

- ① APPROXIMATE $\int_2^{26} \frac{1}{\ln x} dx$ USING $n=4$ AND
 A) THE MIDPOINT RULE. (DO NOT SIMPLIFY NUMERICALLY.)
 B) THE TRAPEZOIDAL RULE.
- ② FIND $\int \frac{2x^4 - 5x + 20}{x(x-2)^2} dx$.
- ③ IF x IS A RANDOM VARIABLE WITH PROBABILITY DENSITY FUNCTION $f(x) = \frac{25}{12x^3}$, $[1, 5]$,
 A) FIND THE MEAN FOR x .
 B) FIND THE VARIANCE FOR x .
- ④ EVALUATE THE FOLLOWING IMPROPER INTEGRALS, OR SHOW THAT THEY DIVERGE:
 A) $\int_0^{1/e} \frac{24}{x(\ln x)^4} dx$ B) $\int_{3/2}^{\infty} \frac{15}{2x^2 + 3x} dx$
- ⑤ IF THE WAITING TIME T AT A STORE IS EXPONENTIALLY DISTRIBUTED WITH A MEAN OF 6 MINUTES, FIND THE MEDIAN FOR T (USING INTEGRATION).
- ⑥ FIND $\int x^3 (\ln x)^2 dx$.
- ⑦ THE TIME T IN HOURS REQUIRED TO UNLOAD A TRUCK IS A RANDOM VARIABLE WITH PROBABILITY DENSITY FUNCTION $f(t) = 4t e^{-2t}$, $[0, \infty)$. FIND THE PROBABILITY THAT IT WILL TAKE LESS THAN 1.5 HOURS TO UNLOAD A TRUCK.
- ⑧ FIND $\int x^3 \sec x^2 \tan x^2 dx$.
- ⑨ FIND THE VOLUME OF THE SOLID GENERATED BY REVOLVING THE REGION UNDER THE GRAPH OF $y = 4 \sin x + 5 \sec x$ FOR $0 \leq x \leq \frac{\pi}{4}$ ABOUT THE x -AXIS.
- ⑩ FIND $\int \frac{1}{\sqrt{x+5} (x+4)^2} dx$.