$$\int_0^4 x^3\,dx;\ n = 4$$

$$\frac{\left(\frac{4-0}{4}\right)}{2}\left[0^3 + 2(1^3) + 2(2^3) + 2(3^3) + 4^3\right]$$

$$= \boxed{68}$$

$\int_0^{\pi} \sin x \, dx; \, n = 4$

$$\frac{\left(\frac{\pi - 0}{4}\right)}{2}\left[\sin 0 + 2\sin\frac{\pi}{4} + 2\sin\frac{\pi}{2} + 2\sin\frac{3\pi}{4} + \sin\pi\right]$$

$$= \frac{\pi}{8}\left(0 + \sqrt{2} + 2 + \sqrt{2} + 0\right) = \frac{\pi\left(2 + 2\sqrt{2}\right)}{8}$$

$$= \boxed{\frac{\pi\left(1 + \sqrt{2}\right)}{4}}$$

$$\int_2^5 \frac{x}{x-1}\,dx\,;\; n = 3$$

$$\text{Trap}: \frac{\left(\frac{5-2}{3}\right)}{2}\left[\frac{2}{2-1} + 2\left(\frac{3}{3-1}\right) + 2\left(\frac{4}{4-1}\right) + \frac{5}{5-1}\right] = \boxed{\frac{107}{24}}$$

$\int_1^7 f(x)\,dx;\ n = 3;$

x	1	2	3	4	5	6	7
$f(x)$	1	5	4	5	0	8	6

Trap: $\frac{\left(\frac{7-1}{3}\right)}{2}\left[1 + 2(4) + 2(0) + 6\right] = \boxed{15}$

$\int_{-1}^{7} g(x)\,dx;\ n = 4;$

x	-1	2	4	5	7
$g(x)$	3	4	6	2	10

Trap: $\left(\frac{3+4}{2}\right)(3) + \left(\frac{4+6}{2}\right)(2) + \left(\frac{6+2}{2}\right)(1) + \left(\frac{2+10}{2}\right)(2)$

$= \frac{21}{2} + 10 + 4 + 12 = \boxed{\frac{73}{2}}$