7. 
$$\int_0^{\pi} x \cos(2m+1)x \, dx = 0$$
  $\Gamma X2 (332)(12a)$ 

8. 
$$\int_0^\pi \sin^{v-1} x \cos ax \, dx = \frac{\pi \cos \frac{a\pi}{2}}{2^{\nu-1} \nu B\left(\frac{\nu+a+1}{2}, \frac{\nu-a+1}{2}\right)}$$
 [Re  $\nu > 0$ ] Лб V 121(68)и, Вт 337и

9. 
$$\int_0^{\pi/2} \sin^{\nu-1} x \cos ax \, dx = \frac{\pi}{2^{\nu} \nu B\left(\frac{\nu + a + 1}{2}, \frac{\nu - a + 1}{2}\right)}$$

$$[Re \ \nu > 0]$$

$$\Gamma X2 (332)(9c)$$

10. 
$$\int_0^{\pi/2} \sin^{\nu-2} x \cos \nu x \, dx = \frac{1}{\nu - 1} \sin \frac{\nu \pi}{2}$$
 [Re  $\nu > 1$ ] X2 (332)(9c)

11. 
$$\int_0^\pi \sin^\nu x \cos \nu x \, dx = \frac{\pi}{2^\nu} \cos \frac{\nu \pi}{2}$$
 [Re  $\nu > -1$ ] Лб V 121(70)и

12. 
$$\int_0^\pi \sin^{2n} x \cos 2mx \, dx = 2 \int_0^{\pi/2} \sin^{2n} x \cos 2mx \, dx = \frac{(-1)^m}{2^{2n}} \binom{2n}{n-m} \pi \qquad [n \geqslant m]$$
$$= 0 \qquad \qquad [n < m]$$
Bu (40)(16), \Gamma X2 (332)(12b)

13.7 
$$\int_0^{\pi} \sin^{2n+1} x \cos 2mx \, dx =$$

$$= 2 \int_0^{\pi/2} \sin^{2n+1} x \cos 2mx \, dx = \frac{(-1)^m 2^{n+1} n! (2n+1)!!}{(2m-2n-3)!! (2m+2n+1)!!} \qquad [n \leqslant m-1]$$

$$= \frac{(-1)^{n+1} 2^{n+1} n! (2m-2n+3)!! (2n+1)!!}{(2m+2n+1)!!} \qquad [n < m-1]$$

$$= \frac{(-1)^{n+1} 2^{n+1} n! (2m-2n+3)!! (2n+1)!!}{(2m+2n+1)!!} \qquad [n < m-1]$$

$$= \frac{(-1)^{n+1} 2^{n+1} n! (2m-2n+3)!! (2n+1)!!}{(2m+2n+1)!!} \qquad [n < m-1]$$

14. 
$$\int_0^{\pi/2} \cos^{\nu-2} x \sin \nu x \, dx = \frac{1}{\nu - 1}$$
 [Re  $\nu > 1$ ]  $\Gamma X2 (332)(16c)$ ,  $\Phi x$  II 152

15. 
$$\int_0^\pi \cos^m \sin nx \, dx = [1 - (-1)^{m+n}] \int_0^{\pi/2} \cos^m x \sin nx \, dx =$$

$$= [1 - (-1)^{m+n}] \left\{ \sum_{k=0}^{r-1} \frac{m!}{(m-k)!} \frac{(m+n-2k-2)!!}{(m+n)!!} + s \frac{m!(n-m-2)!!}{(m+n)!!} \right\}$$

$$\begin{bmatrix} r = \begin{cases} m, & \text{если } m \leqslant n \\ n, & \text{если } m \geqslant n \end{cases}, \quad s = \begin{cases} 2, & \text{если } n-m=4l+2>0 \\ 1, & \text{если } n-m=2l+1>0 \\ 0, & \text{если } n-m=4l \text{ или } n-m<0 \end{cases}$$

$$\Gamma X2 (332)(13a)$$

16. 
$$\int_0^{\pi/2} \cos^n x \sin nx \, dx = \frac{1}{2^{n+1}} \sum_{k=1}^n \frac{2^k}{k}$$
  $\Phi_x$  II 153