CSD2201/2200 Week 11 Homework
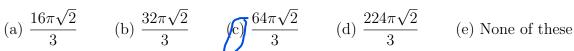
Due: 30th November 2023, 2359 HRS

For each question, key in **the** correct option into the homework into the "Week 11 Homework" option in the "6 November to 12 November" section in our combined CSD2201 and CSD2200 meta course page on Moodle.

Question 1

Let R be the region bounded by the graphs $x = y^2$ and $x = 4 - y^2$. Find the volume of the solid obtained by rotating R about the y-axis.

(a) $\dfrac{16\pi\sqrt{2}}{3}$ 　　 (b) $\dfrac{32\pi\sqrt{2}}{3}$ 　　 (c) $\dfrac{64\pi\sqrt{2}}{3}$ 　　 (d) $\dfrac{224\pi\sqrt{2}}{3}$ 　　 (e) None of these

Question 2

Let R be the region bounded by the curves $y = \ln x$, $y = 0$ and $x = e$. Find the volume of the solid obtained by rotating R about the y-axis.

(a) $\dfrac{\pi e^2}{2}$ 　　 (b) $\dfrac{\pi}{2}$ 　　 (c) $\dfrac{\pi(2e^2 + 1)}{2}$ 　　 (d) $\dfrac{\pi(e^2 + 1)}{2}$ 　　 (e) None of these

Question 3

Evaluate $\displaystyle \lim_{n \to \infty} \frac{2n^3 + 3}{3n^3 + 2n^2 + 4n}$.

(a) 0 　　 (b) 1 　　 (c) $\dfrac{2}{3}$ 　　 (d) $\dfrac{3}{2}$ 　　 (e) None of these

Question 4

Evaluate $\displaystyle \lim_{n \to \infty} \sqrt[n]{2^{1+4n}}$.

(a) 2 　　 (b) 4 　　 (c) 8 　　 (d) 16 　　 (e) None of these

Question 5

Evaluate the geometric sum $\sum_{n=2}^{\infty} 2^{4n}3^{6-3n}$ (if it converges).

(a) $\dfrac{6912}{11}$ (b) $\dfrac{2816}{27}$ (c) $\dfrac{11}{27}$ (d) $\dfrac{16}{27}$ (e) Diverges

Question 6

Amongst the following series, which are divergent?

(A) $\sum_{n=2}^{\infty} \dfrac{n+1}{n^3 - n^2}$ (B) $\sum_{n=1}^{\infty} \dfrac{1}{\sqrt[n]{n}}$ (C) $\sum_{n=1}^{\infty} \dfrac{(-1)^{n-1}3n}{n^2 + 1}$

(a) (A) only   (b) (B) only   (c) (C) only

(d) (B) and (C) only   (e) None of these

Question 7

Find the radius of convergence of $\sum_{n=1}^{\infty} \dfrac{(3x-1)^n}{5^n \sqrt{n}}$.

(a) 1   (b) 3   (c) 5   (d) $\dfrac{5}{3}$ (e) None of these