Basic Integration

Numberbender | WORKSHEET

Name: _____ Date: _____ Score: _____

Integrate problems 1–15. Show all work.

Calculus 1 Worksheet #22
Basic Integration

Examples:

1. $\int(x^7-6x+8)dx=\frac{x^8}{8}-6\frac{x^2}{2}+8x+c=\boxed{\frac{1}{8}x^8+3x^2+8x+C}$
2. $\int(x^3-\frac{1}{x^3})dx=\int(x^3-x^{-3})dx\Rightarrow\frac{x^4}{4}-\frac{x^{-2}}{-2}+C=\boxed{\frac{1}{4}x^4+\frac{1}{2x^2}+C}$
3. $\int(\frac{1}{5}-\frac{2}{x^3}+2x)dx=\int(\frac{1}{5}-2x^{-3}+2x)dx\Rightarrow=\frac{1}{5}\frac{x^1}{1}-\frac{2x^{-2}}{-2}+\frac{2x^2}{2}+C=\boxed{\frac{1}{5}x+\frac{1}{x^2}+x^2+C}$
4. $\int\frac{1}{\sqrt[4]{z^5}}dz=\int z^{-\frac{5}{4}}dz=\frac{z^{-\frac{1}{4}}}{-\frac{1}{4}}+C=-4\sqrt[4]{z}+C$
5. $\int(x-2)^3dx=\int(x^3-6x^2+12x-8)dx\Rightarrow\frac{x^4}{4}-\frac{6x^3}{3}+\frac{12x^2}{2}-\frac{8x^1}{1}+C=\boxed{\frac{1}{4}x^4-2x^3+6x^2-8x+C}$
6. $\int x^{-1}dx\Rightarrow\ln(x)+C$

Integrate problems 1-15

1. $\int 6x^2dx$	2. $\int 6tdt$	3. $\int(2x-3)dx$
4. $\int(1-4x)dx$	5. $\int(x^2-2x-3)dx$	6. $\int(3z^2-3z+1)dz$
7. $\int(1-x^2)dx$	8. $\int(2x+1)^2dx$	9. $\int\frac{dx}{x^2}$
10. $\int\frac{dt}{t}$	11. $\int\frac{2du}{u}$	12. $\int x^{-9}dx$
13. $\int\frac{x^2+4}{x}dx$	14. $\int\sqrt[3]{x^4}dx$	15. $\int(x^{-1}+2)^2dx$

Review 16-18

Answer key — for instructor use only.

Answers:

1. $2x^3+C$	2. $3t^2+C$	3. x^2-3x+C	4. $x-2x^2+C$
5. $\frac{x^3}{3}-x^2-3x+C$	6. $z^3-\frac{3}{2}z^2+z+C$	7. $x-\frac{x^3}{3}+C$	8. $\frac{4x^3}{3}+2x^2+x+\mathrm{C}$ or $\frac{1}{6}(2x+1)^3+\mathrm{C}$
9. $\frac{-1}{\mathrm{x}}+\mathrm{C}$	10. $\ln\lvert t\rvert+C$	11. $2\ln\lvert u\rvert+C$	12. $-\frac{x^{-8}}{8}+C$
13. $\frac{x^2}{2}+4\ln\lvert x\rvert+C$	14. $\frac{3}{7}x^{\frac{7}{3}}+C$	15. $-x^{-1}+4\ln\lvert x\rvert+4x+C$	16. Domain= [-4,4] Range = [0,4]