

Time Value of Money

Introduction:

The time value of money (TVM) is the principle that a certain amount of money has different *buying power* (or value) at different points in time (e.g. now versus the future). This happens because a certain amount of money has the potential to earn interest over time thus increasing in “value.” In other cases, interest must be paid for the use of money.

Time value of money applies to many calculations in business math including simple and compound interest, annuities, perpetuities, bonds, etc.

Tips for Solving TVM Word Problems/Exercises:

When working with time value of money math problems it is very important to:

1. Understand the specific terminology used. (See Glossary of Terms)
2. Write down what is given in the question.
3. Write down exactly what you are trying to find.
4. Use a graphical representation (i.e. timeline) to represent what’s happening with the money.
5. Identify what concept the problem describes. (See Concepts Summary Chart below).
6. Use the appropriate formula or TVM calculator algorithm.
7. Check for reasonableness of your answer.

Glossary of Terms:

Amortization – repayment of principal and interest earned on an interest-bearing loan (e.g. residential mortgage) by a series of equal payments made at equal intervals of time.

Annuity – a series of payments, usually equal in size, made at equal periodic time intervals.

Compound interest – interest that is calculated on the principal AND accumulated interest. Every time interest is calculated it is added onto the principal.

Compounding frequency (also known as **conversion frequency**) – how often compound interest is calculated and added onto the principal.

Dated value (also called **equivalent value**) – the value of a sum of money on a specific date which includes interest relative to its due date.

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Demand loan – a loan for which partial payment or payment in full may be requested by the lender at any time or may be paid by the recipient at any time.

Discounting – finding the present value (also known as **discounted value** or **proceeds**) of a future sum of money.

Effective rate of interest – the annual rate of interest that earns the *same* amount of interest per year as a nominal rate compounded a number of times per year. (Note: for a given nominal annual rate of interest the effective rate of interest increases as the number of conversion periods per year increases).

Equivalent rates – interest rates that accumulate a given principal to the *same future value* over the same period of time.

Face value – the amount that must be paid on the legal due date for a note.

Focal date – a specific time (for example, now) chosen to compare one or more dated values of money.

Future value (also called **maturity value**) – amount of money that includes the principal plus the interest earned over a given period of time at a given interest rate.

Legal due date (also called **date of maturity**) – the date on which a promissory note is to be paid. In Canada, this includes three days of grace unless “No Grace Days” is written on the note.

Nominal rate of interest – the stated annual (or yearly) rate of interest charged on the principal.

Periodic rate of interest – the rate of interest per compounding period.

Present value – the principal that grows to a specific future value of money over a given period of time based on a given interest rate.

Rate money is worth – the prevailing rate of interest.

Simple Interest – interest that applies only to the principal (and NOT on accumulated interest).

Treasury bills (T- bills) – promissory notes issued by the federal government and some provincial governments. T-bills are issued at a discount from their face value.

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Concepts Summary Chart

