1. The sequence $a_n = \frac{2^n}{n!}$

(a) converges to 3.
(b) converges to 0.
(c) converges to 2.
(d) converges to 1.
(e) diverges.

2. The series

$$1 + \frac{1}{2\sqrt{2}} + \frac{1}{3\sqrt{3}} + \frac{1}{4\sqrt{4}} + ...$$

(a) is a divergent geometric series
(b) is a divergent p-series
(c) is a convergent p-series with $p = 3/2$
(d) is a divergent harmonic series
(e) is a convergent p-series with $p = 1/2$

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

(a) diverges by Comparison Test with $\sum_{n=1}^{\infty} \frac{1}{2^n}$.
(b) diverges by Limit Comparison Test with $\sum_{n=1}^{\infty} \frac{1}{2^n}$.
(c) diverges by Integral Test.
(d) diverges by Ratio Test.
(e) converges by Comparison Test with $\sum_{n=1}^{\infty} \frac{1}{2^n}$.

4. The following series $\sum_{k=0}^{\infty} \frac{2^{k+3}}{e^{k-3}}$ is

(a) convergent to $\frac{2}{(e-2)^2}$

(b) divergent

(c) convergent to $8e^3$

(d) convergent to $\frac{8e^4}{e-2}$

(e) convergent to 0

5. The minimum number of terms needed to approximate the sum of the alternating series $\sum_{n=1}^{\infty} \frac{(-1)^n n}{3^n}$ with an error less than 0.01 is

(a) 6.
(b) 4.
(c) 5.
(d) 7.
(e) 10.

6.) The series $\sum_{n=1}^{\infty} \frac{1+2^{n+1}}{3^n}$

(a) converges to 11/2

(b) diverges

(c) converges to 1

(d) converges to 9/2

(e) converges to 7/2

7. The curve $y = 1 - x^2$, $0 \leq x \leq 1$ is rotated about the $y-$ axis. The area of the resulting surface is

(a) $\frac{\pi}{6}(\sqrt{5} - 1)$

(b) $\frac{4\pi}{3}(5\sqrt{5} - 1)$

(c) $\frac{\pi}{6}(5\sqrt{5} - 1)$

(d) $\frac{4\pi}{3}(\sqrt{5} - 1)$

(e) $\frac{5\sqrt{5}\pi}{6}$

8. The series $\sum_{n=1}^{\infty} \sin(\frac{1}{n})$

(a) diverges.

(b) converges to 0 because $\lim_{n\to\infty} \sin(\frac{1}{n}) = 0$..

(c) converges to 1.

(d) is alternating series.

(e) diverges because $\lim_{n\to\infty} \sin(\frac{1}{n}) = 0$.

9. The sequence $a_n = \frac{\cos 2n}{1+\sqrt{n}}$

(a) converges to 2.

(b) converges to 1.

(c) diverges.

(d) converges to 0.

(e) converges to π.

10. The series $\sum_{n=1}^{\infty} \frac{(-10)^n}{n!}$

(a) diverges by the Ratio Test
(b) diverges by the Integral Test
(c) converges by the Ratio Test with $L = 1$
(d) diverges by the Ratio Test with $L = 10$
(e) converges absolutely by the Ratio Test with $L = 0$

11. The length of the arc of the curve $12xy = 4y^4 + 3$ from $\text{A}\left(\frac{7}{12}, 1\right)$ to $\text{B}\left(\frac{67}{24}, 2\right)$ is

(a) $\int_1^2 \left(y^2 + \frac{y^{-2}}{4}\right)$ dy.
(b) $\int_1^2 \left(\frac{y^2}{4} + y^{-2}\right)$ dy.
(c) $\int_{7/12}^{67/24} \left(y^2 + \frac{y^{-2}}{4}\right)$ dy.
(d) $\int_1^2 \left(y^2 - \frac{y^{-2}}{4}\right)$ dy.
(e) $\int_{7/12}^{67/24} \left(y^2 + 4y^{-2}\right)$ dy.

12. The area of the surface obtained by rotating the curve $9x = y^2 + 18$, $2 \leq x \leq 6$, about the x-axis is equal to

(a) 8π
(b) 16π
(c) 49π
(d) 98π
(e) 24π

13. The series $\sum_{n=2}^{\infty}\left(\frac{1}{n\ (\ln\sqrt{n})^3}\right)$

(a) diverges by the Ratio Test
(b) converges by the Integral Test
(c) diverges by the Root Test
(d) diverges by l'Hospital's rule
(e) converges because $\lim_{n\to\infty}\left(\frac{1}{n\ (\ln\sqrt{n})^3}\right) = 0$

14. The sum of the series $\sum_{n=2}^{\infty}\left(\frac{2}{n^2-1}\right)$ is equal to

(a) $\frac{3}{2}$.
(b) $\frac{5}{2}$.
(c) $\frac{3}{4}$.
(d) $\frac{5}{4}$.
(e) $\frac{7}{4}$.

15. The series $\sum_{n=2}^{\infty}\frac{(-1)^n}{\ln n}$

(a) diverges by the Root Test
(b) diverges by the Integral Test
(c) converges to 1
(d) converges absolutely diverges by the Integral Test
(e) converges conditionally