Effective interest rates

6 questions | 18 marks

Equivalent correct methods earn the corresponding marks.

1. Convert 4.8% nominal per year, compounded quarterly, to an effective annual rate.
[3 marks]

Quarterly rate is 0.012.

Effective rate is $(1.012)^4 - 1$.

Answer: 4.8871%

2. A balance grows by a factor of 1.072 in one year. State its effective annual interest rate.
[3 marks]

Effective rate is annual multiplier minus 1.

$1.072 - 1 = 0.072 = 7.2\%$.

Answer: 7.2%

3. Find the nominal annual rate, compounded monthly, equivalent to 6% effective per year.
[3 marks]

Monthly rate is $1.06^{\frac{1}{12}} - 1$.

Multiply that periodic rate by 12 to quote the nominal annual rate.

Answer: 5.8411%

4. What monthly effective rate is equivalent to an 8% effective annual rate? [3 marks]

Let i be the monthly rate, so $(1+i)^{12} = 1.08$.

$i = 1.08^{\frac{1}{12}} - 1$.

Answer: 0.6434%

5. AUD 4,000 is invested for 3 years at an effective annual rate of 5.2%. Find its balance. [3 marks]

Use the effective annual multiplier for each of three years.

Balance is $4000(1.052)^3$.

Answer: AUD 4,657.01

6. A nominal rate is 0% with monthly compounding. Find its effective annual rate and explain the result. [3 marks]

$(1+\frac{0}{12})^{12} - 1 = 0$.

Every monthly multiplier is 1.

Answer: 0%; changing the frequency cannot create interest from a zero periodic rate.