Partice Problems

Indicate the answer choice that best completes the statement or answers the question.

1. Approximate $f(x) = 5x^2e^{x-1}$ by a Taylor polynomial with degree $n = 3$ at $a = 1$. Using Taylor's Inequality, determine the accuracy of the approximation in the interval $0.5 \le x \le 1.5$? Round your answer to four decimal places.

a. error < 0.5635
b. error < 0.4200
c. error < 0.2269
d. error < 0.4141
e. error < 0.4973

2. Use series to evaluate the limit.

$$\lim_{x \to 0} \frac{\sin x}{7 + x - 7e^x}$$

a. $-\frac{1}{6}$
b. $-\frac{1}{8}$
c. $-\frac{1}{7}$
d. 7
e. 0

3. Use the table of integrals to evaluate the integral.

$$\int \frac{dx}{\sqrt{1 - e^{9x}}}$$

a. $\frac{1}{9} \ln \left| \frac{\sqrt{1 - e^{9x}} - 1}{\sqrt{1 - e^{9x}} + 1} \right| + C$
b. $\sin^{-1} e^{9x} + C$
c. $2\tan^{-1} \sqrt{1 - e^{9x}} + C$
d. $\frac{e^{9x}}{\sqrt{1 - e^{9x}}} + C$
e. $-\frac{1}{9} \sqrt{1 - e^{9x}} + C$

Partice Problems

4. Find the parametric equations for the path of a particle that moves two and a half times clockwise around the circle $(x-6)^2+y^2=16$, starting at $(6, 4)$.

a. $x=6+4\sin t, y=4\cos t, 0\le t\le 5\pi$
b. $x=4\sin t, y=4\cos t+6, 0\le t\le 5\pi$
c. $x=4\cos t+6, y=4\sin t, 0\le t\le 5\pi$
d. $x=6-4\sin t, y=4\cos t, 0\le t\le 5\pi$
e. $x=16\sin t, y=16\cos t+6, 0\le t\le 2\pi$

5. Use the Alternating Series Estimation Theorem to estimate the range of non-negative values of *x* for which the given approximation is accurate to within the stated error. Round your answer to two decimal places.

$$\ln(1+x)\approx x-\frac{x^2}{2}+\frac{x^3}{3} \quad |\text{error}|<0.01$$

a. $0\le x<0.45$
b. $0\le x<0.25$
c. $0\le x<0.80$
d. $0\le x<0.13$
e. $0\le x<0.06$

6. An electric dipole consists of two electric charges of equal magnitude and opposite sign. For a particular electric dipole, the electric field E a distance D away from the dipole is given by

$$E=\frac{1}{D^2}-\frac{1}{(D+1)^2}$$

By expanding this expression for E as a series in powers of $\frac{1}{D}$, obtain an approximation for E when D is very large.

a. $E\approx\frac{2}{D^3}$
b. $E\approx\frac{2}{D^2}$
c. $E\approx\frac{1}{D}+\frac{2}{D^3}$
d. $E\approx\frac{2}{D^2}-\frac{3}{D^3}$
e. $E\approx\frac{1}{D}+\frac{2}{D^2}-\frac{3}{D^3}$

Partice Problems

7. For what values of k is the series $\sum_{n=1}^{\infty} \frac{n^2-4}{n^k+4}$ convergent?

a. $k>3$
b. $k>2$
c. $k>0$
d. $k<3$
e. $k<4$

8. Use the Table of Integrals to evaluate the integral.

$$\int_0^2 x^3 e^{2x}\,dx$$

a. $\frac{3}{8}+\frac{17}{8}e^4$
b. $\frac{3}{8}+\frac{1}{8}e^2$
c. $\frac{71}{8}e^{-4}+\frac{17}{8}e^4$
d. $\frac{5}{8}e^2$
e. $8-3e^4$

9. Find a power series representation for the function.

$$f(x)=\frac{1}{16+4x^2}$$

a. $\sum_{n=0}^{\infty} \frac{(-1)^n}{4^{n+2}}x^{2n}$
b. $\frac{1}{16}\sum_{n=0}^{\infty} \frac{(-1)^n}{4^{n+2}}x^{2n}$
c. $\frac{1}{16}\sum_{n=0}^{\infty}\left(-\frac{1}{4}\right)^n x^n$
d. $\frac{1}{16}\sum_{n=0}^{\infty}\left(\frac{1}{4}\right)^n x^n$
e. $\frac{1}{16}\sum_{n=0}^{\infty}\left(\frac{1}{4}\right)^n x^{2n}$

Partice Problems

10. Determine the interval of convergence for the power series representation of the following function.

$$f(x)=\frac{26x}{15{,}625x^6+1}$$

a. $\left(-\frac{1}{5},\frac{1}{5}\right)$

b. $(-5,5)$

c. $(-15{,}625,15{,}625)$

d. $\left(-\frac{1}{15{,}625},\frac{1}{15{,}625}\right)$

e. $\left(-\frac{26}{15{,}625},\frac{26}{15{,}625}\right)$

11. Express the function as a power series by first using partial fractions.

$$f(x)=\frac{2x+4}{x^2+4x+3}$$

What is the interval of convergence?

a. $(-1,1)$

b. $(-4,4)$

c. $(-2,2)$

d. $\left(-\frac{1}{2},\frac{1}{2}\right)$

e. $(-3,3)$

12. Find parametric equations for the ellipse $\frac{x^2}{9}+\frac{y^2}{16}=1$.

a. $x=3\sin t, y=4\cos t$

b. $x=4\sin t, y=3\cos t$

c. $x=9\sin t, y=16\cos t$

d. $x=16\sin t, y=9\cos t$

e. $x=9\sin t, y=16\sin t$

13. Eliminate the parameter to find a Cartesian equation of the curve.

$x=\cot\theta, y=\csc^2\theta, 0<\theta<\pi$

a. $y=x^2+1$

Partice Problems

b. $y = 1 - x^2$

c. $y = x^2 - 1$

d. $y = \sqrt{x} - 1$

e. $y = 1 - \sqrt{x}$

14. Find a Cartesian equation for the curve represented by the given polar equation.

$r = \frac{1}{2}\cot\theta\csc\theta$

a. $2y^2 = x$

b. $x^2 - y^2 = 2$

c. $x^2 + y^2 = \sqrt{2}$

d. $y = 1 - 2x$

e. $xy = 2$

15. Find the radius of convergence of the series.

$\sum_{n=1}^{\infty} (2n)!(x-1)^n$

a. $R = 0$

b. $R = -1$

c. $R = 1$

d. $R = -9$

e. $R = \infty$

16. Find the slope of the tangent line to the parabola with directrix $y = 9$, when $\theta = 0$.

a. –1

b. 1

c. 9

d. $\sqrt{2} - 1$

e. $\sqrt{2} + 1$

17. Find the exact length of the polar curve $r = 9(1 + \sin\theta)$.

a. 72

b. 36

c. 2π

d. 144

Partice Problems

e. $\frac{5\pi}{2}$

18. For what values of *p* is the series $\sum_{x=1}^{\infty} \frac{\sqrt[6]{x}}{\sqrt{x^p + 7x + 5}}$ divergent?

a. $p \le \frac{9}{6}$

b. $p > \frac{9}{6}$

c. $p < 2$

d. $p > 1$

e. $p \le \frac{7}{3}$

19. Evaluate the integral.

$\int x^9 e^{7x^5} dx$

a. $\frac{1}{245} e^{7x^5}(7x^5 - 1) + C$

b. $\frac{1}{245} e^{7x^5} + C$

c. $\frac{1}{35} e^{7x^5}(7x^5 - 1) + C$

d. $\frac{1}{245} e^{7x^5}(7x^4 - 1) + C$

e. $\frac{1}{35} e^{7x^5} + C$

20. The resistivity *p* of a given metal depends on the temperature *t* according to the equation $p(t) = p_{20} e^{\alpha(t-20)}$ where α and p_{20} are constants for a given metal. Find a third-degree Taylor polynomial at $t = 20$ that approximates the resistivity function.

a. $p(t) \approx p_{20}\left[1 + \alpha(t-20) + \frac{1}{2}\alpha^2(t-20)^2 + \frac{1}{6}\alpha^3(t-20)^3\right]$

b. $p(t) \approx p_{20}\left[1 + \alpha(t-20) + \alpha^2(t-20)^2 + \alpha^3(t-20)^3\right]$

Partice Problems

c. $p(t) \approx p_{20}\left[1+\alpha(t-20)+\frac{1}{2}\alpha^2(t-20)^2+\frac{1}{3}\alpha^3(t-20)^3\right]$

d. $p(t) \approx p_{20}\left[1+\alpha(t-20)+\frac{1}{2}\alpha(t-20)^2+\frac{1}{6}\alpha(t-20)^3\right]$

e. $p(t) \approx \frac{1}{6}p_{20}\alpha^3(t-20)^3$

21. Determine the interval of convergence for the power series representation of the following function.

$f(x)=\frac{2x-5}{3-x}$

a. $(-3, 3)$

b. $(-1, 1)$

c. $(-2, 2)$

d. $\left(-\frac{1}{3}, \frac{1}{3}\right)$

e. $\left(-\frac{2}{5}, \frac{2}{5}\right)$

22. If the sum of the following series is approximated by the sum of the first 6 terms of the series, estimate the maximum error in the answer.

$\sum_{n=1}^{\infty}\frac{4}{4^n+5^n}$

Hint: T_n can be calculated directly for a more accurate error bound instead of estimating using an integral.

a. $\frac{1}{6{,}144}$

b. $\frac{1}{1{,}536}$

c. $\frac{1}{3{,}072}$

d. $\frac{1}{12{,}288}$

e. $\frac{1}{384}$

23. Evaluate the integral.

$\int\frac{x^2}{\sqrt{9x^2+9}}\,dx$

Partice Problems

a. $\frac{1}{6}\left[x\sqrt{x^2+1}-\ln\left(x+\sqrt{x^2+1}\right)\right]+C$

b. $\frac{1}{6}\ln\left(x+\sqrt{x^2+1}\right)+C$

c. $\frac{1}{6}x\sqrt{x^2+1}+C$

d. $x\sqrt{x^2+1}-\ln\left(x+\sqrt{x^2+1}\right)+C$

e. $\frac{1}{12}\left[x\sqrt{x^2+1}-\ln\left(x+\sqrt{x^2+1}\right)\right]+C$

24. Use Taylor's Inequality to determine the number of terms of the Maclaurin series for e^x that should be used to estimate $e^{0.6}$ to within 0.0001.

a. 6
b. 7
c. 5
d. 1
e. 2

25. Find a power series representation for the function and determine the radius of convergence.

$f(x)=\frac{2}{11-7x}$

a. $2\sum_{n=0}^{\infty}\frac{7^n}{11^{n+1}}x^n,\ R=\frac{11}{7}$

b. $\frac{2}{11}\sum_{n=0}^{\infty}\left(\frac{7}{11}x\right)^n,\ R=\frac{7}{11}$

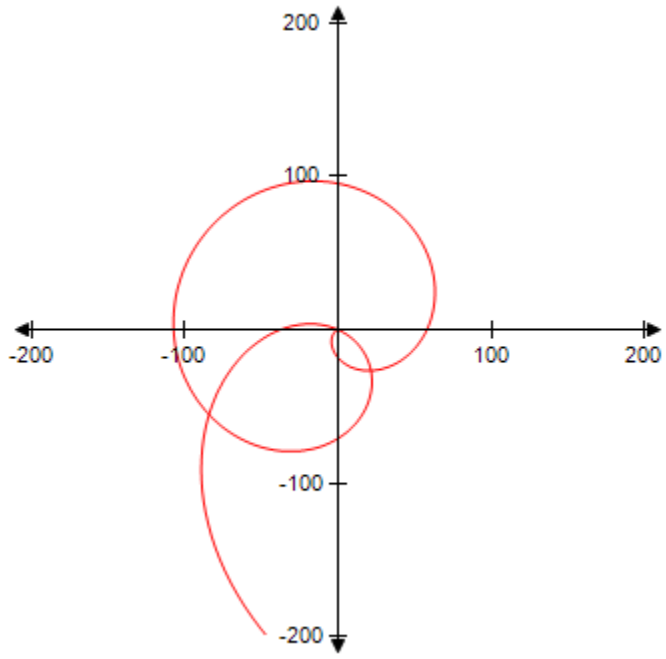
c. $\frac{2}{11}\sum_{n=0}^{\infty}\left(\frac{7}{11}x\right)^n,\ R=\frac{11}{7}$

d. $\frac{2}{11}\sum_{n=0}^{\infty}\left(\frac{11}{7}x\right)^n,\ R=\frac{11}{7}$

e. $\frac{2}{11}\sum_{n=0}^{\infty}\left(\frac{11}{7}x\right)^n,\ R=\frac{7}{11}$

26. Identify the polar equation having the following graph.

Partice Problems



a. $r = \theta^3 - 9\theta^2$

b. $r = \ln(\theta^2 + 5)$

c. $r = 4(1 + \sin\theta)$

d. $r = \cos(\sin\theta)$

e. $r = 7\theta$

27. Use the Midpoint Rule to approximate the given interval with the specified value of *n*. Round your answer to four decimal places.

$$\int_1^5 e^{-x}\sin\left(\frac{x}{7}\right)dx,\ n = 8$$

a. 0.0973
b. 0.2925
c. 0.2204
d. 0.2444
e. 0.2003

28. Find the point(s) of intersection of the following two parametric curves, by first eliminating the parameter, then solving the system of equations.

$x = t + 15, y = t^2$ and $x = \frac{1}{20}t, y = t$

Partice Problems

a. $(45, 900)$

b. $(5, 100)$

c. $(900, 100)$

d. A and B

e. A and C

29. Approximate $f(x) = \dfrac{6}{x+1}$ by a Taylor polynomial with degree $n = 3$ at $a = 0$.

a. $f(x) \approx 6 - 6x + 6x^2 - 6x^3$

b. $f(x) \approx 6 + 6x + 6x^2 + 6x^3$

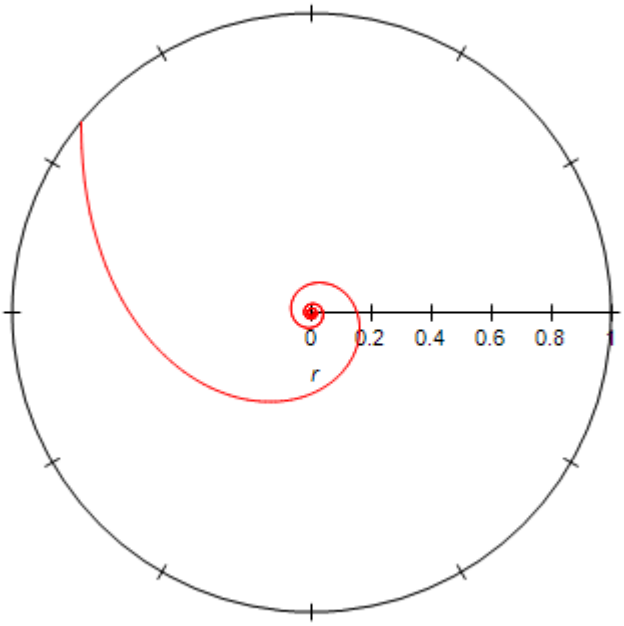
c. $f(x) \approx 1 - \dfrac{1}{2}x + \dfrac{1}{3}x^2 - \dfrac{1}{4}x^3$

d. $f(x) \approx 1$

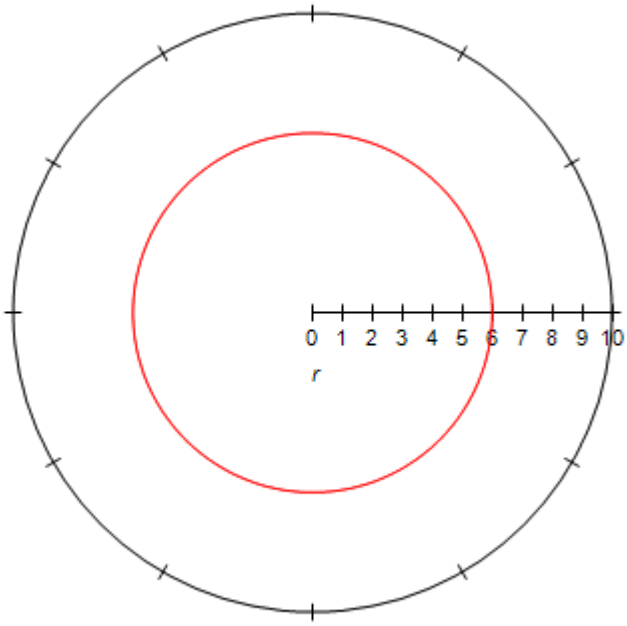
e. $f(x) = x - \dfrac{1}{7}x^3$

30. Sketch the curve with the polar equations $r\theta^2 = 6,\ \theta > 0$.

a.



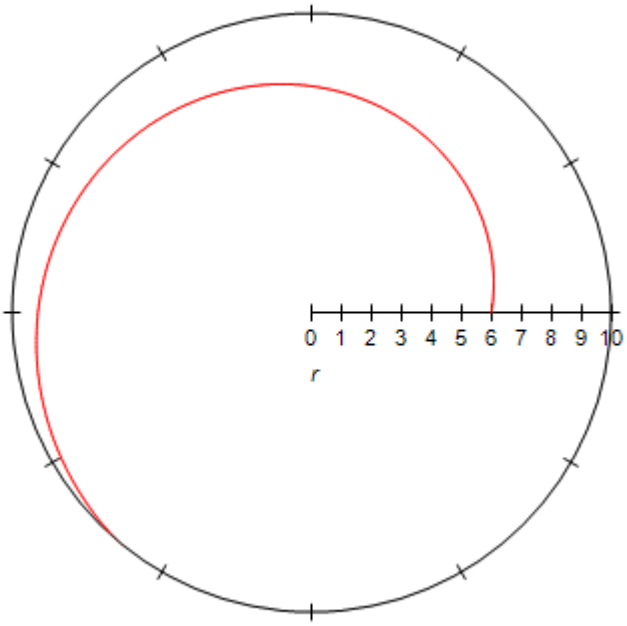
b.

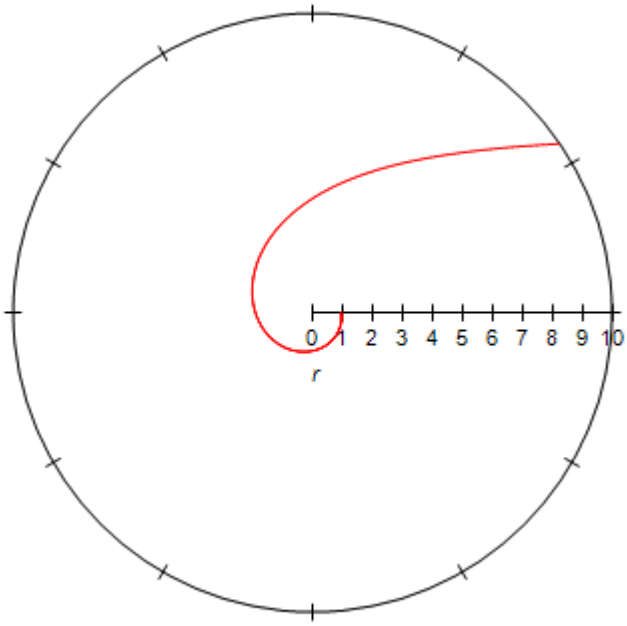


c.

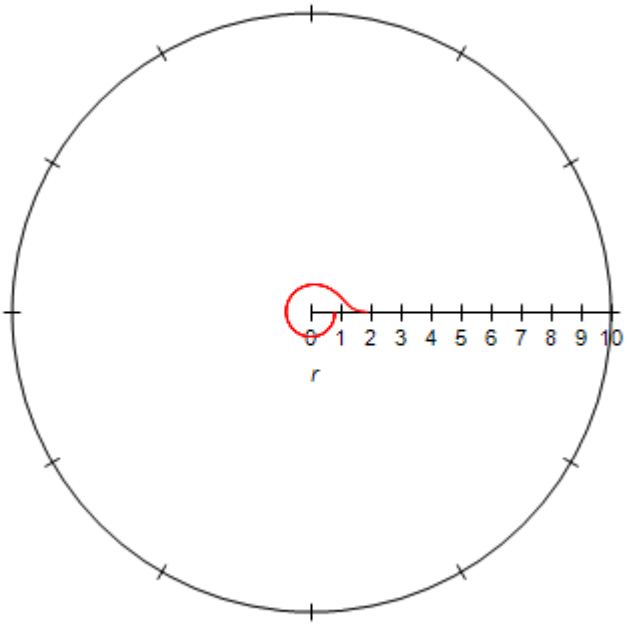
d.

Partice Problems





e.



31. Use differentiation to find a power series representation for

$$f(x) = \frac{x^4}{(1+x)^4}$$

Partice Problems

a. $\frac{1}{6}\sum_{n=0}^{\infty}(-1)^n(n+3)(n+2)(n+1)x^{n+4}$

b. $\frac{1}{6}\sum_{n=0}^{\infty}(-1)^n n(n-1)(n-2)x^{n+4}$

c. $\sum_{n=0}^{\infty}(-1)^n n(n-1)(n-2)x^n$

d. $\sum_{n=0}^{\infty}(-1)^n(n+3)(n+2)(n+1)x^n$

e. $\sum_{n=0}^{\infty}(-6)^n(n+3)(n+2)(n+1)x^{n+4}$

32. Find the volume of the solid obtained when the region under the curve $y = 5\sin^{-1}3x,\ x \geq 0$, is rotated about the *y*-axis.

a. $\frac{5\pi^2}{36}$

b. $\frac{\pi^2}{4}$

c. $\frac{3\pi}{4}$

d. ∞

e. 2

33. Evaluate the integral.

$\int \frac{4x+10}{x^3+x}\,dx$

a. $10\ln x + 4\tan^{-1}x - 5\ln\left(x^2+1\right) + C$

b. $10\ln x + 4\tan^{-1}x + C$

c. $5\ln x + 4\tan^{-1}x - 10\ln\left(x^2+1\right) + C$

d. $10\ln x - \tan^{-1}x - 5\ln\left(x^2+1\right) + C$

e. $-\frac{5}{x^2} - \frac{4}{x} + C$

Partice Problems

34. The region bounded by the curve $y = \frac{\sin x}{5 + x^2}$, the *x*-axis, and the line $x = 2$ is rotated about the *x*-axis. Use Simpson's Rule with $n = 4$ to estimate the volume of the resulting solid.

a. 0.0831
b. 0.8537
c. 0.2633
d. 0.9047
e. 0.1392

35. Find the points on the polar curve where the tangent line is vertical.

$r = e^{\frac{\theta}{\sqrt{3}}}, \; 0 \le \theta \le 2\pi$

a. $\left(0, \frac{\pi}{2}\right)$
b. $\left(e^{\frac{\pi\sqrt{3}}{18}}, \frac{\pi}{6}\right)$
c. $\left(e^{\frac{7\pi\sqrt{3}}{18}}, \frac{7\pi}{6}\right)$
d. B and C
e. All the above

36. Find the distance between the points with polar coordinates $\left(6, \frac{2\pi}{3}\right)$ and $(4, \pi)$.

a. $2\sqrt{7}$
b. $2\sqrt{3}$
c. 6
d. $\sqrt{-2 + \frac{\pi^2}{9}}$
e. $\frac{4}{3}$

37. Let *P* be a point at a distance 6 units from the center of a circle of radius 2. The curve traced out by *P* as the circle rolls along a straight line is called a trochoid. (Think of the motion of a point on a spoke of a bicycle wheel.) Assuming the line is the *x*-axis and $\theta = 0$ when *P* is at one of its lowest points, find the parametric equations of the trochoid. (Hint: use the same parameter θ as for the cycloid.)

Partice Problems

a. $x = 2\theta - 6\sin\theta,\ y = 2 - 6\cos\theta$
b. $x = 2\theta - 6\sin\theta,\ y = 6 - 2\cos\theta$
c. $x = 6\theta - 2\sin\theta,\ y = 2 - 6\cos\theta$
d. $x = 6\theta - 2\sin\theta,\ y = 6 - 2\cos\theta$
e. $x = 2\theta - 6\cos\theta,\ y = 2 - 6\sin\theta$

38. Approximate $f(x) = 2\sinh^{-1}x$ by a Taylor polynomial with degree $n = 4$ at $a = 0$.

a. $f(x) \approx 2x - \frac{1}{3}x^3$
b. $f(x) \approx 2x + \frac{1}{2}x^2 - \frac{1}{3}x^3$
c. $f(x) \approx \frac{1}{3}x^4$
d. $f(x) \approx 2x + \frac{1}{3}x^4$
e. $f(x) \approx x - 2x^3$

39. Evaluate the integral.

$$\int \frac{7(x^2-1)e^{x^2}}{x^3}\,dx$$

a. $\frac{7e^{x^2}}{2x^2} + C$
b. $\frac{7e^{x^2}}{2x^2} + \frac{7}{2}e^{x^2} + \frac{7}{2}x^2 + C$
c. $\frac{7}{2}e^{x^2} + \frac{7}{2}x^2 + C$
d. $\frac{7}{2}e^{x^2}\ln x + C$
e. $\ln x - \frac{7}{2}x^2 + C$

40. Find a power series representation for the function.

Partice Problems

$$f(x)=\frac{x^3}{6x^2+1}$$

a. $\sum_{n=0}^{\infty}(-6)^n x^{2n+3}$
b. $\sum_{n=0}^{\infty}(-6)^n x^{2n}$
c. $\sum_{n=0}^{\infty}6^n x^{2n+3}$
d. $\sum_{n=0}^{\infty}6^n x^{2n}$
e. $x^3\sum_{n=0}^{\infty}(-6)^n x^n$

41. Use the Midpoint Rule to approximate the given interval with the specified value of *n*. Round your answer to four decimal places.

$$\int_0^3 \frac{6x^2}{1+x^3}\,dx,\ n=6$$

a. 6.6700
b. 8.4091
c. 5.1697
d. 8.3611
e. 5.4179

42. Approximate $f(x)\approx 5\sin(2x)$ by a Taylor polynomial with degree $n=4$ at $a=\frac{\pi}{4}$. Using the Alternating Series Estimation Theorem or Taylor's Inequality, determine the accuracy of the approximation in the interval $0\le x\le\frac{\pi}{2}$? Round your answer to four decimal places.

a. error <0.1043
b. error <0.9038
c. error <0.0759
d. error <0.3185
e. error <0.8566

43. Approximate $f(x)=\cos x$ by a Taylor polynomial with degree $n=1$ at $a=\frac{\pi}{3}$. Using Taylor's Inequality, determine the accuracy of the approximation in the interval $0\le x\le\frac{2\pi}{3}$? Round your answer to first significant figure.

Partice Problems

a. error < 0.5
b. error < 0.2
c. error < 0.05
d. error < 0.5
e. error < 0.5

44. Evaluate the indefinite integral as a power series.

$$\int \frac{\ln(1+x^2)}{x^2}\,dx$$

a. $C + \sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^{2n-1}}{n(2n-1)}$
b. $C + \sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^{2n}}{2n^2}$
c. $C + \sum_{n=1}^{\infty} (-1)^{n+1} \frac{x^{2n+1}}{n(2n+1)}$
d. $C + \sum_{n=0}^{\infty} (-1)^{n} \frac{x^{2n+1}}{n(2n+1)}$
e. $C + \sum_{n=0}^{\infty} (-1)^{n} \frac{x^{2n}}{n(2n+1)}$

45. Find polar coordinates (r, θ) of the point $(-7\sqrt{2}, 7\sqrt{2})$, where $r < 0$ and $0 \le \theta \le 2\pi$.

a. $\left(-14, \frac{7\pi}{4}\right)$
b. $\left(14, \frac{3\pi}{4}\right)$
c. $\left(-7, \frac{3\pi}{4}\right)$
d. $\left(7\sqrt{2}, \frac{2\pi}{3}\right)$
e. $\left(-7\sqrt{2}, \frac{5\pi}{3}\right)$

46. Find the area of the region that lies inside both curves.
$r = 4 + 3\cos\theta$, $r = 4 - 3\cos\theta$

Partice Problems

a. $20.5\pi - 48$
b. $20.5\pi + 48$
c. 48
d. 96
e. $4\pi - 6$

47. Find the slope of the tangent line to the hyperbola with eccentricity 4 and directrix $x = 3$, when $\theta = \frac{5\pi}{4}$.

a. $4\sqrt{2} - 1$
b. $4\sqrt{2} + 1$
c. 4
d. $3\sqrt{3} - 1$
e. –1

48. Use the table of integrals to evaluate the integral.

$$\int \frac{dx}{x\sqrt{\ln x(10 - \ln x)}}$$

a. $\cos^{-1}\left(1 - \frac{1}{5}\ln x\right) + C$
b. $-\sqrt{\ln x(10 - \ln x)} + \cos^{-1}\left(1 - \frac{1}{5}\ln x\right) + C$
c. $-\frac{\sqrt{\ln x(10 - \ln x)}}{5\ln x} + C$
d. $\cos^{-1}\left(\frac{10 - \ln x}{10}\right) + C$
e. $\sin^{-1}\left(1 - \frac{1}{5}\ln x\right) + \sqrt{\ln x(10 - \ln x)} + C$

49. Find the points on the polar curve $r = 9 - 9\cos\theta$ where the tangent line is horizontal.

a. $(0, 0)$
b. $\left(\frac{27}{2}, \frac{2\pi}{3}\right)$
c. $\left(\frac{27}{2}, \frac{4\pi}{3}\right)$
d. B and C

e. All of the above

50. How many terms of the Maclaurin series for $\sqrt{3+x}$ do you need to estimate $\sqrt{5}$ to within 0.005?

a. 4
b. 1
c. 5
d. 3
e. 2

51. Write a polar equation of a parabola with the focus at the origin and the vertex $(r, \theta) = (4, \pi)$.

a. $r = \dfrac{8}{1-\cos\theta}$
b. $r = \dfrac{8}{1+\cos\theta}$
c. $r = \dfrac{4}{1-\sin\theta}$
d. $r = \dfrac{4}{1+\sin\theta}$
e. $r = \dfrac{8}{1+\sin\theta}$

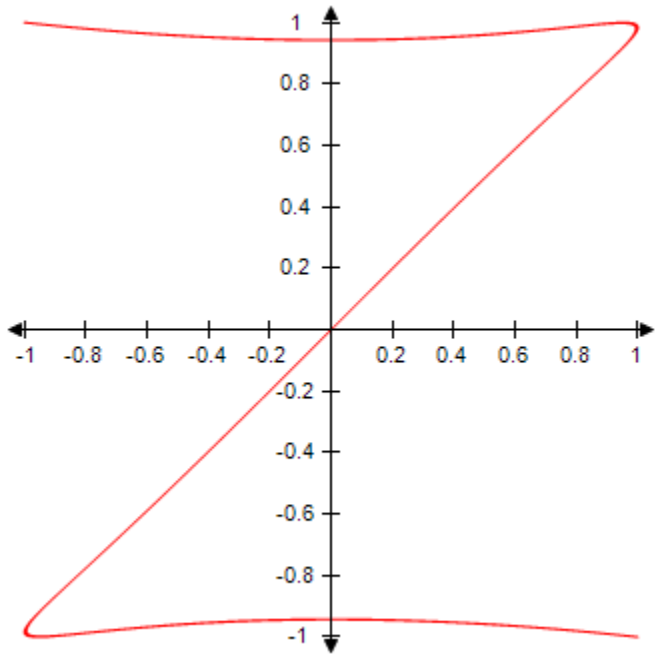
52. For what values of is the series convergent?

$$\sum_{n=1}^{\infty} \frac{e^{px}}{4x-1}$$

a. $p < 0$
b. $p \geq 0$
c. $p < 1$
d. $p \geq 1$
e. $p \neq 0$

53. Determine which of the following parametric equations matches the graph.

Partice Problems



a. $x = \sin 3t,\ y = \sin(t + \sin 2t)$

b. $x = t^3 + 1,\ y = -t^2$

c. $x = \sin 2t,\ y = \cos\left(t^2 - 3t\right)$

d. $x = \sinh t,\ y = \cosh t$

e. $x = \sin t,\ y = \sec t^2$

54. Consider the series $\sum_{n=1}^{\infty} \frac{f(n)}{\left(1+n^5\right)^4}$. Which of the following functions $f(n)$ ensures the series is convergent?

a. $f(n) = (1+n^4)(1+n)^3$

b. $f(n) = n^9\sqrt{n^2+5}$

c. $f(n) = e^n$

d. $f(x) = 5^n - 5$

e. $\sqrt{n^{20}-n}$

55. If the sum of the following series is approximated by the sum of the first 10 terms of the series, estimate the maximum error in the answer.

$$\sum_{n=1}^{\infty} \frac{2}{9+n^5}$$

Partice Problems

a. $\frac{1}{20{,}000}$

b. $\frac{1}{40{,}000}$

c. $\frac{1}{200{,}000}$

d. $\frac{1}{400{,}000}$

e. $\frac{1}{2{,}000{,}000}$

56. Approximate $f(x)=\frac{\ln\frac{x}{2}}{x}$ by a Taylor polynomial with degree $n=3$ at $a=2$. Using the Alternating Series Estimation Theorem, determine the accuracy of the approximation in the interval $1.8\le x\le 2.2$? Round your answer to six decimal places, if necessary.

a. error ≤ 0.000104

b. error ≤ 0.000013

c. error ≤ 0.00275

d. error ≤ 0.278

e. error ≤ 0.0965

57. Use a power series to approximate the definite integral to five decimal places.

$$\int_0^{0.5}\frac{t^2}{1+t^5}\,dt$$

a. 0.04119

b. 0.05090

c. 0.60250

d. 0.68290

e. 0.03164

58. Evaluate the integral.

$$\int\frac{14x\cos x^2}{1+\sin^2\left(x^2\right)}\,dx$$

a. $7\tan^{-1}\left(\sin\left(x^2\right)\right)+C$

Partice Problems

b. $7\sin^{-1}(\tan(x^2))+C$

c. $\tan(x^2)+C$

d. $\dfrac{14}{\tan^{-1}(\sin(x^2))}+C$

e. $\dfrac{14}{1-\sin(x^2)}+C$

59. Approximate $f(x)=\sec\left(\frac{1}{2}x\right)$ by a Taylor polynomial with degree $n=2$ at $a=0$. Using Taylor's Inequality, determine the accuracy of the approximation in the interval $-0.4\le x\le 0.4$? Round your answer to five decimal places.

a. error ≤ 0.00145

b. error ≤ 0.09996

c. error ≤ 0.16067

d. error ≤ 0.19534

e. error ≤ 0.15504

60. Use the table of integrals to evaluate the integral.

$$\int \frac{\sec^3 x\tan x}{\sqrt{16-\sec^2 x}}\,dx$$

a. $-\frac{1}{2}\sec x\sqrt{16-\sec^2 x}+8\sin^{-1}\left(\frac{1}{4}\sec x\right)+C$

b. $-\frac{1}{2}\tan x\sqrt{16-\sec^2 x}+16\sin^{-1}\left(\frac{1}{4}\sec x\right)+C$

c. $-\frac{1}{\sec x}\sqrt{16-\sec^2 x}+16\sin^{-1}\left(\frac{1}{4}\sec x\right)+C$

d. $-\frac{1}{2}\sec x\sqrt{16-\sec^2 x}-\sin^{-1}\left(\frac{1}{4}\sec x\right)+C$

e. $-\frac{1}{2}\sec x\sqrt{4-\sec x}+2\sin^{-1}\left(\frac{1}{4}\sec x\right)+C$

61. Evaluate the indefinite integral as a power series.

$$\int 5x\tan^{-1}x\,dx$$

Partice Problems

a. $C+5\sum_{n+0}^{\infty}(-1)^n\frac{x^{2n+3}}{(2n+1)(2n+3)}$

b. $C+5\sum_{n+0}^{\infty}(-1)^n\frac{x^{2n}}{(2n+1)^2}$

c. $C+5\sum_{n+0}^{\infty}(-1)^n\frac{x^{2n+2}}{2n+2}$

d. $C+5\sum_{n+0}^{\infty}(-1)^n\frac{x^{2n+1}}{2n+1}$

e. $C+\sum_{n+0}^{\infty}(-1)^n\frac{x^{n+1}}{n+1}$

62. If the sum of the following series is approximated by the sum of the first 5 terms of the series, estimate the maximum error in the answer.

$$\sum_{n=1}^{\infty}\frac{e^{\frac{1}{n^4}}}{n^3}$$

a. 0.05437
b. 0.0012
c. 0.0006
d. 0.000024
e. 0.006

63. Evaluate the integral.

$$\int_{-1}^{1}\frac{x^3}{1+\sin^2 x}\,dx$$

a. 0
b. 1
c. $\frac{1}{3}$
d. $\frac{1}{6}$
e. 3

64. Find a polar equation for the curve represented by the given Cartesian equation.

$2x^2+y^2=8x$

Partice Problems

a. $r = \dfrac{8\cos\theta}{2\cos^2\theta + \sin^2\theta}$

b. $r = 8\cos\theta$

c. $r = 0$

d. $r = 2\cos^2\theta + \sin^2\theta$

e. $r = 2\cos\theta + \tan^2\theta$

65. Express the function as a power series by first using partial fractions.

$f(x) = \dfrac{2x+5}{x^2+5x+4}$

a. $\sum_{n=0}^{\infty}(-1)^n\left(1+\dfrac{1}{4^{n+1}}\right)x^n$

b. $\sum_{n=0}^{\infty}\left(\dfrac{1}{4^{n+1}}\right)x^n$

c. $\sum_{n=0}^{\infty}\left(1-\dfrac{1}{2^{n+1}}\right)x^n$

d. $\sum_{n=0}^{\infty}(-1)^n\left(5+\dfrac{1}{4^{n+1}}\right)x^n$

e. $\sum_{n=0}^{\infty}(-1)^n x^n$

66. Find the point(s) of intersection of the following two parametric curves, by first eliminating the parameter, then solving the system of equations.

$x = t, y = t^3$ and $x = t^3, y = t^6$

a. $(0, 0)$

b. $(1, 1)$

c. $(1, -1)$

d. A and B

e. All the above

67. Evaluate the integral.

$\int_1^9 \left| -x^2 + 3x + 10 \right| dx$

a. 112

Partice Problems

b. $\frac{112}{3}$

c. 3

d. -10

e. -112

68. Evaluate the integral.

$\int_{-\pi}^{\pi}(x-7\cos x)^2 dx$

a. $49\pi+\frac{2}{3}\pi^3$

b. 49π

c. 0

d. $\frac{7}{8}$

e. $8+\frac{2}{3}\pi^2$

69. The polar coordinates of a point are $\left(4, \frac{\pi}{3}\right)$. Determine the Cartesian coordinates of the point.

a. $(2, 2\sqrt{3})$

b. $(2\sqrt{3}, 2)$

c. $(2, 2)$

d. $(2\sqrt{2}, 2)$

e. $(2, 2\sqrt{2})$

70. Find the slope of the tangent line to the polar curve $r = 1-\sin 4\theta$ at $\theta = \frac{\pi}{4}$.

a. $\frac{5}{3}$

b. 4

c. $-\frac{1}{2}$

d. 4

Partice Problems

e. $\dfrac{5\sqrt{3}+4}{1-4\sqrt{3}}$

Indicate one or more answer choices that best complete the statement or answer the question.

71. Use a graph to estimate the values of θ for which the curves $r = 9 + 3\sin 5\theta$ and $r = 18\sin\theta$ intersect. Round your answer to two decimal places.

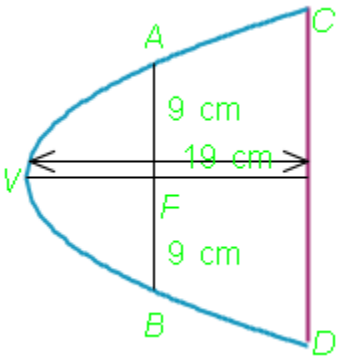
a. θ = 1.48
b. θ = 0.58
c. θ = 4.7
d. θ = 0.49
e. θ = 2.57

72. Determine whether the sequence is increasing, decreasing, or not monotonic. Is the sequence bounded?

$a_n = \dfrac{1}{5n+1}$

a. increasing
b. decreasing
c. not monotonic
d. bounded

73. A cross-section of a parabolic reflector is shown in the figure. The bulb is located at the focus and the opening at the focus is 18 cm. Find an equation of the parabola. Let V be the origin. Find the diameter of the opening $|CD|$, 19 cm from the vertex.



a. $|CD| = 6\sqrt{38}$
b. $|CD| = 18$
c. The equation is $y = 18x^2$
d. $|CD| = 4\sqrt{414}$

Partice Problems

e. The equation is $y^2 = 18x$

f. The equation is $y^2 - \frac{x^2}{18} = 1$

Enter the appropriate value to answer the question or solve the problem.

74. Evaluate the integral or show that it is divergent.

$$\int_1^{\infty} \frac{\ln x}{x^5}\,dx$$

75. Evaluate the integral.

$$\int_{\pi/3}^{\pi/2} 5\cot^2 x\,dx$$

76. Find $\frac{d^2y}{dx^2}$.

$x = 5(t + \sin t),\ y = 5(t - \cos t)$

77. Test the series for convergence or divergence.

$$\sum_{k=1}^{\infty} \frac{(-3)^{k+1}}{4^{2k}}$$

78. Test the series for convergence or divergence.

$$\sum_{m=1}^{\infty} \frac{3^m m^3}{m!}$$

79. Find the area of the region that lies inside both curves.

$r = 8 + 2\sin\theta,\ r = 7$

80. For what values of *K* is the following integral improper?

Partice Problems

$$\int_0^K \frac{3x}{x^2-19x+90}\,dx$$

81. Use the binomial series to expand the function as a power series. Find the radius of convergence.

$$\frac{1}{(7+x)^8}$$

82. Evaluate the integral.

$$\int_0^{1/2} 8x\cos \pi x\ dx$$

83. Evaluate the integral.

$$\int \frac{\cos x}{16+\sin^2 x}\,dx$$

84. Find the area of the region that is bounded by the given curve and lies in the specified sector.

$r = 9\sqrt{\sin 2\theta},\ 0 \le \theta \le \frac{\pi}{2}$

85. Find a Cartesian equation for the curve described by the given polar equation.

$r = 11 \sin \theta$

86. Find a power series representation for the function and determine the radius of convergence.

$$f(x) = \arctan\left(\frac{x}{2}\right)$$

87. Approximate the sum to the indicated accuracy.

$\sum \frac{(-1)^{n-1}}{n^7}$ (five decimal places)

88. Find the values of *p* for which the series is convergent.

$$\sum_{n=1}^{\infty} 3n\left(1+n^2\right)^p$$

Partice Problems

89. Use the sum of the first 10 terms to approximate the sum of the series. Estimate the error.

$$\sum_{n=1}^{\infty} \frac{1}{1+4^n}$$

90. Use the binomial series to expand the function as a power series. Find the radius of convergence.

$$\sqrt[5]{1+x^6}$$

91. Approximate the sum to the indicated accuracy.

$$\sum_{n=0}^{\infty} \frac{(-1)^n}{4^n n!}$$ (four decimal places)

92. Household electricity is supplied in the form of alternating current that varies from 190 V to –190 V with a frequency of 60 cycles per second (Hz). The voltage is thus given by the function $E(t)$, where t is the time in seconds. Voltmeters read the RMS (root-mean-square) voltage, which is the square root of the average value of $[E(t)]^2$ over one cycle. Calculate the RMS voltage of household current. Round your answer to the nearest integer.

$E(t) = 190\sin(120\pi t)$

93. Evaluate the following integral.

$$\int_0^1 \frac{3\ln 4x}{\sqrt{x}}\,dx$$

94. Find the volume obtained by rotating the region bounded by the given curves about $y = -1$.

$y = \sin x$, $x = 0$, $x = \pi$, $y = 0$

95. Use the sum of the first 9 terms to approximate the sum of the following series.

$$\sum_{n=1}^{\infty} \frac{6}{n^5+n^2}$$

Write your answer to six decimal places.

96. Determine whether the sequence convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{1}{n^2-6n+9}$$

97. A water storage tank has the shape of a cylinder with diameter 10 ft. It is mounted so that the circular cross-sections are vertical. If the depth of the water is 7 ft, what percentage of the total capacity is being used? Round the answer to the

Partice Problems

nearest tenth.

98. Sketch the parametric curve and eliminate the parameter to find the Cartesian equation of the curve.

$x = \cos\theta,\ y = 3\sec\theta,\ 0 \le \theta \le \dfrac{\pi}{2}$

99. Test the series for convergence or divergence.

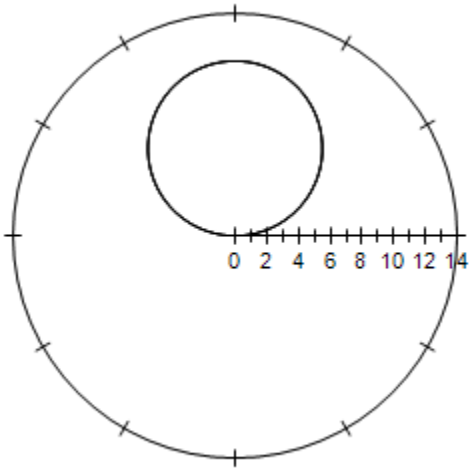
$\sum_{k=3}^{\infty} (-1)^k \cos k$

100. Evaluate the integral.

$\int_0^{\pi/12} 6\cos^5 6x\ dx$

101. Find the area that the curve encloses.

$r = 11\sin\theta$



102. True or False?

The exact length of the parametric curve $x = e^t \cos t,\ y = e^t \sin t,\ 0 \le t \le \dfrac{\pi}{4}$ is $\sqrt{2}e^{\pi/4}$

Partice Problems

103. A torus is generated by rotating the circle $x^2+(y-4)^2=36$ about the *x*-axis. Find the volume enclosed by the torus. Round the answer to the nearest hundredth.

104. Use the Table of Integrals to evaluate the integral.

$$\int \frac{x^2}{\sqrt{x^6-5}}dx$$

105. Find $\frac{d^2y}{dx^2}$.

$x=7+t^2, y=t-t^3$

106. Evaluate the integral.

$$\int \frac{1}{\sqrt{x+1}+(x+1)\sqrt{x+1}}dx$$

107. Make a substitution to express the integrand as a rational function and then evaluate the integral.

$$\int_4^{25} \frac{\sqrt{x}}{x-100}dx$$

Round the answer to four decimal places.

108. How many terms of the series $\sum_{m=1}^{\infty} \frac{10}{5m(\ln m)^2}$ would you need to add to find its sum to within 0.02?

109. Evaluate the integral.

$$\int \frac{9}{e^{3x}-e^x}dx$$

110. Determine whether the sequence defined as follows is convergent or divergent.

$a_1=1, a_{n+1}=7-a_n$ for $n \geq 1$

111. Find the Maclaurin series for *f*(*x*) using the definition of a Maclaurin serires.

$f(x)=(5+x)^{-3}$

Partice Problems

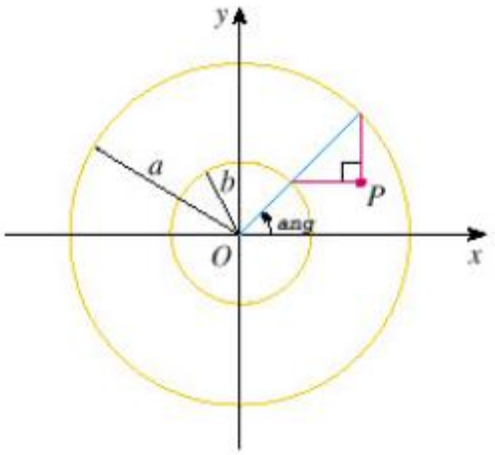
112. Find the sum of the series.

$$\sum_{n=0}^{\infty} \frac{3^n}{4^n n!}$$

113. Evaluate the integral.

$$4\int_0^{\pi/2} \sin^3\theta\cos^2\theta \, d\theta$$

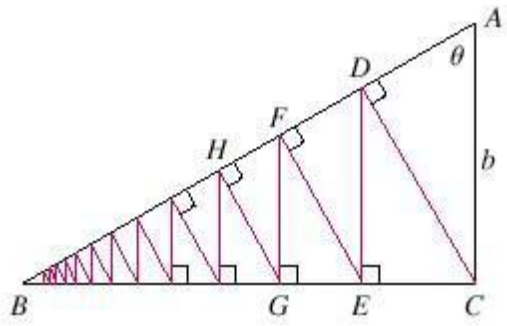
114. If a and b are fixed numbers, find parametric equations for the set of all points P determined as shown in the figure, using the angle *ang* as the parameter. Write the equations for $a = 15$ and $b = 6$.



115. A right triangle ABC is given with $\theta = 1.1$ and $|AC| = b = 8$. CD is drawn perpendicular to AB, DE is drawn perpendicular to BC, EF ⊥ AB and this process is continued indefinitely as shown in the figure. Find the total length of all the perpendiculars |CD| + |DE| + |EF| + |FG| + ...

Write your answer to two decimal places.

Partice Problems

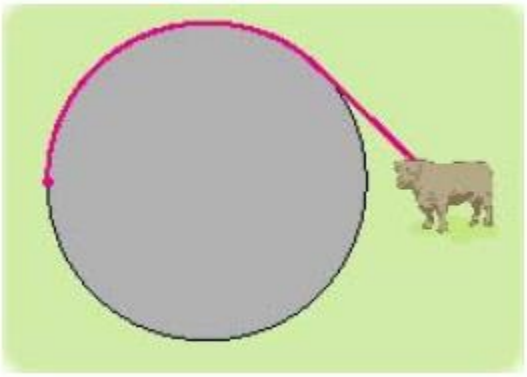


116. Evaluate the integral using the indicated trigonometric substitution.

$$\int \frac{dx}{x^2\sqrt{x^2-25}};\ x = 5\sec\theta$$

117. Set up an integral that represents the area of the surface obtained by rotating the given curve about the *x*-axis. Then use your calculator to find the surface area correct to four decimal places.
$x = 5\sin t, y = 5\sin 2t, \quad 0 \le t \le \pi/2$

118. A cow is tied to a silo with radius 5 by a rope just long enough to reach the opposite side of the silo. Find the area available for grazing by the cow. Round the answer to the nearest hundredth.



119. Find an equation of the tangent line to the curve at the point corresponding to the value of the parameter.

$x = e^{\sqrt{t}},\ y = t - \ln t^7;\ t = 1$

120. Use the Alternating Series Estimation Theorem or Taylor's Inequality to estimate the range of values of *x* for which the given approximation is accurate to within the stated error.

Partice Problems

$$\cos x \approx 1 - \frac{x^2}{2} + \frac{x^4}{24} \quad |error| < 0.08$$

Write a such that $-a < x < a$.

121. Use the Integral Test to determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{1}{8n+4}$$

122. Test the series for convergence or divergence.

$$\sum_{k=5}^{\infty} \frac{5}{k(\ln k)^4}$$

123. Write the partial sum of the converging series which represent the decimal number 0.2433.

124. Evaluate the integral.

$$\int_2^{\infty} \frac{8dy}{y^2+2y-3}$$

125. Evaluate the integral.

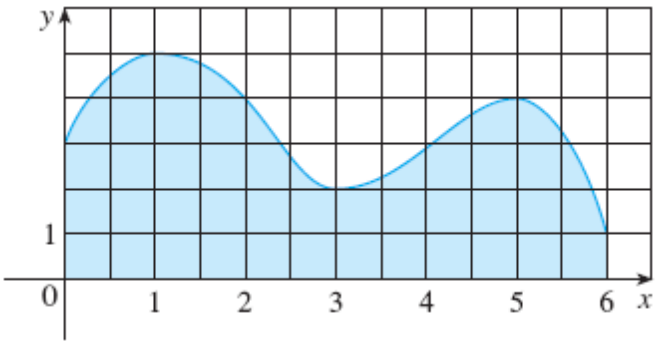
$$\int 5y^3 e^y dy$$

126. Evaluate the indefinite integral as an infinite series.

$$\int \frac{3\left(e^x - 1\right)}{x} dx$$

127. Estimate the area of the shaded region by using the Trapezoidal Rule with $n = 6$. Round the answer to the nearest tenth.

Partice Problems



128. Evaluate the integral.

$$\int \frac{\cos(\ln 14t)}{t}\,dt$$

129. Find an equation of the tangent to the curve at the point by first eliminating the parameter.

$x = e^t, y = (t-8)^2; \quad (1, 64)$

130. Evaluate the integral.

$$\int_{-1/\sqrt{3}}^{1/\sqrt{3}} \frac{e^{\arctan y}}{1+y^2}\,dy$$

131. Using the arc length formula, set up, but do not evaluate, an integral equal to the total arc length of the ellipse.

$x = 4\sin\theta, y = 2\cos\theta$

132. Evaluate the integral.

$$\int_0^4 \frac{x}{x+4}\,dx$$

133. Find the Maclaurin series for f and its radius of convergence.

$f(x) = 3\ln(1-x)$

134. Find an equation of the tangent to the curve at the point corresponding to the given value of the parameter.

$x = t\cos t, \quad y = t\sin t, \quad t = 3\pi$

Partice Problems

135. The terms of a series are defined recursively by the equations $a_1 = 6,\ a_{n+1} = \frac{7n+1}{6n+3} a_n.$

Determine whether $\sum a_n$ converges or diverges.

136. Find the partial sum S_7 of the series $\sum_{m=1}^{\infty} \frac{5}{10 + 8^m}$. Give your answer to five decimal places.

137. Find the area bounded by the curve $x = t - \frac{1}{t},\ y = t + \frac{1}{t}$ and the line $y = 2.5$.

138. Eliminate the parameter to find a Cartesian equation of the curve.
$x = e^{6t} - 4,\ y = e^{12t}$

139. Find the value of the limit for the sequence.

$$\left\{\arctan\left(\frac{2n}{2n+8}\right)\right\}$$

140. Find the Taylor series for $f(x)$ centered at the given value of a. Assume that f has a power series expansion. Also find the associated radius of convergence.

$f(x) = x^4 - 3x^2 + 1,\ a = 1$

141. Find the exact value of the limit of the sequence defined by $a_1 = \sqrt{3},\ a_{n+1} = \sqrt{3 + a_n}.$

142. Find the area bounded by the curves $y = 11\cos x$ and $y = 11\cos^2 x$ between $x = 0$ and $x = \frac{\pi}{2}$.

143. Express the number $0.\overline{89}$ as a ratio of integers.

144. Test the series for convergence or divergence.

$$\sum_{m=1}^{\infty} (-3)^m \frac{\ln m}{\sqrt{m}}$$

Partice Problems

145. Find the area of the region bounded by the hyperbola $9x^2 - 4y^2 = 36$ and the line $x = 6$.

146. Find the sum of the series.

$$\sum_{n=2}^{\infty} 3n(n-1)x^{n+1} \quad |x| < 1$$

147. Use the Table of Integrals to evaluate the integral to three decimal places.

$$\int_3^5 \frac{1}{x^2\sqrt{5x^2-1}}\,dx$$

148. The point in a lunar orbit nearest the surface of the moon is called perilune and the point farthest from the surface is called apolune. The Apollo 11 spacecraft was placed in an elliptical lunar orbit with perilune altitude 110 km and apolune altitude 318 km (above the moon). Find an equation of this ellipse if the radius of the moon is 1730 km and the center of the moon is at one focus.

149. Find parametric equations for the path of a particle that moves once clockwise along the circle $x^2+(y-9)^2=16$, starting at (4, 9).

150. True or False?

If the parametric curve $x = f(t)$, $y = g(t)$ satisfies $g'(3) = 0$, then it has a horizontal tangent when $t = 3$.

151. Evaluate the integral if it is convergent.

$$\int_0^{\infty} e^{-3x}dx$$

152. Evaluate the integral.

$$\int \frac{x^2}{(16-x^2)^{3/2}}\,dx$$

153. Test the series for convergence or divergence.

$$\sum_{n=2}^{\infty} (-1)^n \frac{n}{4\ln n}$$

154. Find the interval of convergence of the series.

Partice Problems

$$\sum_{n=a}^{\infty} \frac{5x^n}{\sqrt[4]{n}}$$

155. Determine whether the sequence converges or diverges. If it converges, find the limit.

$a_n = 2e^{4n/(n+2)}$

156. Find the area enclosed by the curve $r^2 = 7\cos 5\theta$.

157. Determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{1}{n^2+3}$$

158. Find a formula for the general term a_n of the sequence, assuming that the pattern of the first few terms continues.

$$\left\{-\frac{1}{2}, \frac{8}{3}, -\frac{27}{4}, \frac{64}{5}, -\frac{125}{6}, \ldots\right\}$$

159. Evaluate the integral.

$$\int \frac{1+8e^x}{1-e^x}\,dx$$

160. A sequenceis $\{a_n\}$defined recursively by the equation $a_n = 0.5(a_{n-1} + a_{n-2})$ for $n \geq 3$ where $a_1 = 20, a_2 = 20$. Use your calculator to guess the limit of the sequence.

161. Eliminate the parameter to find a Cartesian equation of the curve.

$x(t) = 6\cos^2 t, y(t) = 7\sin^2 t$

162. Find an equation of the tangent to the curve at the point corresponding to the given value of the parameter.
$x = 5t\cos t, \; y = 5t\sin t, \;\; t = -\pi$

163. Determine whether the integral converges or diverges. If it converges, find its value.

$$\int_1^{\infty} \frac{dx}{x^4 \ln x}$$

Partice Problems

164. Find the volume of the resulting solid if the region under the curve

$$y = \frac{1}{x^2 + 3x + 2}$$

from $x = 0$ to $x = 1$ is rotated about the x-axis. Round your answer to four decimal places.

165. Set up an integral that represents the length of the curve. Then use your calculator to find the length correct to four decimal places.

$x = t - 2\sin t, \quad y = 1 - 2\cos t, \; 0 \le t \le 2\pi$

166. Evaluate the integral to six decimal places.

$$\int_0^1 \frac{x^3}{\sqrt{64 - x^2}}\,dx$$

167. Use the Trapezoidal Rule to approximate $\int_2^3 e^{5/x}\,dx$ for $n = 4$. Round the result to four decimal places.

168. Set up, but do not evaluate, an integral that represents the length of the parametric curve.

$x = t - t^{10}, \; y = \frac{10}{9}t^{9/8}, \quad 8 \le t \le 18$

169. Determine whether the series is convergent or divergent. If it is convergent, write its sum. Otherwise write *divergent*.

$$\sum_{n=1}^{\infty} 4\left(\frac{3}{4}\right)^{n-1}$$

170. Evaluate the integral.

$$\int_0^1 \frac{4}{x^{0.6}}\,dx$$

Indicate the answer choice that best completes the statement or answers the question.

171. Find the average value of the function $f(x)$ in the interval $[-\pi, \pi]$.

Partice Problems

$f(x) = \sin^6 x \cos^3 x$

a. π
b. 0
c. $\frac{\pi}{5}$
d. $\frac{\pi}{12}$
e. $\frac{\pi}{6}$

172. Determine whether the given series converges or diverges. If it converges, find its sum.

$$\sum_{n=1}^{\infty} \left(1 + \frac{8}{n}\right)^n$$

a. 1
b. e^8
c. e^{-8}
d. Diverges

173. Determine whether the sequence convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{3}{n^2+3}$$

a. converges
b. diverges

174. Find the eccentricity of the conic.

$$r = \frac{3}{4 - 3\sin\theta}$$

a. $e = \frac{4}{3}$
b. $e = 4$
c. $e = \frac{3}{4}$
d. $e = -3$
e. $e = 3$

175. Evaluate the integral.

Partice Problems

$$\int \frac{1}{-e^{-7x}+e^{7x}}\,dx$$

a. $-\frac{1}{14}\ln\left(\frac{\left|e^{7x}-1\right|}{e^{7x}+1}\right)+C$

b. $\frac{1}{14}\ln\left(\frac{\left|e^{7x}-1\right|}{e^{7x}+1}\right)+C$

c. $\ln\left(\frac{\left|e^{7x}-1\right|}{e^{7x}+1}\right)+C$

d. $-\ln\left(\frac{\left|e^{7x}-1\right|}{e^{7x}}\right)+C$

e. $-\ln\left(\frac{\left|e^{7x}-1\right|}{e^{7x}+1}\right)+C$

176. Use the binomial series to expand the function as a power series. Find the radius of convergence.

$$\frac{x}{\sqrt{16+x^2}}$$

a. $|x|<100$

b. $|x|<8$

c. $|x|<12$

d. $|x|<4$

e. $|x|<1$

177. Find the integral using an appropriate trigonometric substitution.

$$\int \frac{x^3}{\sqrt{x^2+4}}\,dx$$

a. $\frac{1}{3}\left(x^2+4\right)^{3/2}\sqrt{x^2+4}+C$

b. $\frac{1}{3}\left(x^2-8\right)\sqrt{x^2+4}+C$

c. $\frac{1}{3}\left(x^2+8\right)\sqrt{x^2+4}+C$

d. $\frac{1}{3}\left(x^2-4\right)^{3/2}\sqrt{x^2+4}+C$

Partice Problems

178. Use a table of integrals to evaluate the integral.

$\int x^3 \sin(x^2+2)dx$

a. $\frac{1}{2}\sin(x^2+\sqrt{2})-\frac{1}{2}x^2\cos(x^2+\sqrt{2})+C$

b. $\frac{1}{2}\sin(x^2+2)-\frac{1}{2}x^2\cos(x^2+2)+C$

c. $-\frac{1}{2}\sin(x^2+\sqrt{2})-\frac{1}{2}x^2\cos(x^2+\sqrt{2})+C$

d. $-\frac{1}{2}\sin(x^2+2)-\frac{1}{2}x^2\cos(x^2+2)+C$

179. Evaluate the integral.

$\int_1^{\infty} \frac{dx}{x^4 \ln x}$

a. $\frac{1}{2}$

b. 4

c. $-\frac{1}{4}$

d. $\frac{1}{4}$

e. divergent

180. Determine whether the geometric series converges or diverges. If it converges, find its sum.

$\sum_{n=0}^{\infty} 3^n 4^{-n+1}$

a. 12

b. Diverges

c. 3

d. 16

181. Evaluate the integral.

$\int \frac{5\sin 2x}{1+\cos^4 x}dx$

Partice Problems

a. $5\arctan\left(\sec^2 x\right)+C$

b. $-5\cos^2 2x+C$

c. $-5\arcsin(\tan x)+C$

d. $1-5\cos^2 x+C$

e. None of these

182. Write a polar equation of the conic that has a focus at the origin, eccentricity $\frac{9}{2}$, and directrix $y = -3$. Identify the conic $y=-3$.

a. $r = \frac{27}{2-9\sin\theta}$, hyperbola

b. $r = \frac{27}{2-9\cos\theta}$, hyperbola

c. $r = \frac{27}{2-\sin\theta}$, ellipse

d. $r = \frac{27}{2-\cos\theta}$, ellipse

183. For which positive integers k is the series $\sum_{n=1}^{\infty} \frac{(n!)^6}{(kn)!}$ convergent?

a. $k \geq 6$

b. $k \leq 0$

c. $k \geq 0$

d. $k \geq 1$

e. $k \leq -6$

184. Find the partial sum S_7 of the series $\sum_{n=1}^{\infty} \frac{1}{3+4^n}$. Give your answer to five decimal places.

a. $S_7 = 0.21555$

b. $S_7 = 0.18975$

c. $S_7 = 1.60976$

d. $S_7 = 0.18985$

e. $S_7 = 0.19176$

185. Evaluate the integral.

Partice Problems

$\int 15x\ln(1+x)dx$

a. $15\left(\frac{1}{6}x^2-\frac{1}{9}x^3+\frac{x^3}{3}\ln(1+x)+\frac{1}{3}\ln(1+x)\right)+C$

b. $\frac{15}{4}\left(2(x^2-1)\ln(1+x)-x(x-2)\right)+C$

c. $15\left(\frac{1}{4}x^2-\frac{1}{2}\ln(1+x)+\frac{x^2}{2}(\ln(1+x))\right)+C$

d. $\frac{15}{4}\left(2(x^2-1)\ln(1+x)+x(x-2)\right)+C$

e. $15\left(-\frac{1}{3}x+\frac{1}{6}x^2-\frac{1}{9}x^4+\frac{1}{3}\ln(1+x)\right)+C$

186. Evaluate the integral.

$\int_0^1 4x\sin \pi x\ dx$

a. 1.274
b. 2.9200
c. 0.3185
d. 5.274
e. None of these

187. Determine whether the series is convergent or divergent by expressing S_n as a telescoping sum. If it is convergent, find its sum.

$\sum_{n=1}^{\infty} \frac{18}{n^2 + 2n}$.

a. $\frac{27}{2}$

b. 2

c. diverges

d. $\frac{1}{18}$

e. $\frac{2}{27}$

Partice Problems

188. The orbit of Hale-Bopp comet, discovered in 1995, is an ellipse with eccentricity and one focus at the Sun. The length of its major axis is 369.9 AU. [An astronomical unit (AU) is the mean distance between Earth and the Sun, about 93 million miles.] Find the maximum distance from the comet to the Sun. (The perihelion distance from a planet to the Sun is $a(1-e)$ and the aphelion distance is $a(1+e)$.) Find the answer in AU and round to the nearest hundredth.

a. 373.98 AU
b. 375.98 AU
c. 368.98 AU
d. 371.98 AU
e. 377.98 AU

189. Test the series for convergence or divergence.

$$\sum_{m=1}^{\infty} \frac{(-6)^{m+1}}{4^{8m}}$$

a. The series is convergent.
b. The series is divergent.

190. Determine whether the improper integral converges or diverges, and if it converges, find its value.

$$\int_{-8}^{27} \frac{1}{\sqrt[3]{x}}\,dx$$

a. –15
b. $\frac{15}{2}$
c. Diverges
d. $-\frac{15}{2}$

191. Find an equation of the hyperbola centered at the origin that satisfies the given condition.

Vertices: (± 9, 0), asymptotes: $y = \pm \frac{2}{9}x$

a. $\frac{x^2}{81} - \frac{y^2}{4} = 1$
b. $\frac{y^2}{4} - \frac{x^2}{81} = 1$

Partice Problems

c. $\frac{y^2}{81} - \frac{x^2}{4} = 1$

d. $\frac{x^2}{4} - \frac{y^2}{81} = 1$

192. Find the slope of the tangent line to the given polar curve at the point specified by the value of *a*.

$r = \frac{1}{b}, b = \pi$

a. $-\pi$

b. $\frac{3}{\pi}$

c. -2π

d. $\frac{1}{4}$

e. 3

193. Determine which one of the *p*-series below is convergent.

a. $\sum_{n=1}^{\infty} n^{-0.6}$

b. $\sum_{n=1}^{\infty} \frac{1}{n^4}$

c. $\sum_{n=1}^{\infty} \frac{1}{n^{2/3}}$

d. $\sum_{n=1}^{\infty} \frac{1}{n^{0.2}}$

194. Use the Table of Integrals to evaluate the integral.

$\int e^{8x} \sin 4x \, dx$

a. $\frac{1}{10} e^{8x} \sin 4x - \frac{3}{20} e^{8x} \cos 4x + C$

Partice Problems

b. $\frac{1}{10}e^{8x}\sin 4x + \frac{1}{20}e^{8x}\cos 4x + C$

c. $-\frac{1}{10}e^{8x}\sin 4x - \frac{1}{20}e^{8x}\cos 4x + C$

d. $\frac{1}{10}e^{8x}\sin 4x - \frac{1}{20}e^{8x}\cos 4x + C$

e. $-\frac{1}{10}e^{8x}\sin 4x + \frac{1}{20}e^{8x}\cos 4x + C$

195. The region under the curve $y = 6\sin^2 x,\ 0 \le x \le \pi$ is rotated about the *x*-axis. Find the volume of the resulting solid.

a. $\frac{18}{\pi^2}$

b. $\frac{27}{2}\pi^2$

c. $\frac{6}{\pi}$

d. $\frac{\pi^2}{18}$

e. $\frac{\pi}{18}$

196. Find the integral using an appropriate trigonometric substitution.

$$\int \frac{x}{\sqrt{4-x^2}}\,dx$$

a. $\sqrt{4-x^2} + C$

b. $\sqrt{2-x} + C$

c. $-\sqrt{4-x^2} + C$

d. $-\sqrt{2-x} + C$

197. When money is spent on goods and services, those that receive the money also spend some of it. The people receiving some of the twice-spent money will spend some of that, and so on. Economists call this chain reaction the multiplier effect. In a hypothetical isolated community, the local government begins the process by spending *D* dollars. Suppose that each recipient of spent money spends 100*c*% and saves 100*s*% of the money that he or she receives. The values *c* and *s* are called the marginal propensity to consume and the marginal propensity to save and, of course, $c + s = 1$.

Partice Problems

The number $k = 1/s$ is called the multiplier. What is the multiplier if the marginal propensity to consume is 60%?

a. 4
b. 3
c. 6
d. 7
e. 2.5

198. Find the integral.

$$\int \tan^4 x \sec^4 x \, dx$$

a. $\frac{1}{7}\tan^7 x + \frac{1}{5}\tan^5 x + C$
b. $\frac{1}{5}\tan^5 x + \frac{1}{3}\tan^3 x + C$
c. $\frac{1}{5}\tan^5 x - \frac{1}{3}\tan^3 x + C$
d. $\frac{1}{7}\tan^7 x - \frac{1}{5}\tan^5 x + C$

199. Write a polar equation in r and θ of a hyperbola with the focus at the origin, with the eccentricity 3 and directrix $r = -9\csc\theta$.

a. $r = \frac{27}{1 - 27\sin\theta}$
b. $r = \frac{27}{1 - 3\sin\theta}$
c. $r = \frac{27}{1 + 3\sin\theta}$
d. $r = \frac{27}{1 - \sin\theta}$
e. $r = \frac{9}{1 + 9\sin\theta}$

200. Find an equation of the parabola with focus $\left(\frac{13}{2}, 0\right)$ and directrix $x = -\frac{11}{2}$.

a. $y = \frac{x^2}{2} + 12$

Partice Problems

b. $y = 24x^2 - 12$

c. $y^2 = 12x - 24$

d. $y = \frac{x^2}{12} + 2$

e. $y^2 = 24x - 12$

201. Find an approximation of the sum of the series accurate to two decimal places.

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{n^4}$$

a. –1.10
b. –0.89
c. –0.95
d. –1.02

202. Find an equation of the tangent to the curve at the point corresponding to the given value of the parameter.

$x = \cos\theta + \sin 2\theta + 6,\ y = \sin\theta + \cos 2\theta + 6,\ \theta = \pi$

a. $y = \frac{x}{2} + 2$

b. $y = \frac{2}{x}$

c. $y = \frac{x}{2} + \frac{3}{2}$

d. $y = \frac{19}{2} - \frac{x}{2}$

e. None of these

203. Use Simpson's Rule to approximate the integral with answers rounded to four decimal places.

$$\int_{-1}^{1} \sqrt{x^2 + 5}\, dx;\ n = 6$$

a. 4.0879
b. 5.7208
c. 5.1613
d. 4.6170

Partice Problems

204. Evaluate the integral or show that it is divergent.

$$\int_{-\infty}^{\infty} \frac{4dx}{4x^2+4x+5}$$

a. $-\frac{\pi}{8}$

b. $\frac{\pi}{4}$

c. $\frac{\pi}{8}$

d. π

e. divergent

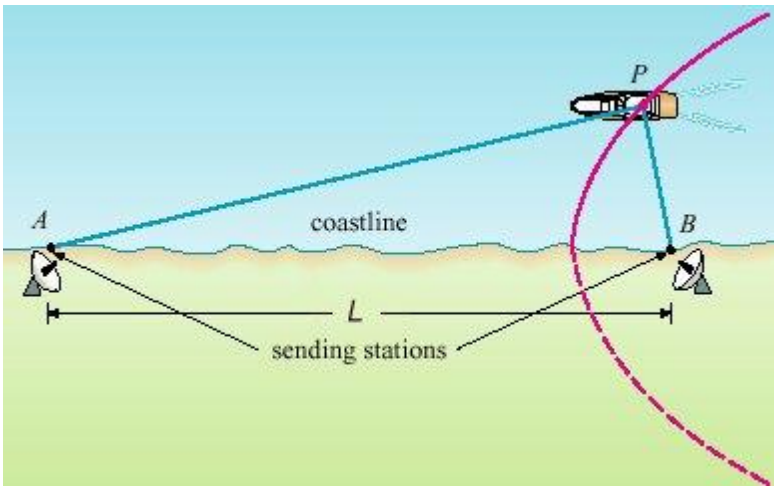
205. A sequenceis $\{a_n\}$ defined recursively by the equation $a_n = 0.5(a_{n-1} + a_{n-2})$ for $n \geq 3$ where a_1 = 18, a_2 = 18.

Use your calculator to guess the limit of the sequence.

a. 6
b. 18
c. 26
d. 17
e. 19

206. In the LORAN (LOng RAnge Navigation) radio navigation system, two radio stations located at *A* and *B* transmit simultaneous signals to a ship or an aircraft located at *P*. The onboard computer converts the time difference in receiving these signals into a distance difference $|A|-|B|$, and this, according to the definition of a hyperbola, locates the ship or aircraft on one branch of a hyperbola (see the figure). Suppose that station *B* is located *L* = 400 mi due east of station *A* on a coastline. A ship received the signal from *B* 1360 microseconds (μs) before it received the signal from *A*. Assuming that radio signals travel at a speed of 940 *ft* /μs and if the ship is due north of *B*, how far off the coastline is the ship? Round your answer to the nearest mile.

Partice Problems



a. 210 miles
b. 213 miles
c. 212 miles
d. 209 miles
e. 211 miles

207. Determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{1}{n^2 - 6n + 12}$$

a. converges
b. diverges

208. Find the integral.

$$\int \tan^3 x \sec^5 x \, dx$$

a. $\frac{1}{5}\sec^5 x - \frac{1}{3}\sec^3 x + C$

b. $\frac{1}{5}\sec^5 x + \frac{1}{3}\sec^3 x + C$

c. $\frac{1}{7}\sec^7 x - \frac{1}{5}\sec^5 x + C$

d. $\frac{1}{7}\sec^7 x + \frac{1}{5}\sec^5 x + C$

209. Find the interval of convergence of the series.

$$\sum_{n=1}^{\infty} \frac{(-1)^n x^n}{n+5}$$

Partice Problems

a. [-1, 1]
b. (-1, 1)
c. (-1, 1]
d. diverges everywhere
e. [-1, 1)

210. Find the integral.

$$\int \frac{dx}{x(x-7)}$$

a. $\frac{1}{7}\ln\left|\frac{x-7}{x}\right|+C$

b. $\frac{1}{7}\ln\left|\frac{x^2-7}{x}\right|+C$

c. $7\ln\left|\frac{x^2-7}{x}\right|+C$

d. $7\ln\left|\frac{x-7}{x}\right|+C$

211. Find the area bounded by the curves $y=\cos x$ and $y=\cos^5 x$ between $x=0$ and $x=\frac{\pi}{2}$.

a. $\frac{1}{4}$

b. 4

c. $\frac{\sqrt{2}}{2}$

d. $\frac{1}{2}$

e. none of these

212. Write the form of the partial fraction decomposition of the rational expression. Do not find the numerical values of the constants.

$$\frac{x^2-x-8}{2x^3-2x^2+4x-4}$$

Partice Problems

a. $\frac{A}{2x-1}+\frac{Bx+C}{x^2+2}$

b. $\frac{A}{2x+1}+\frac{Bx+C}{x^2-2}$

c. $\frac{A}{2x-2}+\frac{Bx+C}{x^2+2}$

d. $\frac{A}{2x+2}+\frac{Bx+C}{x^2-2}$

213. Evaluate the function $f(x)=\cos x$ by a Taylor polynomial of degree 4 centered at a = 0, and $x=\frac{\pi}{4}$.

a. 0.7074
b. 4.2074
c. 3.2074
d. 2.2074
e. 1.2074

214. Write a polar equation in r and θ of an ellipse with the focus at the origin, with the eccentricity $\frac{8}{7}$ and directrix $x=-13$.

a. $r=\frac{13}{7+8\cos\theta}$

b. $r=\frac{104}{7+8\cos\theta}$

c. $r=\frac{104}{7-8\cos\theta}$

d. $r=\frac{8}{3-8\sin\theta}$

e. $r=\frac{104}{1-8\cos\theta}$

215. Find the point(s) of intersection of the curves $r=1$ and $r=2\cos\theta$.

a. $\left(1,\frac{\pi}{6}\right),\left(1,-\frac{\pi}{6}\right)$

b. $\left(1,\frac{\pi}{4}\right),\left(1,-\frac{\pi}{4}\right)$

Partice Problems

c. $\left(1, \frac{\pi}{3}\right), \left(1, -\frac{\pi}{3}\right)$

d. $\left(1, \frac{\pi}{6}\right)$

e. $\left(1, \frac{\pi}{3}\right)$

216. Find an equation of the ellipse that satisfies the given conditions.
Foci: (0, ± 1), vertices (0, ± 2)

a. $\frac{x^2}{4} + \frac{y^2}{3} = 1$

b. $\frac{x^2}{4} - \frac{y^2}{3} = 1$

c. $\frac{x^2}{3} + \frac{y^2}{4} = 1$

d. $\frac{x^2}{3} - \frac{y^2}{4} = 1$

217. Find the radius of convergence of the series.

$$\sum_{n=1}^{\infty} \frac{n^3 x^n}{3^n}$$

a. $R = 0$
b. $R = \infty$
c. $R = 1$
d. $R = \frac{1}{3}$
e. $R = 3$

218. Find the value of the limit of the sequence defined by

$a_1 = 1, a_{n+1} = 5 - \frac{1}{a_n}$.

a. $\frac{5 + \sqrt{5}}{2}$

Partice Problems

b. $\frac{5-\sqrt{10}}{2}$

c. $\frac{5+\sqrt{10}}{2}$

d. $\frac{5-\sqrt{5}}{2}$

e. $5+\sqrt{10}$

219. Find the integral.

$$\int \frac{3x^2-5x+4}{x^3-2x^2+x}dx$$

a. $\ln\left|\frac{x^4}{x-1}\right|-\frac{2}{x-1}+C$

b. $\ln\left|\frac{x^4}{x-1}\right|-\frac{1}{x-1}+C$

c. $\ln\left|\frac{x-1}{x^4}\right|-\frac{1}{x-1}+C$

d. $\ln\left|\frac{x-1}{x^4}\right|-\frac{2}{x-1}+C$

220. Find the integral using an appropriate trigonometric substitution.

$$\int \frac{1}{x^2\sqrt{x^2+25}}dx$$

a. $\frac{\sqrt{x^2+25}}{25x}+C$

b. $\frac{\sqrt{x^2+25}}{5x}+C$

c. $-\frac{\sqrt{x^2+25}}{25x}+C$

Partice Problems

d. $-\frac{\sqrt{x^2+25}}{5x}+C$

221. Find the integral.

$$\int \frac{3x-11}{x^2-5x-6}dx$$

a. $\ln\left|(x-1)(x+6)^2\right|+C$

b. $\ln\left|(x-6)(x+1)^2\right|+C$

c. $\ln\left|(x+6)(x-1)^2\right|+C$

d. $\ln\left|(x+1)(x-6)^2\right|+C$

222. Evaluate the integral.

$$\int \frac{9dx}{(x^2+2x+2)^2}$$

a. $\frac{1}{2}\left(\tan(x+1)+\frac{19}{x^2+2x+2}\right)+C$

b. $\frac{1}{2}\left(\tan^{-1}(x+2)+\frac{9}{x^2+2}\right)+C$

c. $\frac{1}{2}\left(\tan^{-1}(x+9)+\frac{1}{x^2+2x+2}\right)+C$

d. $\frac{9}{2}\left(\tan(x+2)+\frac{x+1}{x^2+2x+2}\right)+C$

e. $\frac{9}{2}\left(\tan^{-1}(x+1)+\frac{x+1}{x^2+2x+2}\right)+C$

223. Determine whether the sequence defined by $a_n=\frac{5^n}{9^n+1}$ converges or diverges. If it converges, find its limit.

a. 1

b. $\frac{5}{9}$

c. 0

Partice Problems

d. Diverges

224. If $600 is invested at 4% interest, compounded annually, then after n years the investment is worth $a_n = 600(1.04)^n$ dollars. Find the size of investment after 4 years.

a. $2,496
b. $512.88
c. $624
d. $701.92
e. $576.92

225. Evaluate the integral using an appropriate trigonometric substitution.

$$\int_0^2 \frac{x^2}{\sqrt{4-x^2}}\,dx$$

a. $\frac{\pi}{2}$
b. $\frac{\pi}{2} - 1$
c. $\frac{\pi}{3} - \frac{\sqrt{3}}{2}$
d. π

226. Find the radius of convergence and the interval of convergence of the power series.

$$\sum_{n=2}^{\infty} \frac{x^n}{n(\ln n)^8}$$

a. $R = 0, I = \{0\}$
b. $R = 1, I = [-1, 1]$
c. $R = 1, I = (-1, 1)$
d. $R = \infty, I = (-\infty, \infty)$

227. Determine which one of the p-series below is divergent.

a. $\sum_{n=1}^{\infty} \frac{1}{n^{0.8}}$

b. $\sum_{n=1}^{\infty} n^{-5\pi}$

Partice Problems

c. $\sum_{n=1}^{\infty} \frac{1}{n^{2e}}$

d. $\sum_{n=1}^{\infty} \frac{1}{n^{5}}$

228. Find the integral.

$\int \sin^3 x \cos^6 x \, dx$

a. $-\frac{1}{9}\cos^9 x + \frac{1}{7}\cos^7 x + C$

b. $\frac{1}{9}\cos^9 x - \frac{1}{7}\cos^7 x + C$

c. $\frac{1}{7}\cos^7 x - \frac{1}{5}\cos^5 x + C$

d. $-\frac{1}{7}\cos^7 x + \frac{1}{5}\cos^5 x + C$

229. Use long division to evaluate the integral.

$\int \frac{x^2}{x+7} dx$

a. $\frac{1}{2}(x-21)(x+7)+49\ln|x+7|+C$

b. $\frac{1}{2}(x+21)(x+7)-49\ln|x+7|+C$

c. $\frac{x^2}{2}-14x-147+\ln|x+7|+C$

d. $\frac{x^2}{2}-14x+147+49\ln|x+7|+C$

e. $\frac{x^2}{2}+2x+\ln|x+49|+C$

230. Evaluate the indefinite integral as a power series.

$\int \tan^{-1}(t^2) dt$

Partice Problems

a. $C+\sum_{n=0}^{\infty}\frac{(-1)^n t^{2n+3}}{(2n+3)}$

b. $C+\sum_{n=0}^{\infty}\frac{(-1)^n t^{4n+3}}{(2n+1)(4n+3)}$

c. $C+\sum_{n=0}^{\infty}\frac{(-1)^n t^{2n+2}}{(2n+1)}$

d. $C+\sum_{n=0}^{\infty}\frac{(-1)^n t^{4n+2}}{(2n+1)(4n+3)}$

e. $C+\sum_{n=0}^{\infty}\frac{(-1)^n t^{4n+3}}{(4n+3)}$

231. Use the power series for $f(x)=\sqrt[3]{4+x}$ to estimate $\sqrt[3]{4.06}$ correct to four decimal places.

a. 1.5953
b. 1.7189
c. 1.7195
d. 1.7156
e. 1.7200

232. Find a power series representation for

$f(t) = \ln(16 - t)$

a. $\ln 16-\sum_{n=1}^{\infty}\frac{t^n}{16^n}$

b. $\ln 16-\sum_{n=1}^{\infty}\frac{t^n}{n16^n}$

c. $\sum_{n=0}^{\infty}\frac{t^n}{n16^n}$

d. $\sum_{n=1}^{\infty}\frac{16t^n}{n^n}$

e. $\ln 16+\sum_{n=1}^{\infty}\frac{t^{2n}}{16^n}$

233. Use multiplication or division of power series to find the first three nonzero terms in the Maclaurin series for the function.

$f(x) = 5e^{-x^2}\cos 4x$

Partice Problems

a. $5\left(1-17x^2+\frac{115}{6}x^4\right)$

b. $5\left(1-9x^2+\frac{115}{6}x^4\right)$

c. $5\left(1-9x+\frac{115}{6}x^4\right)$

d. $5\left(1-9x^2+\frac{97}{6}x^4\right)$

e. $5\left(1-17x^2+\frac{67}{6}x^4\right)$

234. Determine whether the series is convergent or divergent by expressing S_n as a telescoping sum. If it is convergent, find its sum.

$$\sum_{n=2}^{\infty} \frac{3}{n(n^2-1)}.$$

a. 1

b. $\frac{3}{4}$

c. 2

d. diverges

e. $\frac{1}{4}$

235. Use series to evaluate the limit correct to three decimal places.

$$\lim_{x \to 0} \frac{7x-\tan^{-1}7x}{x^3}$$

Select the correct answer.

a. 118.933

b. 114.133

c. 34.3233

d. 114.333

e. 115.933

236. Given the series $\sum_{m=1}^{\infty} \frac{3m}{4^m(3m+5)}$ estimate the error in using the partial sum s_8 by comparison with the

Partice Problems

series $\sum_{m=9}^{\infty} \frac{1}{4^m}$.

a. $R_8 \le 2.6130051$

b. $R_8 \ge 0.0000052$

c. $R_8 \le 0.0000051$

d. $R_8 \ge 0.0000051$

e. $R_8 \le 0.000005$

237. Determine whether the improper integral converges or diverges, and if it converges, find its value.

$\int_6^{\infty} \frac{1}{x^3} dx$

a. Diverges

b. $\frac{1}{36}$

c. $\frac{1}{72}$

d. 0

238. Find the integral.

$\int x\tan^2 5x \, dx$

a. $\frac{1}{5}x^2\tan 5x + \frac{1}{25}\ln|\cos 5x| - \frac{1}{2}x^2 + C$

b. $\frac{1}{2}x^2\tan 5x + \frac{1}{5}\ln|\cos 5x| - \frac{1}{2}x^2 + C$

c. $\frac{1}{2}x\tan 5x + \frac{1}{5}\ln|\cos 5x| - \frac{1}{2}x^2 + C$

d. $\frac{1}{5}x\tan 5x + \frac{1}{25}\ln|\cos 5x| - \frac{1}{2}x^2 + C$

239. Find parametric equations to represent the line segment from $(-2,3)$ to $(12,-8)$.

a. $x = -2 - 14t, y = 3 - 11t, 0 \le t \le 1$

Partice Problems

b. $x = -2 - 14t, y = 3 - 11t, 0 \le t \le 2$

c. $x = 8 - 14t, y = 3 - 11t, 0 \le t \le 2$

d. $x = -2 + 14t, y = 3 - 11t, 0 \le t \le 1$

e. $x = 2 + 14t, y = 3 - 11t, 0 \le t \le 1$

240. A rubber ball is dropped from a height of 8 m onto a flat surface. Each time the ball hits the surface, it rebounds to 50% of its previous height. Find the total distance the ball travels.

a. 16

b. 24

c. 8

d. 32

241. Find the area of the region that lies inside the first curve and outside the second curve.

$r = 3\cos\theta, r = 1 + \cos\theta$

a. $A = 2\pi$

b. $A = \pi$

c. $A = \frac{3\pi}{2}$

d. $A = \frac{\pi}{4}$

e. $A = \frac{\pi}{2}$

242. Find the exact area of the surface obtained by rotating the given curve about the *x*-axis.

$x = \cos^3\theta, \ y = \sin^3\theta, \ 0 \le \theta \le \pi/2$

a. $\frac{6\pi}{5}$

b. $\frac{18\pi}{5}$

c. $\frac{12\pi}{5}$

d. $\frac{\pi}{4}$

e. None of these

243. Evaluate the integral using integration by parts with the indicated choices of *u* and *dv*.

$\int 3\theta\cos\theta d\theta, u = 3\theta, dv = \cos\theta d\theta$

a. $3\sin\theta + 3\cos\theta + C$

Partice Problems

b. $3\theta\cos\theta + 3\sin\theta + C$

c. $3\theta\sin\theta + 3\cos\theta + C$

d. $3\sin\theta - 3\cos\theta + C$

e. None of these

244. Find all values of *p* for which the series $\sum_{n=1}^{\infty} \frac{\ln(n^6)}{n^p}$ converges.

a. $p < 6$

b. $p < 1$

c. $p > 6$

d. $p > 1$

245. Find the length of the curve.
$x = 3t^2 + 5,\ y = 2t^3 + 5,\ 0 \le t \le 1$

a. $2\sqrt{2} - 2$

b. $4\sqrt{2}$

c. $4\sqrt{2} - 1$

d. $4\sqrt{2} - 2$

e. None of these

246. Determine whether the improper integral converges or diverges, and if it converges, find its value.
$\int_{6\pi}^{\infty} \cos x\ dx$

a. 12

b. 0

c. 6

d. Diverges

247. Find an equation for the conic that satisfies the given conditions.

parabola, vertex (0, 0), focus (0, –6)

a. $x^2 = 6y$

b. $y^2 = -25x$

c. $x^2 + y^2 = 24y$

d. $x^2 = -24y$

Partice Problems

e. $x^2 = -y$

248. Find the values of *p* for which the series is convergent.

$$\sum_{n=2}^{\infty} \frac{(-1)^n}{(\ln(n^2))^p}$$

a. $p > 1$
b. $p > 0$
c. $p < 0$
d. $p < 1$

249. Determine whether the sequence defined by $a_n = \frac{\sin 7n}{8n}$ converges or diverges. If it converges, find its limit.

a. Diverges

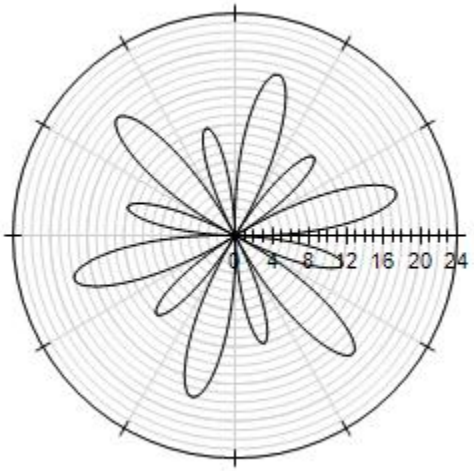
b. 1

c. $\frac{7}{8}$

d. 0

250. The graph of the following curve is given. Find the area that it encloses.

$r = 3 + 15\sin 6\theta$



Partice Problems

a. $A = \frac{27\sqrt{5}}{2}$

b. $A = \frac{243}{2}\pi$

c. $A = 18\pi$

d. $A = \pi + \frac{27\sqrt{5}}{2}$

e. $A = 18\pi + \frac{243}{2}$

251. Find an equation for the conic that satisfies the given conditions.

hyperbola, foci $(0, \pm 7)$, vertices $(0, \pm 5)$

a. $7x^2 = y$

b. $\frac{(x-7)^2}{49} - \frac{y^2}{24} = 1$

c. $\frac{7}{24}x^2 = y$

d. $\frac{x^2}{49} + \frac{y^2}{24} = 1$

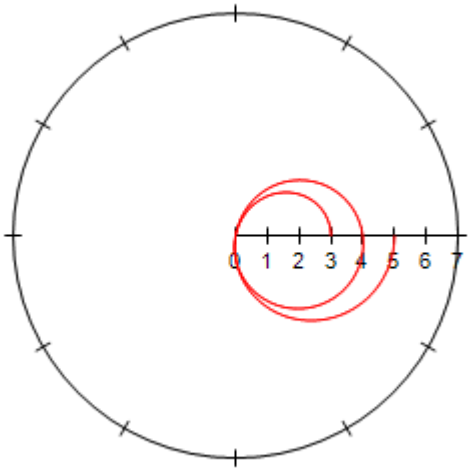
e. $\frac{y^2}{25} - \frac{x^2}{24} = 1$

252. Sketch the polar curve with the given equation.

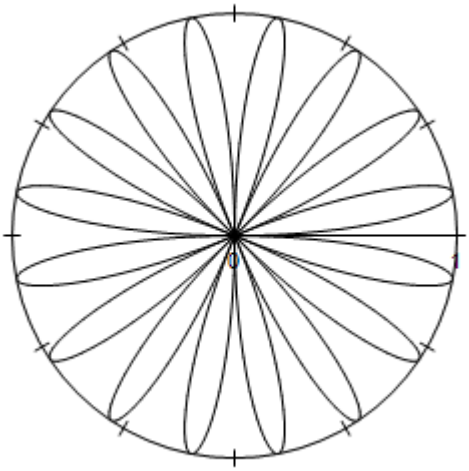
$r = \sin 8\theta, \quad -\pi \le x \le \pi$

Partice Problems

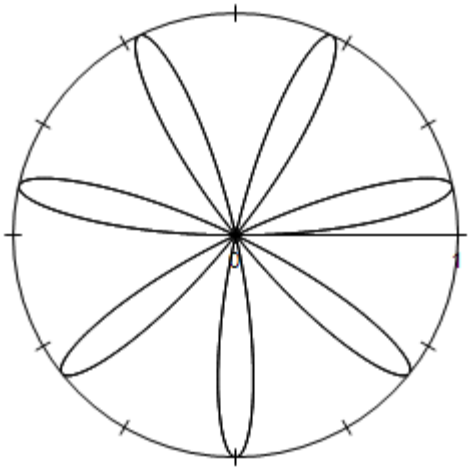
a.



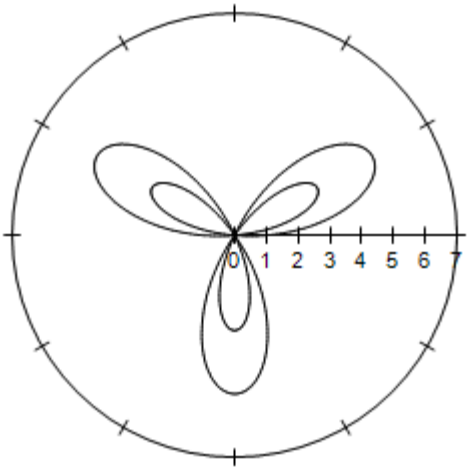
b.



c.



d.



253. Find the value of the limit for the sequence given.

$$\left\{\frac{1\cdot 9\cdot 17\cdots(9n+1)}{(9n)^2}\right\}$$

a. 0
b. –1
c. π
d. 3
e. 1

254. Determine whether the sequence defined by $a_n = \dfrac{n^2-7}{9n^2+1}$ converges or diverges. If it converges, find its

Partice Problems

limit.

a. $\frac{1}{9}$

b. –7

c. $-\frac{7}{9}$

d. Diverges

255. Find the Maclaurin series for $f(x)$ using the definition of the Maclaurin series.

$f(x) = x\cos(5x)$

a. $\sum_{n=0}^{\infty} \frac{(-1)^n 5^n x^{2n+1}}{(2n)!}$

b. $\sum_{n=0}^{\infty} \frac{(-1)^n 5^{2n} x^{2n+1}}{n!}$

c. $\sum_{n=0}^{\infty} \frac{(-1)^n 5^{2n} x^{2n}}{(2n)!}$

d. $\sum_{n=0}^{\infty} \frac{(-1)^n 5^{2n} x^{2n+1}}{(2n)!}$

e. $\sum_{n=0}^{\infty} \frac{(-1)^{n+1} 5^{2n} x^{2n+1}}{(2n)!}$

256. Find the polar equation for the curve represented by the given Cartesian equation.

$x + y = 4$

a. $r = 4(\cos\theta + \sin\theta)$

b. $r = \frac{2}{\cos\theta - \sin\theta}$

c. $r = \frac{4}{\cos\theta + \sin\theta}$

d. $r = \frac{4}{\cos\theta - \sin\theta}$

e. $r = 2(\cos\theta + \sin\theta)$

Partice Problems

257. Find the sum of the series.

$$\frac{2}{1\cdot 3}-\frac{2^2}{2\cdot 3^2}+\frac{2^3}{3\cdot 3^3}-\frac{2^4}{4\cdot 3^4}+\ldots$$

a. $\ln\left(\frac{4}{3}\right)$

b. $\frac{5e}{3}$

c. $\ln\left(\frac{5}{3}\right)$

d. $\ln\left(\frac{1}{3}\right)$

e. $e^{5/3}$

258. Find the radius of convergence and the interval of convergence of the power series.

$$\sum_{n=1}^{\infty}\frac{2\cdot 4\cdot 6\cdot \ldots \cdot 2n}{3\cdot 5\cdot 7\cdot \ldots \cdot (2n+1)}x^{2n+1}$$

a. $R=\infty, I=(-\infty,\infty)$

b. $R=1, I=(-1, 1)$

c. $R=0, I=\{0\}$

d. $R=1, I=[-1, 1]$

259. Use Simpson's Rule to approximate the integral with answers rounded to four decimal places.

$$\int_0^{\pi/2}\sqrt{4+\sin^2 x}\,dx;\ n=6$$

a. 4.0689

b. 3.3296

c. 2.9599

d. 3.6993

260. Let *a* and *b* be real numbers. What integral must appear in place of the question mark "?" to make the following statement true?

$$\int_{-\infty}^{a}\frac{8}{x^2+7}dx+\int_{a}^{\infty}\frac{8}{x^2+7}dx=?+\int_{b}^{\infty}\frac{8}{x^2+7}dx$$

Partice Problems

a. $\int_{-\infty}^{a} \frac{7}{x^2+8}dx$

b. $\int_{b}^{-\infty} \frac{8}{x^2-7}dx$

c. $\int_{-\infty}^{b} \frac{8}{x^2+7}dx$

d. $\int_{b}^{-\infty} \frac{8}{x^2+7}dx$

e. none of these

261. Use the Trapezoidal Rule to approximate the integral with answers rounded to four decimal places.

$\int_0^1 \frac{dx}{2x\ +\ 4};\ n = 7$

a. 0.2029
b. 0.1088
c. 0.1163
d. 0.2326

262. Determine whether the sequence converges or diverges. If it converges, find the limit.

$a_n = e^{n/(n+4)}$

a. e

b. ln 3

c. diverges

d. e^3

e. $\ln\left(\frac{1}{3}\right)$

263. Use a table of integrals to evaluate the integral.

$\int \frac{\sqrt{3x+5}}{x^2}dx$

Partice Problems

a. $-\frac{\sqrt{3x+5}}{x}+\frac{3\sqrt{5}}{10}\ln\left|\frac{\sqrt{3x+5}-\sqrt{5}}{\sqrt{3x+5}+\sqrt{5}}\right|+C$

b. $-\frac{\sqrt{3x+5}}{x}+\frac{3\sqrt{5}}{5}\ln\left|\frac{\sqrt{3x+5}-\sqrt{5}}{\sqrt{3x+5}+\sqrt{5}}\right|+C$

c. $-\frac{3\sqrt{5}}{5}\ln\left|\frac{\sqrt{3x+5}-\sqrt{5}}{\sqrt{3x+5}+\sqrt{5}}\right|+C$

d. $-\frac{3\sqrt{5}}{10}\ln\left|\frac{\sqrt{3x+5}-\sqrt{5}}{\sqrt{3x+5}+\sqrt{5}}\right|+C$

264. A particle moves on a straight line with velocity function $v(t)=\sin\omega t\cos^5\omega t$. Find its position function $s=f(t)$ if $f(0)=0$.

a. $\frac{\cos^7\omega t+1}{7\omega}$

b. $\frac{\sin^9\omega t+1}{9\omega}$

c. $\frac{\sin^5\omega t-1}{5\omega}$

d. $\frac{1-\cos^6\omega t}{6\omega}$

e. $\frac{1-\cos^8\omega t}{8\omega}$

265. Determine whether the series is absolutely convergent, conditionally convergent, or divergent.

$$\sum_{n=1}^{\infty}\left(\frac{4n^2+3}{3n^2+4}\right)^n$$

a. conditionally convergent
b. absolutely convergent
c. divergent

266. Use the Trapezoidal Rule to approximate the integral with answers rounded to four decimal places.

$$\int_0^2 \frac{dx}{\sqrt{x^3+4}};\quad n=6$$

a. 0.8528

Partice Problems

b. 0.9842
c. 0.4921
d. 0.4695

267. Use series to approximate the definite integral to within the indicated accuracy.

$\int_0^{0.5} x^2 e^{-x^2} dx \qquad |error| < 0.001$

a. 0.0354
b. 0.0125
c. 0.0625
d. 0.1447
e. 0.2774

268. Find the integral.

$\int \frac{3x-11}{x^2-5x-6} dx$

a. $\ln|(x+6)(x-1)^2|+C$

b. $\ln|(x-1)(x+6)^2|+C$

c. $\ln|(x-6)(x+1)^2|+C$

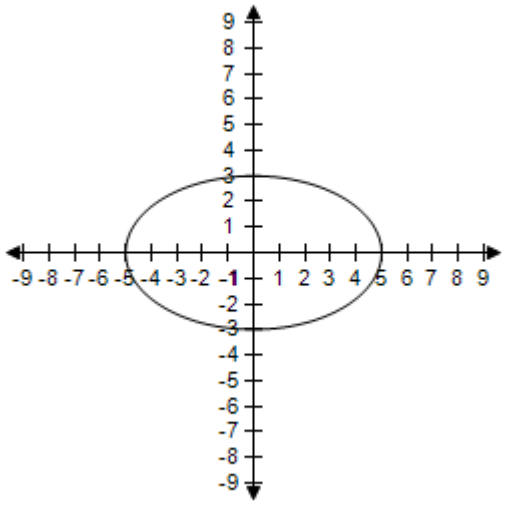
d. $\ln|(x+1)(x-6)^2|+C$

269. Match the equation with the correct graph.

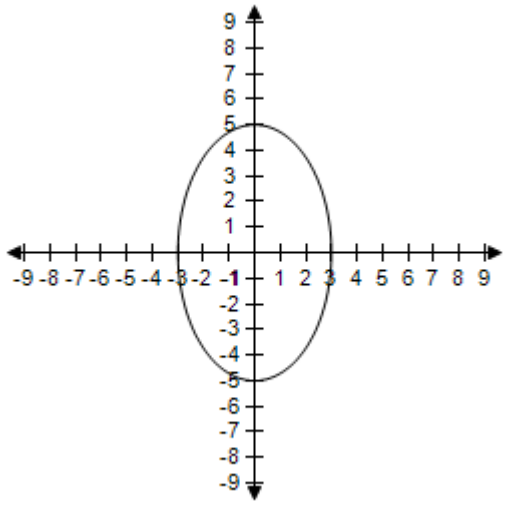
$\frac{x^2}{25} - \frac{y^2}{9} = 1$

Partice Problems

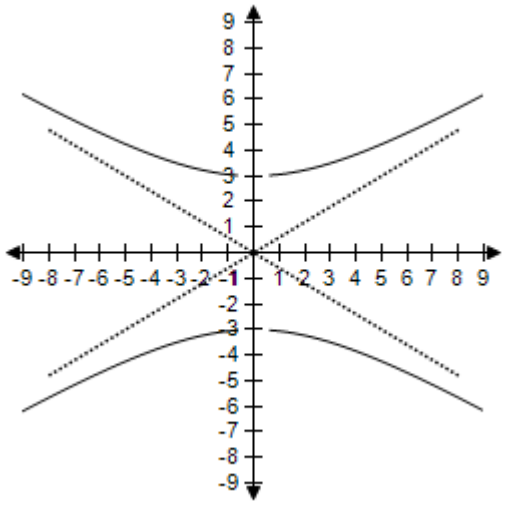
a.



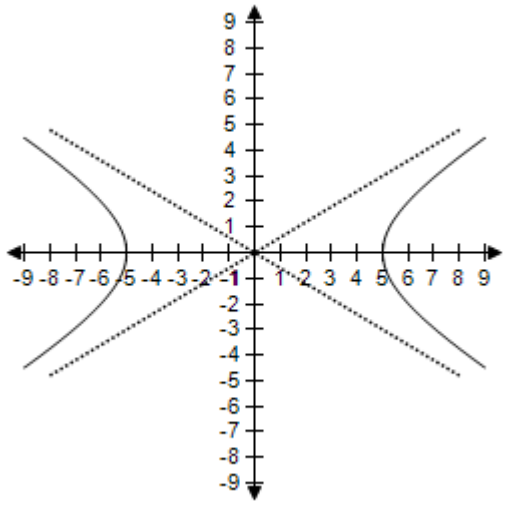
b.



c.

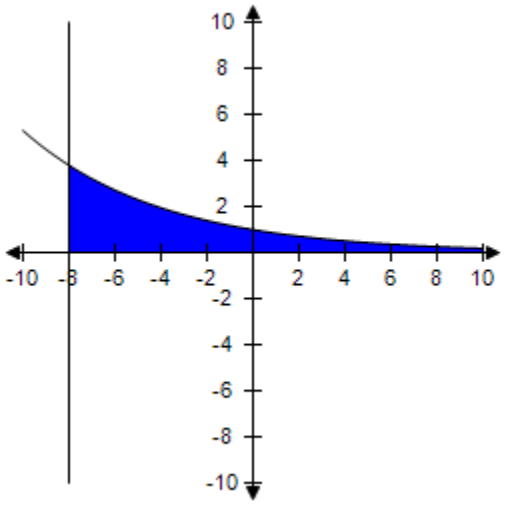


d.



270. The region $\{(x+y)|x \geq -8,\ 0 \leq y \leq e^{-x/6}|\}$ is represented below.
Find the area of this region to two decimal places.

Partice Problems



a. 22.76
b. 17.89
c. 16.08
d. 15.89
e. 15.87

271. Find the integral.

$\int x^6 \ln x \, dx$

a. $\frac{1}{7}x^7(7\ln x - 1) + C$

b. $\frac{1}{49}x^7(\ln x - 1) + C$

c. $\frac{1}{7}x^6 + \frac{1}{x} + C$

d. $\frac{1}{49}x^7(7\ln x - 1) + C$

272. Evaluate the indefinite integral.

$\int x \cos 10x \, dx$

a. $\frac{1}{100}\sin 10x + \frac{x}{10}\cos 10x + C$

Partice Problems

b. $\frac{1}{100}\cos 10x + \frac{x}{10}\sin 10x + C$

c. $\frac{1}{10}\cos 10x + \frac{x}{10}\sin 10x + C$

d. $\frac{x}{100}\cos 10x + \frac{x}{10}\sin 10x + C$

e. None of these

273. Determine whether the improper integral converges or diverges, and if it converges, find its value.

$\int_{5\pi}^{\infty} \cos x \, dx$

a. 0
b. 5
c. 10
d. Diverges

274. Use a table of integrals to evaluate the integral.

$\int x\sqrt{2+2x}\, dx$

a. $\frac{2\sqrt{2}}{15}(2x-1)(x+1)^{\frac{3}{2}} + C$

b. $\frac{2\sqrt{2}}{15}(3x-2)(x+1)^{\frac{3}{2}} + C$

c. $\frac{2\sqrt{2}}{15}(3x-2)\sqrt{x+1} + C$

d. $\frac{2}{15}(3x-2)\sqrt{x+1} + C$

275. Determine the number of terms sufficient to obtain the sum of the series accurate to three decimal places.

$\sum_{n=0}^{\infty} \frac{(-2)^{n+3}}{(n+1)!}$

a. 9
b. 12
c. 10

d. 11

276. Determine whether the given series converges or diverges. If it converges, find its sum.

$$\sum_{n=0}^{\infty} \frac{5n^2 + 7}{8n^2 + 2}$$

a. $\frac{7}{2}$

b. $\frac{6}{5}$

c. Diverges

d. $\frac{5}{8}$

277. Use a table of integrals to evaluate the integral.

$$\int e^{-5x} \sin 3x \, dx$$

a. $-\frac{1}{8} e^{-5x}(5\sin 3x + 5\cos 3x) + C$

b. $-\frac{1}{8} e^{-5x}(5\sin 3x + 3\cos 3x) + C$

c. $-\frac{1}{34} e^{-5x}(5\sin 3x + 5\cos 3x) + C$

d. $-\frac{1}{34} e^{-5x}(5\sin 3x + 3\cos 3x) + C$

278. Use a table of integrals to evaluate the integral.

$$\int x\sqrt{5 + 5x}\, dx$$

a. $\frac{2}{15}\sqrt{5}(5x - 1)(x + 1)^{3/2} + C$

b. $\frac{2}{15}\sqrt{5}(3x - 2)(x + 1)^{3/2} + C$

c. $\frac{2}{15}(3x - 2)\sqrt{x + 1} + C$

Partice Problems

d. $\frac{2}{15}\sqrt{5}(3x-2)\sqrt{x+1}+C$

279. Find the length of the polar curve.

$r = 7\cos\theta,\ 0 \le \theta \le \frac{3\pi}{4}$

a. $\frac{21\pi}{11}$

b. $\frac{\pi}{7}$

c. $\frac{21}{4}$

d. $\frac{21\pi}{4}$

e. None of these

280. Evaluate the integral.

$\int_{\pi/6}^{\pi/3} \frac{3\ln(\tan x)}{7\sin x\cos x}\,dx$

a. $-\frac{1}{5}(\ln 4)^2$

b. $-\frac{1}{4}(\ln 3)^2$

c. 0

d. $\frac{1}{6}(\ln 3)^4$

e. $\frac{1}{4}(\ln 3)^2$

281. Find a polar equation for the curve represented by the given Cartesian equation.

$x^2 = 7y$

a. $r = 7\tan\theta\sec\theta$

b. $r = 7\sin\theta$

c. $r = 7\tan\theta$

d. $r = 7\cos\theta\sin\theta$

e. $r = 7\tan\theta\csc\theta$

Partice Problems

282. Use the Table of Integrals to evaluate the integral.

$$\int \frac{\sqrt{49x^2-1}}{x^2}\,dx$$

a. $\frac{\sqrt{7x^2-1}}{x} + \ln\left|x+\sqrt{7x^2-1}\right| + C$

b. $7\ln\left|7x+\sqrt{49x^2-1}\right| + C$

c. $\frac{\sqrt{49x^2-1}}{x} + \ln\left|7x+\sqrt{49x^2}\right| + C$

d. $-\frac{\sqrt{49x^2-1}}{x} + 7\ln\left|14x+2\sqrt{49x^2-1}\right| + C$

e. $-\frac{\sqrt{49x^2-1}}{x} + 7\ln\left|7x+\sqrt{49x^2-1}\right|$

283. Find a power series representation for the function.

$$f(y) = \ln\left(\frac{11+y}{11-y}\right)$$

a. $\sum_{n=0}^{\infty} 22y^{2n+1}$

b. $\sum_{n=0}^{\infty} \frac{2y^{2n+1}}{11^{n+1}(2n+1)}$

c. $\sum_{n=0}^{\infty} \frac{y^{2n+1}}{11^{n+1}(n+1)}$

d. $\sum_{n=7}^{\infty} \frac{22y^{2n+1}}{22}$

e. $\sum_{n=0}^{\infty} \frac{y^{2n+1}}{11}$

284. Determine which series is convergent.

a. $-\frac{3}{4} + \frac{4}{9} - \frac{5}{10} + \frac{6}{11} - \frac{7}{12} + \ldots$

Partice Problems

b. $\frac{4}{3} - \frac{4}{4} + \frac{4}{5} - \frac{4}{6} + \frac{4}{7} - \ldots$

285. Write a polar equation in r and θ of an ellipse with the focus at the origin, with the eccentricity 0.6 and vertex at $\left(1, \frac{\pi}{2}\right)$.

a. $r = \frac{8}{1 + 3\sin\theta}$

b. $r = \frac{8}{5 - 3\cos\theta}$

c. $r = \frac{1.6}{5 - 3\cos\theta}$

d. $r = \frac{1.6}{1 - 3\cos\theta}$

e. $r = \frac{8}{5 + 3\sin\theta}$

286. Find the equation of the directrix of the conic.

$r = \frac{14}{7 + \sin\theta}$

a. $x = 7$

b. $x = -7$

c. $x = 2$

d. $y = -14$

e. $y = 14$

287. Determine whether the geometric series converges or diverges. If it converges, find its sum.

$-\frac{1}{4} + \frac{1}{8} - \frac{1}{16} + \frac{1}{32} - \ldots$

a. $\frac{1}{2}$

b. $-\frac{1}{2}$

c. Diverges

d. $-\frac{1}{6}$

288. Which of the given series are absolutely convergent?

Partice Problems

a. $\sum_{n=1}^{\infty} \frac{\sin 2n}{n}$

b. $\sum_{n=1}^{\infty} \frac{\cos \frac{\pi n}{9}}{n\sqrt{n}}$

289. Approximate the sum to the indicated accuracy.

$\sum_{n=1}^{\infty} \frac{3(-1)^{n-1}}{n^7}$ (five decimal places)

a. 5.97777
b. 3.97777
c. 6.97777
d. 2.97777
e. 4.97777

290. Find the radius of convergence and the interval of convergence of the power series.

$\sum_{n=0}^{\infty} \frac{x^n}{n+3}$

a. $R = 3, I = [-3, 3)$
b. $R = 1, I = (-1, 1)$
c. $R = 1, I = [-1, 1)$
d. $R = 3, I = (-3, 3)$

291. Let $a_k = f(k)$, where f is a continuous, positive, and decreasing function on $[n, \infty)$, and suppose that $\sum_{k=1}^{\infty} a_k$ is convergent. Defining $R_n = S - S_n$, where $S = \sum_{n=1}^{\infty} a_n$ and $S_n = \sum_{k=1}^{n} a_k$, we have that $\int_{n+1}^{\infty} f(x)dx \le R_n \le \int_{n}^{\infty} f(x)dx$. Find the maximum error if the sum of the series $\sum_{n=1}^{\infty} \frac{4}{n^2}$ is approximated by S_{40} .

a. 0.0250
b. 0.0006
c. 0.1000
d. 0.0025

292. Suppose that the radius of convergence of the power series $\sum_{n=0}^{\infty} c_n x^n$ is 36. What is the radius of

Partice Problems

convergence of the power series $\sum_{n=0}^{\infty} c_n x^{2n}$.

a. 252
b. 6
c. 1
d. 256
e. 16

293. Find the integral.

$$\int \frac{x^3 - 2x^2 + 5x - 2}{x^3 - 2x^2 + x} dx$$

a. $2\ln\left|\frac{x-1}{x}\right| - \frac{2}{x-1} + x + C$

b. $2\ln\left|\frac{x}{x-1}\right| - \frac{2}{x-1} + x + C$

c. $2\ln\left|\frac{x}{x-1}\right| - \frac{1}{x-1} + x + C$

d. $2\ln\left|\frac{x-1}{x}\right| - \frac{1}{x-1} + x + C$

294. Evaluate the integral.

$$\int_0^4 \frac{x}{x+8} dx$$

a. $12 - 8\ln 12 + \ln\sqrt{8}$

b. $\frac{1}{8\ln 12} - \ln\sqrt{8}$

c. $4 - 12\ln 8 + \sqrt{8}\ln 16$

d. $4 - 8(\ln 12 - \ln 8)$

e. None of these

295. Use the Midpoint Rule to approximate the given integral with the specified value of *n*. Compare your result to the actual value. Find the error in the approximation.

$$8\int_2^3 e^{-\sqrt{x}} dx; \quad n = 6$$

Partice Problems

a. –0.00008
b. 0.60004
c. 0.00032
d. 1.00032
e. –0.00096

296. The curve $x = 3 - 6\cos^2 t, \quad y = \tan t\left(1 - 2\cos^2 t\right)$ cross itself at some point (x_0, y_0). Find the equations of both tangent lines at that point.

a. $y = \frac{x}{3}, y = -\frac{x}{6}$

b. $y = \frac{x}{2} - 6, \ y = -\frac{x}{2} - 2$

c. $y = x + 3, y = -x + 3$

d. $y = \frac{x}{2}, y = -\frac{x}{2}$

e. $y = \frac{x}{2} + 8, y = -\frac{x}{2} + 2$

297. Find the radius of convergence and the interval of convergence of the power series.

$$\sum_{n=0}^{\infty} \frac{(9x)^n}{n!}$$

a. $R = 9, I = (-9, 9)$
b. $R = 0, I = \{0\}$
c. $R = 9, I = [-9, 9]$
d. $R = \infty, I = (-\infty, \infty)$

298. Determine whether the improper integral converges or diverges, and if it converges, find its value.

$$\int_{-\infty}^{\infty} \frac{6e^x}{6 + e^{2x}} dx$$

a. $\frac{\pi\sqrt{6}}{2}$

b. $\sqrt{6}$

c. $\frac{\pi\sqrt{6}}{6}$

Partice Problems

d. Diverges

299. Evaluate the integral.

$$\int 2\left(\frac{x-1}{x^2+2x}\right)dx$$

a. $2\left(\frac{1}{3}x-\frac{1}{3}\ln x\right)+C$

b. $2\left(\frac{3}{2}\ln(x+2)-\frac{1}{2}\ln x\right)+C$

c. $-2\left(\frac{\sqrt{2}}{2}\arctan x\right)+C$

d. $-2(\ln x-x)+C$

e. None of these

300. Find the radius of convergence and the interval of convergence of the power series.

$$\sum_{n=1}^{\infty}\frac{(-1)^n(x-3)^n}{\sqrt{n}}$$

a. $R=1, I=[2,4)$

b. $R=1, I=(2,4]$

c. $R=3, I=[-3,3)$

d. $R=3, I=(-3,3)$

Partice Problems

Answer Key

1. a

2. a

3. a

4. a

5. a

6. a

7. a

8. a

9. a

10. a

11. a

12. a

13. a

14. a

15. a

16. a

17. a

18. e

19. a

20. a

21. a

22. a

23. a

24. a

25. a

Partice Problems

26. a

27. a

28. d

29. a

30. a

31. a

32. a

33. a

34. a

35. d

36. a

37. a

38. a

39. a

40. a

41. a

42. a

43. a

44. a

45. a

46. a

47. a

48. a

49. e

50. a

51. a

Partice Problems

52. a

53. a

54. a

55. a

56. a

57. a

58. a

59. a

60. a

61. a

62. a

63. a

64. a

65. a

66. d

67. a

68. a

69. a

70. a

71. b, e

72. b, d

73. a, e

74. $\frac{1}{16}$

75. $\frac{5}{\sqrt{3}} - \frac{5\pi}{6}$

Partice Problems

76. $\frac{\sin t+\cos t+1}{5(1+\cos t)^3}$

77. convergent

78. convergent

79. $\frac{164\pi}{3}-\frac{31\sqrt{3}}{2}$

80. $K \geq 9$

81. $|x|<7$

82. $\frac{4\pi-8}{\pi^2}$

83. $\frac{1}{4}\arctan\left(\frac{1}{4}\sin x\right)+C$

84. $\frac{81}{2}$

85. $x^2+\left(y-\frac{11}{2}\right)^2=\left(\frac{11}{2}\right)^2$

86. $\sum_{n=0}^{\infty}(-1)^n\frac{\left(\frac{x}{2}\right)^{2n+1}}{2n+1};\ R=2$

Partice Problems

87. 0.99260

88. $p < -1$

89. 0.27940, error < 0.0000007

90. $|x| < 1$

91. 0.7788

92. 134

93. $6\ln(4) - 12$

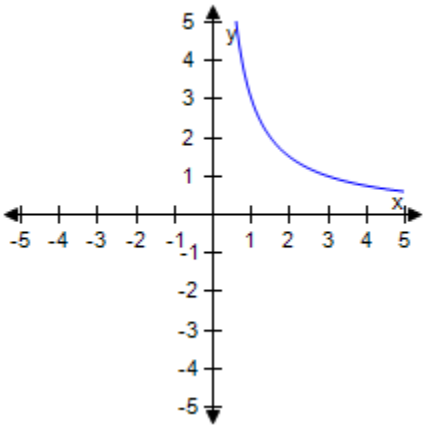
94. $\frac{\pi^2}{2} + 4\pi$

95. 3.199558

96. converges

97. 74.8 %

98. $y = \frac{3}{x}$



99. divergent

Partice Problems

100. $\frac{8}{15}$

101. $\frac{121}{4}\pi$

102. False

103. 2,842.45

104. $\frac{1}{3}\ln\left|x^3+\sqrt{x^6-5}\right|+C$

105. $-\frac{3t^2+1}{4t^3}$

106. $2\tan^{-1}\sqrt{x+1}+C$

107. –0.931

108. $m > e^{100}$

109. $9\left(e^{-x}+\frac{1}{2}\ln\left(\left|\frac{e^{-x}-1}{e^{-x}+1}\right|\right)\right)+C$

110. divergent

111. $\sum_{n=0}^{\infty}\frac{(-1)^n(n+1)(n+2)\left(\frac{x}{5}\right)^n}{250}$

112. $e^{3/4}$

113. $\frac{8}{15}$

Partice Problems

114. $x = 15\cos(ang), y = 6\sin(ang), 0 \le ang \le 2\pi$

115. 98.31

116. $\frac{\sqrt{x^2-25}}{25x} + c$

117. 200.7125

118. 645.96

119. $y = -\frac{12}{e}(x-e)+1$

120. –1.965 < x < 1.965.

121. divergent

122. convergent

123. $\frac{1}{5} + \frac{4}{10^2} + \frac{3}{10^3} + \frac{3}{10^4}$

124. $21\ln 5$

125. $5e^{y}\left(y^3-3y^2+6y-6\right)+C$

126. $C+3\sum_{n=1}^{\infty}\frac{x^n}{n*n!}, R=\infty$

127. 19.8

128. $\sin(\ln 14t)+C$

Partice Problems

129. $y = -16(x-1)+64$

130. $e^{\pi/6} - e^{-\pi/6}$

131. $\int_0^{2\pi} \sqrt{16\cos^2\theta + 4\sin^2\theta}\, d\theta$

132. $4 - 4\ln 8 + 8\ln 2$

133. $-3\sum_{n=0}^{\infty} \frac{x^n}{n}, R = 3$

134. $y = 3\pi x + 9\pi^2$

135. diverges

136. 0.35632

137. $\frac{15}{4} - 4\ln 2$

138. $y = (x+4)^2$

139. $\frac{\pi}{4}$

140. $-1 - 2(x-1) + 3(x-1)^2 + 4(x-1)^3 + (x-1)^4;\ R = \infty$

141. $\frac{1+\sqrt{13}}{2}$

142. $11 - \frac{11\pi}{4}$

Partice Problems

143. $\frac{89}{99}$

144. divergent

145. $6\left(6\sqrt{2}-\ln\left(3+2\sqrt{2}\right)\right)$

146. $-\frac{6x^3}{(1-x)^3}$

147. 0.016

148. $\frac{x^2}{3{,}779{,}136}+\frac{y^2}{3{,}735{,}872}=1$

149. $x=4\cos t, y=9-4\sin t,\ 0\le t\le 2\pi$

150. True

151. $\frac{1}{3}$

152. $\frac{x}{\sqrt{16-x^2}}-\arcsin\left(\frac{x}{4}\right)+C$

153. divergent

154. $[-1, 1)$

155. $2e^4$

156. 28

157. converges

Partice Problems

158. $a_n = \dfrac{(-1)^n n^3}{n+1}$

159. $x - 9\ln(|1 - e^x|) + C$

160. 20

161. $x = 6 - \dfrac{6}{7}y$

162. $y = -\pi(x - 5\pi)$

163. divergent

164. 0.2868

165. 13.3649

166. 0.031414

167. 7.879

168. $\int_8^{18} \sqrt{(1 - 10t^9)^2 + \left(\dfrac{10}{8}\right)^2 t^{2/8}}\, dt$

169. 16

170. 10.000

171. b

172. d

173. a

174. c

175. b

176. d

Partice Problems

177. b

178. b

179. e

180. d

181. a

182. a

183. a

184. a

185. b

186. a

187. a

188. c

189. a

190. b

191. a

192. a

193. b

194. d

195. b

196. c

197. e

198. a

199. b

200. e

201. c

202. d

Partice Problems

203. d

204. d

205. b

206. d

207. a

208. c

209. c

210. a

211. e

212. c

213. a

214. a

215. c

216. c

217. e

218. a

219. a

220. c

221. b

222. e

223. c

224. d

225. d

226. b

227. a

228. b

Partice Problems

229. a

230. b

231. a

232. b

233. b

234. b

235. d

236. c

237. c

238. d

239. d

240. b

241. b

242. a

243. c

244. d

245. d

246. d

247. d

248. b

249. d

250. b

251. e

252. b

253. a

254. a

Partice Problems

255. d

256. c

257. c

258. b

259. b

260. c

261. a

262. a

263. a

264. d

265. c

266. a

267. a

268. c

269. d

270. a

271. d

272. b

273. d

274. b

275. c

276. c

277. d

278. b

279. d

280. c

Partice Problems

281. a

282. e

283. b

284. b

285. e

286. e

287. d

288. b

289. d

290. c

291. c

292. b

293. a

294. d

295. c

296. d

297. d

298. a

299. b

300. b