微積分二　第 8 週：基本積分複習

1. $\int \frac{1}{x+3}dx = \ln(x+3)+C$

2. $\int (3x^8-7x^4+5x-4)\,dx = \frac{1}{3}x^9-\frac{7}{5}x^5+\frac{5}{2}x^2-4x+C$

3. $\int 10\sqrt{x}dx = \frac{20}{3}x^{3/2}+C$

4. $\int \frac{3}{x}dx = 3\ln x+C$

5. $\int \frac{4}{x^9}dx = \frac{1}{-2}x^{-8}+C$

6. $\int 7x\sqrt{x^2+6}\,dx = \frac{7}{3}(x^2+6)^{\frac{3}{2}}+C$

7. $\int 10e^{7x}\,dx = \frac{10}{7}e^{7x}+C$

8. $\int \frac{10}{\sqrt{x}}dx = 20x^{\frac{1}{2}}+C$

9. $\int \frac{x}{x^2+5}dx = \frac{1}{2}\ln(x^2+5)+C$

10. $\int (x+\frac{1}{x})\,dx = \frac{1}{2}x^2+\ln x+C$

11. $\int (\sqrt{x}+\frac{9}{\sqrt{x}})\,dx = \frac{2}{3}x^{\frac{3}{2}}+18x^{\frac{1}{2}}+C$

12. $\int \frac{x^5}{x^6+8}dx = \frac{1}{6}\ln(x^6+8)+C$

13. $\int (4x^3+3x^2+1)\,dx = x^4+x^3+x+C$

14. $\int \frac{3x^2+1}{x}dx = \frac{3}{2}x^2+\ln x+C$

15. $\int \frac{5}{2x+3}dx = \frac{5}{2}\ln(2x+3)+C$

16. $\int x^4(x^5+8)^{30}\,dx = \frac{1}{5}\cdot\frac{1}{31}(x^5+8)^{31}+C$

17. $\int \frac{4}{\sqrt{x+9}}dx = 8(x+9)^{\frac{1}{2}}+C$

18. $\int (x+3)^{50}\,dx = \frac{1}{51}(x+3)^{51}+C$

19. $\int (2x+3)^{10}\,dx = \frac{1}{22}(2x+3)^{11}+C$

20. $\int \frac{7}{(x+2)^8}dx = -(x+2)^{-7}+C$

計算:

1. $\int \frac{3x+7}{(x-2)(x+3)}dx =$

$= \int \frac{13/5}{(x-2)}+\frac{2/5}{(x+3)}dx$

$= \frac{13}{5}\ln(x-2)+\frac{2}{5}\ln(x+3)+C$

2. $\int \frac{3x^3-2x^2+5x+7}{(x-2)^4}dx =$

$= \int \frac{3(x-2)^3+16(x-2)^2+33(x-2)+33}{(x-2)^4}dx$

$= \int \left[\frac{2}{(x-2)}+\frac{16}{(x-2)^2}+\frac{33}{(x-2)^3}+\frac{33}{(x-2)^4}\right]dx$

$= 2\ln(x-2)-16(x-2)^{-1}-\frac{33}{2}(x-2)^{-2}$

$-11(x-2)^{-3}+C$