Given $f(x) = \dfrac{5}{1-3x} = 5 + 15x + 45x^2 + \cdots$

find The associated Taylor polynomial.

Find The antiderivative of $f(x)$ and its associated Taylor polynomial.

Find $\int f(x)\,dx$. Use $u = 1-3x$ $du = -3\,dx$

$-\frac{1}{3}\,du = dx$ $-\frac{1}{3}\int \frac{5}{u}\,du = -\frac{5}{3}\ln|u|$

$-\frac{5}{3}\ln|1-3x| = 5x + \frac{15}{2}x^2 + 15x^3 + \cdots$

10.6

$$\sum_{n=1}^{\infty} \frac{x^n}{n\,2^n}$$ Find interval of convergence.

$\sqrt[n]{n} \to 1$ $\quad \sqrt[n]{\frac{x^n}{2^n}} = \frac{|x|}{2} < 1$

$[-2, 2)$

check endpoints $x=-2$

$$\frac{-2}{1\cdot 2} + \frac{4}{2\cdot 4} - \frac{8}{3\cdot 8} + \cdots \quad C$$

$x=2$;

$$\frac{2}{1\cdot 2} + \frac{4}{2\cdot 4} + \frac{8}{3\cdot 8} + \cdots \quad D$$

Wednesday, June 5, 2019 9:50 AM

Find a Taylor polynomial for

$$g(x) = x^3 \sin 2x$$

$$x^3\left(2x - \frac{(2x)^3}{3!} + \frac{(2x)^5}{5!}\right)$$

$$2x^4 - \frac{8x^6}{3!} + \frac{32x^8}{5!} + \cdots$$

Use a Taylor polynomial with 3 terms to approximate

$$\int_0^1 \cos x^3 \, dx$$

$$\int_0^1 1 - \frac{(x^3)^2}{2!} + \frac{(x^3)^4}{4!} \, dx = \int_0^1 1 - \frac{x^6}{2!} + \frac{x^{12}}{4!} \, dx$$

$$= x - \frac{x^7}{14} + \frac{x^{13}}{13(24)} \Big|_0^1 = 1 - \frac{1}{14} + \frac{1}{13(24)}$$