Exercise 01

Consider an interest rate of 5.0% p.a. and the period between the following value dates: January 27, 2024, and June 7, 2024 (leap year). Using Excel, calculate for the following day-count conventions:

- ACT/ACT
- ACT/365
- ACT/360
- 30/360

the interest accrued over this period for a capital of EUR 10 000.

Solution

Base	Jan.	Feb.	Mar.	Apr.	May	Jun.	Total	Year
ACT/ACT	4	29	31	30	31	7	132	366
ACT/365	4	29	31	30	31	7	132	365
ACT/360	4	29	31	30	31	7	132	360
30/360	3	30	30	30	30	7	130	360

ACT/ACT: 132/366 x 5.0% x 10 000 = EUR 180.3279
ACT/365: 132/365 x 5.0% x 10 000 = EUR 180.8219
ACT/360: 132/360 x 5.0% x 10 000 = EUR 183.3333
30/360: 130/360 x 5.0% x 10 000 = EUR 180.5556

Excel Solution

The Excel date/time function `YEARFRAC` calculates the fraction of the year represented by the number of days between two dates, using the following syntax:

`YEARFRAC(`Start_date, End_date, Base)

- Start_date: Required. A date representing the start date.
- End_date: Required. A date representing the end date.
- Base: Optional. The type of day-count basis to use (0-4), where:

Base	Day-Count Convention
0 ou omitido	EUA (NASD) 30/360
1	ACT/ACT
2	ACT/360
3	ACT/365
4	Europeia 30/360

ACT/ACT: = YEARFRAC(DATA(2024, 1, 27), DATA(2024, 6, 7), 1) * 5.0% * 10000 → EUR 180.3279
ACT/365: = YEARFRAC(DATA(2024, 1, 27), DATA(2024, 6, 7), 3) * 5.0% * 10000 → EUR 180.8219
ACT/360: = YEARFRAC(DATA(2024, 1, 27), DATA(2024, 6, 7), 2) * 5.0% * 10000 → EUR 183.3333
30/360: = YEARFRAC (DATA(2024,1, 27), DATA(2024, 6, 7), 4) * 5.0% * 10000 → EUR 180.5556

The Excel date/time function `DATE` returns the sequential serial number that represents a particular date, using the following syntax:

`DATE`(year, month, day).

Other useful Excel date/time functions in this context are:

- `DAYS`(end_date, start_date) – Returns the number of days between two dates
- `DAYS360`(end_date, start_date, method) – Returns the number of days between two dates based on a 360-day year (twelve 30-day months). Method is a logical value that specifies which method to use for the calculation, the U.S. or the European.

Logical Value	Method
`FALSE` or omited	US (NASD)
`TRUE`	European

U.S. (NASD) Method: If the start date is the last day of a month, it will be considered as the 30th day of the same month. If the end date is the last day of a month and the start date is before the 30th day of the month, the end date will be considered as the 1st day of the next month; otherwise, the end date will be considered as the 30th day of the same month.

European Method: The start and end dates that fall on the 31st of a month will be considered as the 30th day of the same month. (Source: Microsoft Excel Support.)