

MAT 155B - FALL 12 - PRACTICE TEST 2

INSTRUCTIONS: In questions 1 to 6 below, compute the given integrals.

Question 1. $\int \frac{\cos^5 \theta}{\sqrt{\sin \theta}} d\theta.$

Question 2. $\int e^{x+e^x} dx.$

Question 3. $\int x^{-3}(\ln x)^2 dx.$

Question 4. $\int_1^2 \frac{\ln(\ln x)}{x} dx.$

Question 5. $\int_0^3 x^2 \sqrt{9-x^2} dx.$

Question 6. $\int_0^{\frac{1}{2}} \frac{xe^{2x}}{(1+2x)^2} dx.$

INSTRUCTIONS: In questions 7 to 10 below, write out the form of the partial fraction decomposition of the function. *Do not* determine the numerical values of the coefficients. For example, given:

$$\frac{x+7}{x^3+4x^2+4x},$$

write

$$\frac{x+7}{x^3+4x^2+4x} = \frac{A}{x} + \frac{B}{x+2} + \frac{C}{(x+2)^2},$$

and that is the answer, i.e., you do not have to find the values of A , B and C .

Question 7. $\frac{x}{(x+4)(2x-1)}.$

Question 8. $\frac{x^3-4x-10}{x^2-x-6}.$

Question 9. $\frac{x^2-x+6}{x^3+3x}.$

Question 10. $\frac{4x}{(x^3 + x^2 + x + 1)^2}$.

INSTRUCTIONS: In questions 11 to 15, evaluate the given integrals, if possible.

Question 11. $\int_0^{\infty} \frac{1}{\sqrt[4]{1+x}} dx$.

Question 12. $\int_0^{\infty} \frac{x \arctan x}{(1+x^2)^2} dx$.

Question 13. $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$.

Question 14. $\int_0^{10} \frac{1}{(x-\pi)^7} dx$.

Question 15. $\int_{-\infty}^{\infty} \frac{x^2}{9+x^6} dx$.

INSTRUCTIONS: In questions 16 to 18, determine whether the given integral converges.

Question 16. $\int_1^{\infty} \frac{\sin^2 x}{x^2} dx$.

Question 17. $\int_0^{\infty} \frac{e^{x^2}}{e^{3x} + e^{2x} + 8} dx$.

Question 18. $\int_0^1 \frac{1}{x\sqrt{x^2+1}} dx$.

INSTRUCTIONS: In questions 19 and 20, set up an integral for the area of the surface obtained by rotating the given curve about the indicated axis. Do not evaluate the integral.

Question 19. $y = \sin^2 x$, $-\pi \leq x \leq \pi$, about the x -axis.

Question 20. $y = e^x$, $1 \leq x \leq 2$, about $x = -1$.