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

16. Express the indefinite integral $\int -3\,(\sec(t))^6\,\tan(t)\,dt$ in terms of elementary functions. Use the symbol C to denote an arbitrary constant.

17. Express the indefinite integral $\int \frac{6\,x+6}{3\,x^2+6\,x+1}\,dx$ 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. $\frac{6}{5}$
2. $2 \cdot \ln(3) + 6$
3. $5 \cdot \ln(3) + 80$
4. $\frac{3\,x^5}{5} + \frac{7\,x^2}{2} + C$
5. $7\,e^x - 4\,\cos(x) + C$
6. $-5\,\ln(|x|) + \frac{4\,x^3}{3} + \frac{5\,x^2}{2} + C$
7. 20
8. 0
9. 1
10. $-\frac{16\,\cos\left(x^{\frac{7}{4}} + 1\right)}{7} + C$
11. $\frac{\sin(5\,x)}{5} + C$
12. $\frac{\left(x^2 + 2\,x + 5\right)^4}{4} + C$
13. $\frac{4\,e^{-t^3}}{3} + C$
14. $\frac{5}{3} - \frac{5 \cdot e^{-1}}{3}$
15. $-\frac{(\sin(x))^9}{3} + C$
16. $-\frac{1}{2\,\left(1 - (\sin(t))^2\right)^3} + C$
17. $\ln\left(\left|3\,x^2 + 6\,x + 1\right|\right) + C$