資財10

微積分乙(下)第一次期中考 2018/04/03

1. 30% Find (a) $\int \frac{2x+2}{(x^2+2x-4)^4}dx$, (b) $\int \frac{e^{\sqrt{x}}}{2\sqrt{x}}dx$, (c) $\int \frac{(\log_2(5x+1))^2}{5x+1}dx$, (d) $\int x^3 e^{x^4}dx$, and (e) $\int x^3 \ln x dx$.

2. 10% Find (a) $\frac{d}{dx}\int_2^x 4^{\sin t+\cos t}dt$, and (b) $\frac{d}{dx}\int_2^{x^2} 4^{\sin t+\cos t}dt$.

3. 10% Find $\int \cos x e^x dx$.

4. 10% Find $\int_{-5}^{5} t^4+\sin t\cdot t^2+\cos t\,dt$.

5. 10% Find (a) $\lim_{n\to\infty}\sum_{i=1}^{n}\frac{1}{n}\sqrt{1-\frac{i}{n}}$, and (b) $\lim_{n\to\infty}\sum_{i=1}^{n}\frac{1}{n}\sqrt{1-\left(\frac{i}{n}\right)^2}$.

6. 10% The rate of growth of the profit (in millions of dollars) from a new technology is approximated by $f(x)=xe^{-x^2}$, where x represents time measured in years. The total profit in the third year that the new technology is in operation is \$10,000 (0.01 million). (a) Find the total profit function. (b) What happens to the total amount of profit in the long run?

7. 10% Find the area between $\sqrt{x}$ and $x\sqrt{x}$.

8. 10% Find the area under the semicircle $y=\sqrt{4-x^2}$ and above the x-axis by using $n=4$ with (a) The teapezoidai rule and (b) Simpson's rule.

$e=2.71828, e^3=20.0855$