In accountancy, depreciation refers to two aspects of the same concept **:**
(i) The decrease in value of assets (fair value depreciation)
(ii) The allocation of the cost of assets to periods in which the assets are used (depreciation with the matching principle).

A method of reallocating the cost of a tangible asset over its useful life span of it being in motion. Businesses depreciate long-term assets for both tax and accounting purposes. The former affects the balance sheet of a business or entity, and the latter affects the net income that they report. Generally the cost is allocated, as depreciation expense, among the periods in which the asset is expected to be used. This expense is recognized by businesses for financial reporting and tax purposes. Methods of computing depreciation, and the periods over which assets are depreciated, may vary between asset types within the same business and may vary for tax purposes. These may be specified by law or accounting standards, which may vary by country. There are several standard methods of computing depreciation expense.

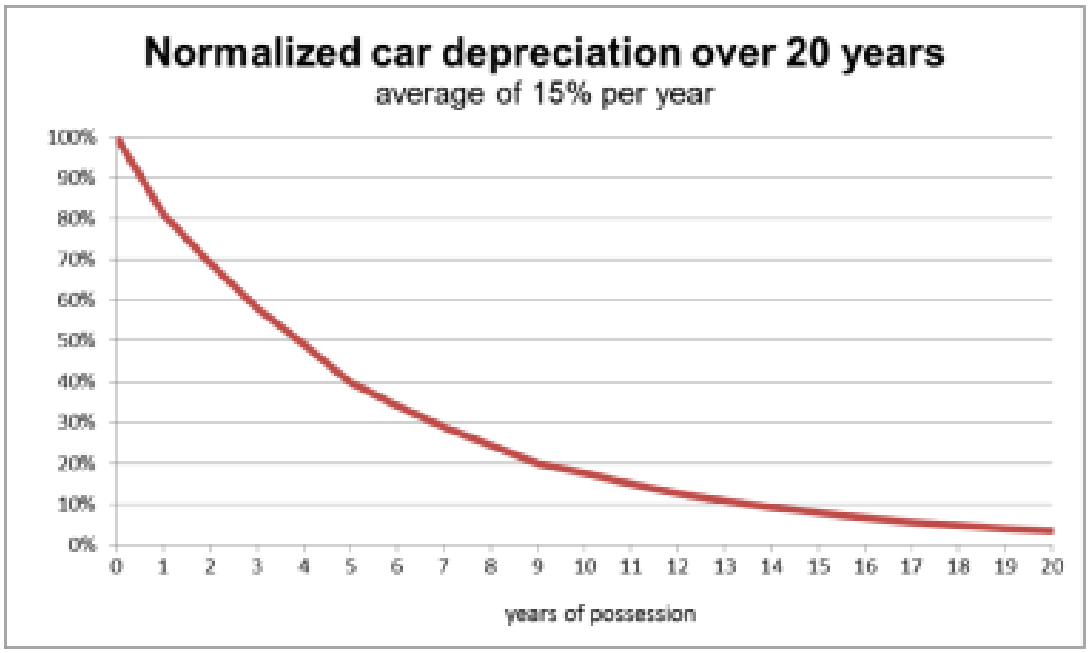
Methods of depreciation **:** There are several methods for calculating depreciation, generally based on either the passage of time or the level of activity (or use) of the asset.

1. ***Straight-line depreciation*** **:** Straight-line depreciation is the simplest and most often used method. In this method, the company estimates the salvage value (scrap value) of the asset at the end of the period during which it will be used to generate revenues (useful life). (The salvage value is an estimate of the value of the asset at the time it will be sold or disposed of; it may be zero or even negative. Salvage value is also known as scrap value or residual value.) The company will then charge the same amount to depreciation each year over that period, until the value shown for the asset has reduced from the original cost to the salvage value.

Straight-line method **:**
For example, a vehicle that depreciates over 5 years is purchased at a cost of $17,000, and will have a salvage value of $2000. Then this vehicle will depreciate at $3,000 per year, i.e. (17-2) / 5 = 3K. This table illustrates the straight-line method of depreciation. Book value at the beginning of the first year of depreciation is the original cost of the asset. At any time book value equals original cost minus accumulated depreciation.
book value = original cost − accumulated depreciation Book value at the end of year becomes book value at the beginning of next year. The asset is depreciated until the book value equals scrap value.
If the vehicle were to be sold and the sales price exceeded the depreciated value (net book value) then the excess would be considered a gain and subject to depreciation

Depreciation Expense	Accumulated Depreciation at year end	Book Value at year end
		Original Cost - $17,000
$3,000	$3,000	$14,000
$3,000	$6,000	$11,000
$3,000	$9,000	$8,000
$3,000	$12,000	$5,000
$3,000	$15,000	Scrap value - $2,000

recapture. In addition, this gain above the depreciated value would be recognized as ordinary income by the tax office. If the sales price is ever less than the book value, the resulting capital loss is tax deductible. If the sale price were ever more than the original book value, then the gain above the original book value is recognized as a capital gain.
If a company chooses to depreciate an asset at a different rate from that used by the tax office then this generates a timing difference in the income statement due to the difference (at a point in time) between the taxation department's and company's view of the profit.



$$\text{Annual Depreciation Expense} = \frac{\text{Cost of Fixed Asset} - \text{Residual Value}}{\text{Useful Life of Asset}(years)}$$

There are several standard methods of computing depreciation expense, generally based on either the passage of time or the level of activity (or use) of the asset.
We will discuss a few important ones viz. -

1. ***S****traight-line depreciation*
2. *Written Down Value*
3. ***D****oubling Declining balance method*
4. ***A****nnuity depreciation*
5. ***S****um-of-years-digits method*
6. ***U****nits-of-production depreciation method*
7. ***U****nits of time depreciation*
8. ***G****roup depreciation method*
9. ***C****omposite Depreciation Method*

2. *Doubling Declining balance method* : Suppose a business has an asset with $1,000 original cost, $100 salvage value, and 5 years of useful life. First, the straight-line depreciation rate would be 1/5, i.e. 20% per year. Under the double-declining-balance method, double that rate, i.e. 40% depreciation rate would be used. The table below illustrates this ：

Depreciation rate	Depreciation expense	Accumulated depreciation	Book value at end of the year
		original cost $1,000	
40%	400	400	600
40%	240	640	360
40%	144	784	216
40%	86.4	870.4	129.6

129.60 - 100.00	29.6	900	scrap value 100.00

When using the double-declining-balance method, the salvage value is not considered in determining the annual depreciation, but the book value of the asset being depreciated is never brought below its salvage value, regardless of the method used. Depreciation ceases when either the salvage value or the end of the asset's useful life is reached.

Since double-declining-balance depreciation does not always depreciate an asset fully by its end of life, some methods also compute a straight-line depreciation each year, and apply the greater of the two. This has the effect of converting from declining-balance depreciation to straight-line depreciation at a midpoint in the asset's life.
With the declining balance method, one can find the depreciation rate that would allow exactly for full depreciation by the end of the period, using the formula:

Depreciation rate = 1 - $\sqrt[N]{\{\text{Residual Value / Cost of Fixed Asset}\}}$
N^{th} root

where N is the estimated life of the asset (for example, in years).

3. ***Annuity depreciation*** **:** Annuity depreciation methods are not based on time, but on a level of Annuity. This could be miles driven for a vehicle, or a cycle count for a machine. When the asset is acquired, its life is estimated in terms of this level of activity. Assume the vehicle above is estimated to go 50,000 miles in its lifetime. The per-mile depreciation rate is calculated as: ($17,000 cost - $2,000 salvage) / 50,000 miles = $0.30 per mile. Each year, the depreciation expense is then calculated by multiplying the number of miles driven by the per-mile depreciation rate.

4. ***Sum-of-years-digits method*** **:** Sum-of-years-digits is a depreciation method that results in a more accelerated write-off than the straight line method, and typically also more accelerated than the declining balance method. Under this method the annual depreciation is determined by multiplying the depreciable cost by a schedule of fractions.

Sum of the years' digits method of depreciation is one of the accelerated depreciation techniques which are based on the assumption that assets are generally more productive when they are new and their productivity decreases as they become old. The formula to calculate depreciation under SYD method is **:**
SYD Depreciation = Depreciable Base x (Remaining Useful Life/Sum of the Years' Digits)
Depreciable Base = Cost - Salvage Value
Example **:** If an asset has original cost of $1000, a useful life of 5 years and a salvage value of $100, compute its depreciation schedule.
First, determine years' digits. Since the asset has useful life of 5 years, the years' digits are **:** 5, 4, 3, 2, and 1.
Next, calculate the sum of the digits **:** 5+4+3+2+1=15
The sum of the digits can also be determined by using the formula $(n^2 + n) / 2$ where n is equal to the useful life of the asset in years. The example would be shown as $(5^2 + 5) / 2=15$
Depreciation rates are as follows **:**
5/15 for the 1st year, 4/15 for the 2nd year, 3/15 for the 3rd year, 2/15 for the 4th year, and 1/15 for the 5th year.

Depreciable base	Depreciation rate	Depreciation expense	Accumulated depreciation	Book value at end of the year
				original cost $1,000
900	5/15	300 = (900 x 5/15)	300	700
900	4/15	240 = (900 x 4/15)	540	460

900	3/15	180 = (900 x 3/15)	720	280
900	2/15	120 = (900 x 2/15)	840	160
900	1/15	60 = (900 x 1/15)	900	100 (scrap value)

5. *Units-of-production depreciation method* : Under the units-of-production method, useful life of the asset is expressed in terms of the total number of units expected to be produced:

Annual Depreciation Expense = x Actual Production

Suppose, an asset has original cost $70,000, salvage value $10,000, and is expected to produce 6,000 units.

Depreciation per unit = ($70,000−10,000) / 6,000 = $10

10 × actual production will give the depreciation cost of the current year.

The table below illustrates the units-of-production depreciation schedule of the asset.

Units of production	Depreciation cost per unit	Depreciation expense	Accumulated depreciation	Book value at end of the year
				original cost -$70,000
1,000	10	10,000	10,000	60,000
1,100	10	11,000	21,000	49,000
1,200	10	12,000	33,000	37,000
1,300	10	13,000	46,000	24,000
1,400	10	14,000	60,000	10,000 (scrap value)

Depreciation stops when book value is equal to the scrap value of the asset. In the end, the sum of accumulated depreciation and scrap value equals the original cost.

6. *Units of time depreciation* : Units of time depreciation is similar to units of production, and is used for depreciation equipment used in mining or natural resource exploration, or cases where the amount the asset is used is not linear year to year.
A simple example can be given for construction companies, where some equipment is used only for some specific purpose. Depending on the number of projects, the equipment will be used and depreciation charged accordingly.

7. *Group depreciation method* : Group depreciation method is used for depreciating multiple-asset accounts using straight-line-depreciation method. Assets must be similar in nature and have approximately the same useful lives. ‘

8. *Composite depreciation method* : The composite method is applied to a collection of assets that are not similar, and have different service lives. For example, computers and printers are not similar, but both are part of the office equipment. Depreciation on all assets is determined by using the straight-line-depreciation method.

Written Down Value Method:
1. Depreciation is calculated on written down value of the asset.
2. Amount of depreciation keeps on reducing every year.

3. Book value never gets reduced to zero.
4. Applicable for income tax purposes.
5. The total charge remains almost the same as in the initial years repairs are less and depreciation is high while in later years, repairs increase and depreciation decreases.
6. This method is suitable for assets which gives higher utility in the initial years like Machinery etc.

Written Down Value Method (WDV) of Depreciation
It is also known as Reducing Balance or Reducing Installment Method or Diminishing Balance Method. Under this method, the depreciation is calculated at a certain fixed percentage each year on the decreasing book value commonly known as WDV of the asset (book value less depreciation).

The use of book value (the balance brought forward from the previous year) and fixed rate of depreciation result in decreasing depreciation charges over the life span of the asset.
While applying the depreciation rate both salvage or scrap value and removal costs are ignored. It is not possible to reduce the book value to zero; but it can be reduced close to its salvage value at the end of its useful life.
The rate of depreciation may be determined using the following formula:

$$\text{Depreciation Rate} = 100\left(1 - n\sqrt{\frac{S}{C}}\right) \quad \text{where n = number of years}$$

S = Salvage value

C = Cost of asset

For example, if a plant costs Rs. 8,000 with an estimated salvage value of Rs. 1,000 at the end of third year of its useful life, the rate of depreciation will be calculated thus:

$$\text{Rate of Depreciation} = 100\left(1 - 3\sqrt{\frac{1000}{8000}}\right)$$

$$= 50\%$$

Merits:
The following are the advantages of this method:
(a) As this method equalizes the total charges of using the asset (i.e., the amount of depreciation plus repair charges) from year to year, it is considered more equitable than straight-line method. This is because depreciation charges decline each year whereas repair charges increase year by year.
(b) It matches the service of the asset with the depreciation charge. When asset is more efficient in the initial years, higher depreciation is charged compared to later years. It is true about fixed assets such as motor vehicles.
(c) It recognizes the risk of obsolescence by charging the major part of depreciation in the early years of the life of the asset.
(d) It results in a better cash flow through tax deferral as under this method, the net income to be taxed is lower in the initial years and higher in subsequent years.
(e) As and when additions are made to the asset, fresh calculations of depreciation are not necessary.
(f) Income-tax authorities recognize this method.

Demerits:
The main drawbacks of this method are as follows:
In subsequent years the original cost of the asset is completely lost sight of.
(b) The asset can never be reduced to zero.
(c) This method does not take into consideration the interest on capital invested in the asset.
(d) This method requires elaborate book-keeping. The determination of correct rate of depreciation is a complex task.
Suitability:
This method is most suitable to those assets that have more efficiency in the beginning and late on decreases year after year. This method is usually adopted for plant and machinery, fixtures and fittings, motor vehicles, etc.