

13. Use the Limit Comparison Test to determine whether the series converges or

diverges.  $\sum_{n=2}^{\infty} \frac{2}{n^2 - \sqrt{n}}$

14. Use the ratio test to determine if the following series is absolutely convergent, conditionally convergent or divergent. Find the radius of convergence and the interval of convergence if it is convergent.

$$\sum_{n=2}^{\infty} \frac{1 \cdot 4 \cdot 7 \cdots (3n-5)}{(\ln n)n!} (-1)^{n-1}$$

15. Find a power series representation for the function and determine the interval of convergence.

a)  $f(x) = \frac{3}{3+x^2}$

16. Evaluate the indefinite integral as an infinite series.  $\int \frac{\sin 2x}{x} dx$

17. Find the Taylor series for  $f(x)$  centered at the given value of  $a$  and find its radius of convergence.  $f(x) = \sqrt{x+2}$ , centered at  $a = 2$

18. Expand  $\frac{1}{(1-2x)^3}$  as a power series using the binomial series. State the radius of convergence.

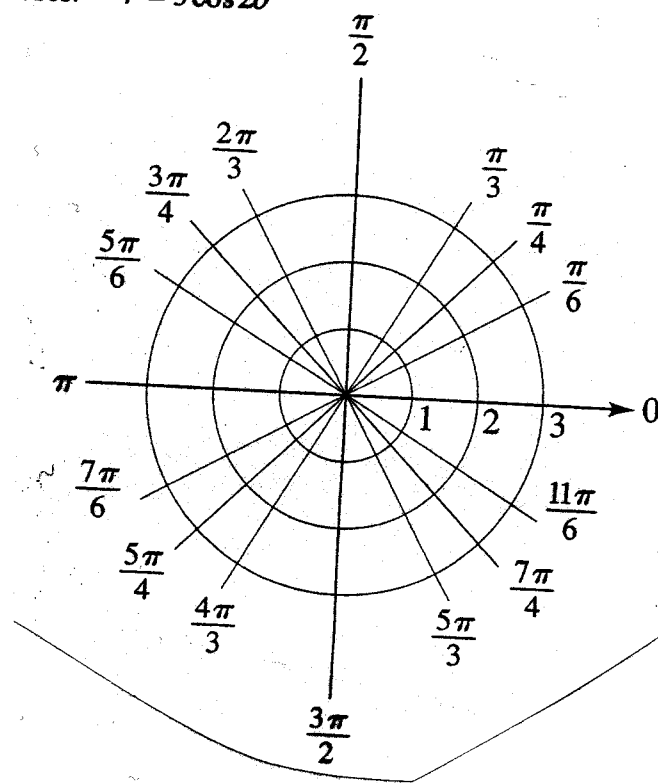
19. Find the length of the curve,  $x = \frac{t}{1+t}$ ,  $y = \ln(1+t)$ ,  $0 \leq t \leq 2$

20. a) Find a Cartesian equation for the curve described by the polar equation  
 $r = \sec \theta$

b) Find a polar equation for the curve  $x = -y^2$

c) Find the slope of the tangent line to the polar curve  $r = \ln \theta$ , at  $\theta = e$ .

21. Sketch the curve and find the area that it encloses.  $r = 3 \cos 2\theta$



22. Find an equation for the conic which satisfies the given conditions.

a) Parabola, directrix  $x = 2$ , focus  $(3, 6)$

b) Ellipse, foci  $(\pm 2, 0)$ , vertices  $(\pm 5, 0)$

c) Find the vertices, foci and asymptotes of the hyperbola and sketch its graph.

$$\frac{x^2}{9} - \frac{y^2}{16} = 1$$