中山大學 本科生考试草稿纸 2011.3/7—5-7.

警示 《中山大学授予学士学位工作细则》第七条："考试作弊者不授予学士学位。"

P.144.19 $\int \sin^5 x\cdot\cos^2 x\,dx = \int \sin^4 x\cdot\cos^2 x\,(-d\cos x) = -\int (1-\cos^2 x)^2\cdot\cos^2 x\,d\cos x$

$= -\int (1-2\cos^2 x+\cos^4 x)\cdot\cos^2 x\,d\cos x$

$= \int (-\cos^6 x+2\cos^4 x-\cos^2 x)\,d\cos x$

$= -\frac{\cos^7 x}{7}+\frac{2\cos^5 x}{5}-\frac{\cos^3 x}{3}+C.$

P.144.20 $\int \sin^6 x\,dx = -\int \sin^5 x\,d\cos x = -\sin^5 x\cdot\cos x+\int \cos x\,d\sin^5 x$

$= -\sin^5 x\cdot\cos x+5\int \cos^2 x\cdot\sin^4 x\,dx$

$= -\sin^5 x\cdot\cos x+5\int \sin^4 x\,dx-5\int \sin^6 x\,dx$

$\int \sin^6 x\,dx = -\frac{1}{6}\sin^5 x\cdot\cos x+\frac{5}{6}\int \sin^4 x\,dx$

$= -\frac{1}{6}\sin^5 x\cdot\cos x-\frac{5}{6}\int \sin^3 x\,d\cos x$

$= -\frac{1}{6}\sin^5 x\cdot\cos x-\frac{5}{6}(\sin^3 x\cdot\cos x)+\frac{5}{6}\int \cos x\cdot 3\sin^2 x\cdot\cos x\,dx]$

$= -\frac{1}{6}\sin^5 x\cdot\cos x-\frac{5}{6}\sin^3 \cancel{x}\cdot\cos x+\frac{15}{6}\int \sin^2 x\cos^2 x\,dx$

$= -\frac{1}{6}\sin^5 x\cdot\cos x-\frac{5}{6}\sin^3 x\cdot\cos x-\frac{15}{24}\int \frac{1-\cos 4x}{2}\,dx$

$= -\frac{1}{6}\sin^5 x\cdot\cos x-\frac{5}{6}\sin^3 x\cdot\cos x-\frac{5}{16}x+\frac{15}{64}\sin 4x+C.$

P.144.21 $\int \sin^2 x\cdot\cos^4 x\,dx$

$= \int \sin^2 x\cdot\cos^2 x\cdot\cos^2 x\,dx$

$= \frac{1}{4}\int \sin^2 2x\cdot\frac{1+\cos 2x}{2}\,dx$

$= \frac{1}{8}\int \sin^2 2x\,dx+\frac{1}{16}\int \sin^2 2x\,d\sin 2x$

$= \frac{1}{8}\int \frac{1-\cos 4x}{2}\,dx+\frac{1}{16}\cdot\frac{\sin^3 2x}{3}+C = \frac{x}{16}-\frac{\sin 4x}{64}+\frac{1}{48}\sin^3 2x+C.$