 1 = 5(1-x)$

$5x = 5 - 1$

$x = 4/5$ //

10.3 Qu 3

We can write

$\sqrt{1-2x}$ as $\sqrt{1+y} = (1+y)^{1/2}$ where $y = -2x$.

and ~~expand~~ expand it as

$1 + (\frac{1}{2})y + \frac{1}{2}(-\frac{1}{2})\frac{y^2}{2!} + \frac{1}{2}(\frac{1}{2})(-\frac{3}{2})\frac{y^3}{3!} + \cdots$

$= 1 + y/2 - y^2/8 + y^3/16 - \cdots$

Substituting $y = -2x$, we get.

$$1 + \frac{-2x}{2} - \frac{(-2x)^2}{8} + \frac{(-2x)^3}{16} - \dots$$

$$= 1 - x - \frac{x^2}{2} - \frac{x^3}{2} - \dots$$

"

10.4 Qu 2.

$f(x) = \sin x \Rightarrow$

for $x = 0.2$

$f(0.2) = \sin(0.2)$

By Theorem 10.1, we write the error bound in the Taylor approximation of degree 3 for $f(0.2) = \sin(0.2)$ about $x = 0$. as.

$$R_3(x) = \left| f(0.2) - P_3(0.2) \right| \leq \frac{M}{(3+1)!} \left| 0.2 - 0 \right|^{3+1}$$

$$= \frac{M}{4!} (0.2)^4$$

$$= \frac{M(0.2)^4}{24}.$$

$$|f^{(4)}| \leq \sin(0.2)$$

and

$$|E_3| \leq \frac{\sin(0.2)(0.2)^4}{24} \approx 0.0000132 = 1.32 \times 10^{-5} \quad //$$

Comments

It seems that because there were lots of odd numbered questions in this homework most of you just wrote your answers without showing work.