What Is a Profit and Loss (P&L) Statement?

Profit and loss (P&L) statement refers to a financial statement that summarizes the revenues, costs, and expenses incurred during a specified period, usually a quarter or fiscal year. These records provide information about a company's ability or inability to generate profit by increasing revenue, reducing costs, or both. P&L statements are often presented on a cash or accrual basis. Company managers and investors use P&L statements to analyze the financial health of a company.

How Profit and Loss (P&L) Statements Work

The P&L statement is one of three financial statements that every public company issues on a quarterly and annual basis, along with the balance sheet and the cash flow statement. It is often the most popular and common financial statement in a business plan, as it shows how much profit or loss was generated by a business.

Types of Profit and Loss (P&L) Statements

As noted above, a P&L statement may be prepared in one of two ways. These are the cash method and the accrual method.

Cash method

The cash method, which is also called the cash accounting method, is only used when cash goes in and out of the business. This is a very simple method that only accounts for cash received or paid. A business records transactions as revenue whenever cash is received and as liabilities whenever cash is used to pay any bills or liabilities. This method is commonly used by smaller companies as well as people who want to manage their personal finances.3

In how many different ways can the letters of the word 'MATHEMATICS' be arranged so that the vowels always come together?

In the word 'MATHEMATICS', we'll consider all the vowels AEAI together as one letter.

Thus, we have MTHMTCS (AEAI).

Now, we have to arrange 8 letters, out of which M occurs twice, T occurs twice

Number of ways of arranging these letters =8! / ((2!)(2!))= 10080.

Now, AEAI has 4 letters in which A occurs 2 times and the rest are different.

Number of ways of arranging these letters =4! / 2!= 12.

Required number of words = (10080 x 12) = **120960**

Bankers discount

Suppose that a trader purchases the goods worth Rs. 500 from another trader. The credit given here by trader A to B is 4 months. Thus, B prepares a bill known as the bill of exchange or more commonly as Hundi. So, when the goods are received, A agrees on the exchange by signing a document that allows B to withdraw the amount from A's account as soon as 4 are over from the date of purchase. This date which is exactly after 4 months after the time period is called as the nominally due date. These concepts are very useful when you are solving the questions of bankers discount.

In the above example, in addition to 4 months, three more days are added. These days are in addition to the date and it is known as the legally due date. Also, the amount of Rs. 500 on the bill is known as the face value. Important formula for Bankers Discount

Suppose, **TD = True discount, F = Face value of bill, R = rate of interest, BD = Bankers discount, PW = Present worth, and T = time (years)**

So, simple interest levied on the face value for the bill for unexpired time = BD = FTR/100

Therefore, PW = F/(1 + T(R/100))

Simple interest levied on the present value for the remaining time = TD = PW x TR/100 = FTR/(100 + TR)

So, TD = BD x 100/100 + TR

=> PW = F – TD

F = BD x TD/BD – TD

So, BG = $(TD)^2/PW$

TD = BG x 100/TR

What is Simple Interest?

Simple Interest (S.I) is the method of calculating the interest amount for some principal amount of money. Have you ever borrowed money from your siblings when your pocket money is exhausted? Or lent him maybe? What happens when you borrow money? You use that money for the purpose you had borrowed it in the first place. After that, you return the money whenever you get the next month's pocket money from your parents. This is how borrowing and lending work at home.

But in the real world, money is not free to borrow. You often have to borrow money from banks in the form of a loan. During payback, apart from the loan amount, you pay some more money that depends on the loan amount as well as the time for which you borrow. This is called simple interest. This term finds extensive usage in banking.

Simple Interest Formula

The formula for simple interest helps you find the interest amount if the principal amount, rate of interest and time periods are given.

Simple interest formula is given as:

SI=PTR100

Where SI = simple interest

P = principal

R = interest rate (in percentage)

T = time duration (in years)

In order to calculate the total amount, the following formula is used:

Amount (A) = Principal (P) + Interest (I)

Where,

Amount (A) is the total money paid back at the end of the time period for which it was borrowed.

The total amount formula in case of simple interest can also be written as:

A = P(1 + RT)

Here,

A = Total amount after the given time period

P = Principal amount or the initial loan amount

R = Rate of interest (per annum)

T = Time (in years)

Example :

Rishav takes a loan of Rs 10000 from a bank for a period of 1 year. The rate of interest is 10% per annum. Find the interest and the amount he has to pay at the end of a year.

Solution:

Here, the loan sum = P = Rs 10000

Rate of interest per year = R = 10%

Time for which it is borrowed = T = 1 year

Thus, simple interest for a year, SI = (P × R ×T) / 100 = (10000 × 10 ×1) / 100 = Rs 1000

Amount that Rishav has to pay to the bank at the end of the year = Principal + Interest = 10000 + 1000 = Rs 11,000

Permutation and combination

Permutation and combination are the ways to represent a group of objects by selecting them in a set and forming subsets. It defines the various ways to arrange a certain group of data. When we select the data or objects from a certain group, it is said to be permutations, whereas the order in which they are represented is called combination. Both concepts are very important in Mathematics.

Permutation and combination are explained here elaborately, along with the difference between them. We will discuss both the topics here with their formulas, real-life examples and solved questions. Students can also work on Permutation And Combination Worksheet to enhance their knowledge in this area along with getting tricks to solve more questions.

What is Permutation?

In mathematics, **permutation relates to the act of arranging all the members of a set into some sequence or order.** In other words, if the set is already ordered, then the rearranging of its elements is called the process of permuting. Permutations occur, in more or less prominent ways, in almost every area of mathematics. They often arise when different orderings on certain finite sets are considered.

What is a Combination?

The **combination is a way of selecting items from a collection, such that (unlike permutations) the order of selection does not matter**. In smaller cases, it is possible to count the number of combinations. Combination refers to the combination of n things taken k at a time without repetition. To refer to combinations in which repetition is allowed, the terms k-selection or k-combination with repetition are often used. Permutation and Combination Class 11 is one of the important topics which helps in scoring well in Board Exams.

Permutation and Combination Formulas

There are many formulas involved in permutation and combination concepts. The two key formulas are:

Permutation Formula

A permutation is the choice of r things from a set of n things without replacement and where the order matters.

$^nP_r = (n!) / (n-r)!$

Combination Formula

A combination is the choice of r things from a set of n things without replacement and where order does not matter.

$$_nC_r = \binom{n}{r} = \frac{_nP_r}{r!} = \frac{n!}{r!(n-r)!}$$

Uses of Permutation and Combination

A permutation is used for the list of data (where the order of the data matters) and the combination is used for a group of data (where the order of data doesn't matter).

Example :

In a dictionary, if all permutations of the letters of the word AGAIN are arranged in an order. What is the 49th word?

Solution:

Start with the letter A	The arranging the other 4 letters: G, A, I, N = 4! = 24	First 24 words
Start with the letter G	arrange A, A, I and N in different ways: 4!/2! = 12	Next 12 words
Start with the letter I	arrange A, A, G and N in different ways: 4!/2! = 12	Next 12 words

This accounts up to the 48th word. The 49th word is "NAAGI".

The Difference Between Bar Graphs and Line Graphs

What Is a Bar Graph?

Bar graphs involve rectangular blocks of varying heights, and the height of the block corresponds to the value of the quantity being represented. The vertical axis shows the values – for example, the total number of each type of object counted – and the horizontal axis shows the categories. As a concrete example, if you're counting the different types of vehicles in a parking lot, the individual blocks could represent cars, vans, motorcycles and jeeps, and their heights could represent how many you counted.

What Is a Line Graph?

A line graph differs from a bar graph in that you plot individual points on the two axes and join neighboring points up using straight lines. The vertical axis could represent basically anything, but the horizontal axis ordinarily represents time. The continuous line (or lines) implies a trend over time or at least over some quantity that increases sequentially, like distance from a given point. The appearance of line graphs differs in quite an obvious way from bar graphs (because there are only thin lines plotted on the axes rather than large blocks), but the function differs substantially too. Line graphs can also represent trends in numerous quantities over time, by using multiple lines instead of just one.

When to Use a Bar Graph

The versatility of bar graphs means they're useful in many different situations. However, you need to be able to break your data down into specific categories, or at least be able to group it into categories so each distinct bar has a specific meaning. However, since the vertical axis can represent basically anything, you have a lot of options.

When to Use a Line Graph

Bar graphs can show trends over time (as in the previous example), but line graphs have an advantage in that it's easier to see small changes on line graphs than bar graphs, and that the line makes the overall trends very clear. They are less versatile than bar graphs, but better for many purposes.

Probability Definition in Math

Probability means possibility. It is a branch of mathematics that deals with the occurrence of a random event. The value is expressed from zero to one. Probability has been introduced in Maths to predict how likely events are to happen. The meaning of probability is basically the extent to which something is likely to happen. This is the basic probability theory, which is also used in the probability distribution, where you will learn the possibility of outcomes for a random experiment. To find the probability of a single event to occur, first, we should know the total number of possible outcomes.

Probability is a measure of the likelihood of an event to occur. Many events cannot be predicted with total certainty. We can predict only the chance of an event to occur i.e., how likely they are going to happen, using it. Probability can range from 0 to 1, where 0 means the event to be an impossible one and 1 indicates a certain event. Probability for Class 10 is an important topic for the students which explains all the basic concepts of this topic. The probability of all the events in a sample space adds up to 1.

For example, when we toss a coin, either we get Head OR Tail, only two possible outcomes are possible (H, T). But when two coins are tossed then there will be four possible outcomes, i.e {(H, H), (H, T), (T, H), (T, T)}.

Formula for Probability

The probability formula is defined as the possibility of an event to happen is equal to the ratio of the number of favourable outcomes and the total number of outcomes.

Probability of event to happen P(E) = Number of favourable outcomes/Total Number of outcomes

Sometimes students get mistaken for "favourable outcome" with "desirable outcome". This is the basic formula. But there are some more formulas for different situations or events.

Solved Examples

1) There are 6 pillows in a bed, 3 are red, 2 are yellow and 1 is blue. What is the probability of picking a yellow pillow?

Ans: The probability is equal to the number of yellow pillows in the bed divided by the total number of pillows, i.e. 2/6 = 1/3.

How to Calculate the Day of the Week from Any Date

Here is a calendar calculation technique that I learned from a book called Mind Performance Hacks. It allows you to take a date, like 14 March 1987, and mentally calculate which day of the week it fell on.

The Formula

The formula is:

(Year Code + Month Code + Century Code + Date Number - Leap Year Code) mod 7

Here's How it Works

I'll run through an example with the date, 14 March 1897 — Einstein's birthday.

The Year Code

To calculate the Year Code, use this formula:

(YY + (YY div 4)) mod 7

YY is the last two digits of the year. For the year 1897, it's 97.

First, divide YY by 4 and discard the remainder: 97 div 4 = 24.

Then add 24 back into the YY number, which is 97 in this case, resulting in 121.

The next step is: 121 mod 7.

"Mod" means to divide the number and keep only the remainder. For 121 mod 7, start removing sevens:

- 10 x 7 is 70, leaving us with 51, because 121 - 70 = 51.
- 7 x 7 = 49, and 51 - 49 = 2.

We've removed all the sevens from 121 until we are left with a remainder of 2. That is the Year Code for 1897.

You could use a number shape image like a swan to hold that in memory while you calculate the items below.

The Month Code

This is easy -- just memorize the number 033614625035:

- January = 0
- February = 3
- March = 3
- April = 6
- May = 1
- June = 4
- July = 6
- August = 2
- September = 5
- October = 0
- November = 3
- December = 5

Now you have the Month Code. For Einsteins birthday in March, it is 3.

The Century Code

You then need to apply an adjustment based on the century. In Great Britain, and what was to become the USA, the calendar system changed from the Julian Calendar to the Gregorian Calendar on 2 September 1752. The Gregorian Calendar began on 14 September 1752, skipping 11 days.

Gregorian Dates

For the Gregorian Calendar, remember the number 4206420:

- 1700s = 4
- 1800s = 2
- 1900s = 0
- 2000s = 6
- 2100s = 4
- 2200s = 2
- 2300s = 0

If you are only doing this calendar trick with friends' birthdays, you could probably leave this step out, because dates that fall in the 1900s get a Century Code of zero and don't affect the outcome of the calculation.

Julian Dates

If you are looking at a Julian date, the formula is to take the century number and subtract it from 18 and then mod 7.

Example 1: if the year is 852 CE, take the century number, 8, and subtract it from 18, leaving 10. Then, 10 mod 7 =3.**Example 2:** if the year is 1625 CE, take the century number, 16, and subtract it from 18, leaving 2. 2 mod 7 = 2, so in this case the Century Code is 2.

For Einsteins birthday in 1897, the Century Code is 2, because it's a Gregorian date, and the chart above shows that dates in the 1800s get an adjustment of 2.

Leap Year Code

The other thing to take into account is whether you are dealing with a leap year. **EDIT:** *If the date is in a January or February of a leap year*, you have to subtract one from your total before the final step.

Gregorian Calendar

If you can divide a Gregorian year by 4, it's a leap year, unless it's divisible by 100. But it *is* a leap year if it's divisible by 400.

1992 is a leap year because you can divide it by four. 1900 is not a leap year because you can divide it by 100. 2000 is a leap year because you can divide it by 400.

Julian Calendar

If you can divide a Julian year by 4, it's a leap year.

Einstein's birthday was in 1897 which was not a leap year (0), so it doesn't affect the outcome.

Calculating the Day

Back to the original formula:

(Year Code + Month Code + Century Code + Date Number - Leap Year Code) mod 7

For 14 March 1897, here are the results:

- Year Code: 2
- Month Code: 3
- Century Code: 2
- Date Number: 14 (the 14th of the month)
- Leap Year Code: 0

So:

(2 + 3 + 2 + 14) mod 7 = 21 mod 7 = 0

Match the resulting number in the list below, and you'll have the day of the week:

- 0 = Sunday
- 1 = Monday
- 2 = Tuesday
- 3 = Wednesday
- 4 = Thursday
- 5 = Friday
- 6 = Saturday

Einstein was born on a **Sunday.**

Cube root

Cube root of number is a value which when multiplied by itself thrice or three times produces the original value. For example, the cube root of 27, denoted as $\sqrt[3]{27}$, is 3, because when we multiply 3 by itself three times we get 3 x 3 x 3 = 27 = 3^3. So, we can say, the cube root gives the value which is basically cubed. Here, 27 is said to be a perfect cube. From the word, cube root, we can understand what is the root of the cube. It means which number caused the cube present under the root. Usually, to find the cubic root of perfect cubes, we use the prime factorisation method. In a similar manner, we can learn the significance of square root here.

In three-dimensional geometry, when we learn about different solids, the cube defines an object which has all its faces or sides equal in dimensions. Also, the formula to find the volume of the cube is equal to $side^3$. Hence, if we know the volume of the cube we can easily find the side length of it using cube root formula. This is one of the major applications of cube roots. It defines the cubic root of volume of the cube is equal to the side of it.

Cube Root Symbol

The cube root symbol is denoted by '$^3\sqrt{}$'. In the case of square root, we have used just the root symbol such as '$\sqrt{}$', which is also called a radical. Hence, symbolically we can represent the cube root of different numbers as: Cube root of 5 = $\sqrt[3]{5}$ Cube root of 11 = $\sqrt[3]{11}$ And so on.

Cube Root Formula

As we already know, the cube root gives a value which can be cubed to get the original value. Suppose, cube root of 'a' gives a value 'b', such that;

$\sqrt[3]{a} = b$ This formula is only possible if and only if; $a = b^3$

This formula is useful when we find the cubic root of perfect cubes.

1. Find the cube root of 64.

Solution: To find the cube root of 64, we need to use the prime factorisation method. 64 = 2×2×2×2×2×2 64 = 4 × 4 × 4 64 = 4^3

Now taking the cube root on both the sides, we get;

$\sqrt[3]{64} = \sqrt[3]{(4^3)}$

$\sqrt[3]{64} = 4$

Surds and indices

A surd is a mathematical expression that includes the root function implied for any numeric value, be it a square root, a cube root, or any other root. Surds are helpful when we have to write irrational numbers without simplifying them into any format that cannot be understood easily and precisely.

The primary reason behind the usage of surds is that the decimals that are generated after the simplification of irrational numbers follow recursion or do not terminate, which makes it difficult to write them precisely in decimal form.

For example, let us take $\sqrt{3}$. The value of $\sqrt{3}$ = 1.73205081. This value repeats itself after the decimal place, so it is a good choice to leave it with the square root only and not complicate the calculations.

Any number or algebraic expression that is in the power or exponent place with respect to the base number is referred to as an index number. The index number is helpful in determining the exact number of iterations by which the base number is being multiplied by itself.

Types Of Surds

- Simple Surds: – Simple Surds got their name from their characteristics because they have a single number, or we can call it monomial.
  For example, $\sqrt{2}$.
- Pure Surds: – Pure Surds are surds that do not have any rational factors, that is they are completely irrational.
  For example, $\sqrt{3}$ and $\sqrt{11}$.
- Similar Surds: – Similar surds are called such because these surds have a common root factor.
  For example, $3\sqrt{2}$ and $7\sqrt{2}$.
- Mixed Surds: – Mixed Surds are surds that have a real number coefficient outside the root which makes them partially rational, and hence, they can be defined as a product of an irrational number with a rational number.
  For example, $3\sqrt{7}$ and $2\sqrt{6}$.
- Compound Surds: – A compound surd is a surd that is the algebraic addition or subtraction of two or more than two surds.

For example, (√6 + √3)

Surds And Indices Formula

- √(a x b) = √a x √b

  To simplify √18

  18 = 2 x 9 = 2 x 32, since 9 is the perfect square inside the square root, so it can be broken down into 32.

  Therefore, we can write √18 = √(32 x 2)

  = √32 x √2

  = 3 √2

- √(a / b) = √a / √b

  For example:

  √(12 / 49) = √12 / √49

  =√(22 x 3) / 7

  =√22 x √3 / 7

  = 2√3 / 7

- a / √b = (a / √b) * (√b / √b) = (a/b * √b)

  This rule is called "rationalisation of the root." We can remove the root from the denominator by multiplying it by the numerator and the denominator.

  For example:

  Rationalising 5/√8 can be done by multiplying the numerator and denominator by √8

  5/√8 = (5/√8) x (√8/√8) = 5√8/8

- a√b + c√b = (a + c)√b

  For example: Simplifying 2√3 + 12√3 = (2 + 12)√3 = 14√3

Surds & Indices Questions

- Write down the conjugate of 4√3 + √2?

  4√3 – √2 is the conjugate of this expression.

- Multiply √8 x √5.

  √8 x √5 = √(8 x 5) = √40

- Divide √40 by √12.

  (√40/√12) = (√10/√3) = (√10/√3 * √3/√3) = √30 / 3.

- $5^{3}x-^{2}$ =15625 , find x.

  15625 can be written in exponential form as 56.

  By comparing the exponential part of both LHS and RHS,

  3x – 2 = 6.

  3x = 8

  x = 8/3.

- (13)4 x (13)x = (13)11, find x?

  (13)4+x = (13)11

  Therefore, 4 + x = 11.

$x = 11 – 4 = 7$.

Therefore, the value of x is 7.