Math 132 - Quiz 6

April 21, 2021

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due April 28.

1. (4 points) Determine whether the series converges or diverges.

   (a) $\displaystyle\sum_{n=1}^{\infty} \frac{2^n}{n!}$

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

Turn over.

2. (4 points) Consider the series $\displaystyle\sum_{k=0}^{\infty} \frac{(-1)^k}{2k+1}$.

(a) Use the alternating series test to show that the series converges.

(b) Does the series converge absolutely? Explain why or why not.

(c) It was first discovered by Indian mathematicians in the 12th century that the series converges to $\pi/4$. Use the alternating series remainder theorem to find an upper bound on the error made in the approximation

$$\frac{\pi}{4} \approx 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11}.$$

3. (2 points) Determine whether the series converges or diverges: $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n\, 5^{3n}}{n^n}$