MATH 168 CH. 6 AND CH. 9 - EXTRA EXERCISES

① FIND $\int \frac{1}{x^3 + 4x^2}\, dx$.

② FIND $\int e^{4x} \sin 2x\, dx$.

③ FIND $\int \frac{3x^4 - 4x - 12}{x^3 - 2x^2}\, dx$.

④ EVALUATE $\int_1^{\sqrt{e}} \frac{\ln x}{x^3}\, dx$.

⑤ EVALUATE $\int_{1/4}^{\infty} \frac{15}{2x^2 + 5x + 2}\, dx$, OR SHOW THAT IT DIVERGES.

⑥ FIND $\int \cos \sqrt{x}\, dx$.

⑦ THE TIME T (IN HOURS) TO RECOVER AFTER A RACE IS A RANDOM VARIABLE WITH PDF $f(T) = \frac{1}{2\sqrt{2T+1}}$, $[0, 4]$.

A) FIND THE PROBABILITY THAT A PERSON WILL TAKE LESS THAN 90 MIN. TO RECOVER.

B) FIND THE EXPECTED RECOVERY TIME.

⑧ THE LENGTH OF THE PARABOLA $Y = X^2$ FROM $(0,0)$ TO $(4,16)$ IS GIVEN BY $S = \int_0^4 \sqrt{1 + \left(\frac{dy}{dx}\right)^2}\, dx = \int_0^4 \sqrt{1 + 4x^2}\, dx$.

APPROXIMATE THIS LENGTH USING $n = 4$ AND

a) THE TRAPEZOIDAL RULE.

b) SIMPSON'S RULE.

⑨ EVALUATE $\int_0^{\infty} \frac{1}{x + \sqrt{x}}\, dx$, OR SHOW THAT IT DIVERGES.