CSD2201/2200 Week 7 Homework
Due: 22nd October 2023, 2359 HRS

For each question, key in **the** correct option into the homework into the "Week 7 Homework" option in the "9 October to 15 October" section in our **combined** CSD2201 and CSD2200 meta course page on Moodle.

Question 1

Evaluate $\displaystyle\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \sin^2 x \cos^5 x \, dx$.

(a) 0   (b) $\dfrac{7}{30\sqrt{2}}$ (c) $\dfrac{9}{140\sqrt{2}}$ (d) $\dfrac{71}{420\sqrt{2}}$ (e) None of the above

Question 2

Evaluate $\displaystyle\int_{1}^{\sqrt{2}} \frac{x}{x^4 - 2x^2 + 2} \, dx$.

(a) $\dfrac{\pi}{2}$ (b) $\dfrac{\pi}{4}$ (c) $\dfrac{\pi}{8}$ (d) $\dfrac{\pi}{16}$ (e) None of the above

Question 3

Find an antiderivative of $f(x) = \ln(8x)$.

(a) $x\ln(8x) + (16 - x)$ (b) $x\ln(8x)$ (c) $x\ln x - x$

(d) $x\ln(8x) - \dfrac{x}{8}$ (e) None of the above

Question 4

Evaluate $\displaystyle\int_0^{\frac{1}{2}} e^{\sqrt{2x}}\, dx$.

   (a) 1   (b) 4   (c) 9   (d) 16   (e) None of the above

Question 5

Find CD in the following partial fraction decomposition:

$$\frac{15}{x^4 + 3x^3 + x^2 + 3x} = \frac{A}{x} + \frac{B}{x+3} + \frac{Cx+D}{x^2+1}.$$

   (a) $-\dfrac{9}{2}$ (b) $-\dfrac{1}{2}$ (c) 5   (d) $-\dfrac{27}{4}$ (e) None of the above

Question 6

Say we know that for a function f, $|f''(x)| \leq 3$ on $[-2, 1]$. How large do we need to take n so that the approximation T_n to the integral $\displaystyle\int_{-2}^{1} f(x)\, dx$ is accurate to within 0.0001?

   (a) 259   (b) 184   (c) 179   (d) 173   (e) None of the above

Question 7

Say we know that for a function f, $|f^{(4)}(x)| \leq 4$ on $[-3, 2]$. How large do we need to take n so that the approximation S_n to the integral $\displaystyle\int_{-3}^{2} f(x)\, dx$ is accurate to within 10^{-5}?

   (a) 11   (b) 12   (c) 51   (d) 52   (e) None of the above