

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

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

Question 2

Evaluate $\int_1^{\sqrt{2}} \frac{x}{x^4 - 2x^2 + 2} \, dx$.

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

Question 4

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

(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) $-\frac{9}{2}$

(b) $-\frac{1}{2}$

(c) 5

(d) $-\frac{27}{4}$

(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 $\int_{-2}^1 f(x) dx$ 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 $\int_{-3}^2 f(x) dx$ is accurate to within 10^{-5} ?

(a) 11

(b) 12

(c) 51

(d) 52

(e) None of the above