

- The calculation formula for **compounded TONA (R)** used for determining the final settlement price for 3 Month TONA Futures is as follows.

R = The annualized interest rate (expressed as a percentage) calculated by multiplying the interest rate calculated by daily cumulative compounding of TONA (confirmed) for each business day (for each non-business day, TONA for the preceding business day will apply without compounding) during the Interest Rate Reference Period by (365 / actual number of days in the Interest Rate Reference Period), rounded to four decimal places

$$\underbrace{\left\{ \prod_{i=1}^M \left(1 + TONA_i \times \frac{D_i}{365} \right) - 1 \right\} \times \frac{365}{a}}_{\text{Rounded to four decimal places}}$$

M : Total number of business days during Interest Rate Reference Period for relevant contract month

i : Relevant business day of Interest Rate Reference Period

TONA_i : TONA value (confirmed) for *i*th business day

D_i : Number of calendar days to which *TONA_i* applies

a : Total number of calendar days in Interest Rate Reference Period

Note: If the first day of the Interest Rate Reference Period is a holiday, the calculation formula is as follows:

$$\left(1 + TONA_0 \times \frac{D_0}{365} \right) \left\{ \prod_{i=1}^M \left(1 + TONA_i \times \frac{D_i}{365} \right) - 1 \right\} \times \frac{365}{a}$$

TONA₀ : TONA value (confirmed) for the business day prior to the first day of the Interest Rate Reference Period

D₀ : Number of consecutive non – business days from the first day of the Interest Rate Reference Period

Example of Final Settlement Price & Profit/Loss

- If one unit of the September 2021 contract is sold at 100.0475
- Interest Rate Reference Period: September 15, 2021 (Wed.) through December 14, 2021 (Tue.)

Business Days	Confirmed TONA	Applicable days									
Wed 9/15	-0.033	1	Thu 10/7	-0.009	1	Fri 10/29	-0.027	3	Wed 11/24	-0.041	1
Thu 9/16	-0.026	1	Fri 10/8	-0.008	3	Mon 11/1	-0.029	1	Thu 11/25	-0.042	1
Fri 9/17	-0.022	4	Mon 10/11	-0.021	1	Tue 11/2	-0.031	2	Fri 11/26	-0.043	3
Tue 9/21	-0.022	1	Tue 10/12	-0.032	1	Thu 11/4	-0.033	1	Mon 11/29	-0.047	1
Wed 9/22	-0.021	2	Wed 10/13	-0.040	1	Fri 11/5	-0.036	3	Tue 11/30	-0.048	1
Fri 9/24	-0.022	3	Thu 10/14	-0.052	1	Mon 11/8	-0.045	1	Wed 12/1	-0.050	1
Mon 9/27	-0.024	1	Fri 10/15	-0.046	3	Tue 11/9	-0.051	1	Thu 12/2	-0.050	1
Tue 9/28	-0.025	1	Mon 10/18	-0.039	1	Wed 11/10	-0.049	1	Fri 12/3	-0.043	3
Wed 9/29	-0.025	1	Tue 10/19	-0.038	1	Thu 11/11	-0.047	1	Mon 12/6	-0.035	1
Thu 9/30	-0.049	1	Wed 10/20	-0.036	1	Fri 11/12	-0.038	3	Tue 12/7	-0.028	1
Fri 10/1	-0.018	3	Thu 10/21	-0.031	1	Mon 11/15	-0.030	1	Wed 12/8	-0.022	1
Mon 10/4	-0.017	1	Fri 10/22	-0.028	3	Tue 11/16	-0.037	1	Thu 12/9	-0.015	1
Tue 10/5	-0.015	1	Mon 10/25	-0.027	1	Wed 11/17	-0.037	1	Fri 12/10	-0.008	3
Wed 10/6	-0.012	1	Tue 10/26	-0.026	1	Thu 11/18	-0.038	1	Mon 12/13	-0.009	1
			Wed 10/27	-0.027	1	Fri 11/19	-0.037	3	Tue 12/14	-0.014	1
			Thu 10/28	-0.027	1	Mon 11/22	-0.038	2			
									Total	91 days	

Calculation Process for compounded TONA (R):

$$\{(1 + (-0.033\%) \times 1/365)(1 + (-0.026\%) \times 1/365)(1 + (-0.022\%) \times 4/365)..... (1 + (-0.014\% \times 1/365) - 1\} \times (365/91)$$

$$= -0.03054... \hat{=} -0.0305 \text{ (rounded to four decimal places)}$$

Thus, the final settlement price is $100 - (-0.0305) = 100.0305$

Profit/loss after the final settlement is $(100.0475 - 100.0305) \times 250,000 \times 1 = 4,250$ (profit of JPY 4,250)