Maclaurin and Taylor Series

Calculus: Early Transcendentals 5e by James Stewart

Use a Maclaurin series derived in this section to obtain the Maclaurin series for the given function. Give the interval of convergence

1. $f(x) = \cos \pi x$

2. $f(x) = e^{-x/2}$

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

4. $f(x) = \sin\left(x^4\right)$

5. $f(x) = x^2 e^{-x}$

6. $f(x) = x \cos 2x$

7. $f(x) = \sin^2 x$ Hint : $\sin^2 x = \frac{1}{2}(1 - \cos 2x)$

8. $f(x) = \cos^2 x$

Find the Taylor polynomial of order (n) or Taylor series for f(x) centered at the given value of a .

9. $f(x) = 1 + x + x^2$, a = 2 n = 2

10. $f(x) = x^3$, a = -1 n = 3

11. $f(x) = e^x$ a = 3 order n

12. $f(x) = \ln x$, a = 2 n = 3

13. $f(x) = \cos x$, a = π order n

14. $f(x) = \sin x$, a = $\frac{\pi}{2}$ order n

15. $f(x) = \frac{1}{\sqrt{x}}$, a = 9 order 3

16. $f(x) = x^{-2}$, a = 1 order 3