Review of Calculus I Integrals (Section 1) **Version D**
Rensselaer Calculus Skills Practice Page

No calculators will be allowed and no partial credit will be given.

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1. Express in simplified form the value of $\int_0^1 x^2 \left(x^2+4\right)\, dx$.
2. Express in simplified form the value of $\int_0^{\ln(3)} \left(5\, e^x + 3\right)\, dx$.
3. Express in simplified form the value of $\int_1^3 \frac{4\, x^3 + 2\, x^2}{x^3}\, dx$.
4. Express the indefinite integral $\int x \left(6\, x^3 + 4\right)\, dx$ in terms of elementary functions. Use the symbol C to denote an arbitrary constant.
5. Express the indefinite integral $\int \left(4\, (\sec(x))^2 + 8\, e^x\right)\, dx$ in terms of elementary functions. Use the symbol C to denote an arbitrary constant.
6. Express the indefinite integral $\int \frac{7\, x^4 + 4\, x^3 - 5}{x}\, dx$ in terms of elementary functions. Use the symbol C to denote an arbitrary constant.
7. Express in simplified form the value of $\int_0^1 6\, x^3 \left(2\, x^4 + 1\right)^2\, dx$.
8. Express in simplified form the value of $\int_0^{\pi} 4\, \cos(x)\, (\sin(x))^5\, dx$.
9. Express in simplified form the value of $\int_1^{e^2} -\frac{2\, (\ln(x))^3}{x}\, dx$.
10. Express the indefinite integral $\int -2\, x^{\frac{2}{3}} \sin\left(x^{\frac{5}{3}} + 1\right)\, dx$ in terms of elementary functions. Use the symbol C to denote an arbitrary constant.
11. Express the indefinite integral $\int 2\, e^{5\, x}\, dx$ in terms of elementary functions. Use the symbol C to denote an arbitrary constant.
12. Express the indefinite integral $\int (2\, x + 7) \left(x^2 + 7\, x + 5\right)^4\, dx$ in terms of elementary functions. Use the symbol C to denote an arbitrary constant.
13. Express the indefinite integral $\int -4\, t^3\, e^{-t^4}\, dt$ in terms of elementary functions. Use the symbol C to denote an arbitrary constant.
14. Express in simplified form the value of $\int_0^1 2\, x^3\, e^{-x^4}\, dx$.
15. Express the indefinite integral $\int 3\, (\cos(x))^5 \sin(x)\, dx$ in terms of elementary functions. Use the symbol C to denote an arbitrary constant.

16. Express the indefinite integral $\int 4\,(\sec(x))^3\,\tan(x)\,dx$ in terms of elementary functions. Use the symbol C to denote an arbitrary constant.

17. Express the indefinite integral $\int \frac{14\,x+2}{7\,x^2+2\,x+3}\,dx$ in terms of elementary functions. Use the symbol C to denote an arbitrary constant.

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Answer Key Rensselaer Calculus Skills Practice Page, Fall 2007

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1. $\frac{23}{15}$
2. $3 \cdot \ln(3) + 10$
3. $2 \cdot \ln(3) + 8$
4. $\frac{6\,x^5}{5} + 2\,x^2 + C$
5. $4\,\tan(x) + 8\,e^x + C$
6. $-5\,\ln(|x|) + \frac{7\,x^4}{4} + \frac{4\,x^3}{3} + C$
7. $\frac{13}{2}$
8. 0
9. -8
10. $\frac{6\,\cos\left(x^{\frac{5}{3}} + 1\right)}{5} + C$
11. $\frac{2\,e^{5\,x}}{5} + C$
12. $\frac{\left(x^2 + 7\,x + 5\right)^5}{5} + C$
13. $e^{-t^4} + C$
14. $\frac{1}{2} - \frac{e^{-1}}{2}$
15. $-\frac{(\cos(x))^6}{2} + C$
16. $\frac{4}{3\,(\cos(x))^3} + C$
17. $\ln\left(\left|7\,x^2 + 2\,x + 3\right|\right) + C$