Reducing Balance Depreciation

Reducing balance depreciation, also known as **diminishing value depreciation**, is when an item depreciates by a percentage of the previous book value.

Reducing balance depreciation can be modelled using a recursion rule:

$$V_{n+1} = RV_n$$

Where V_n is the value of the assest after n depreciation periods, and;

R = 1- $\frac{r}{100}$, where r is the depreciation rate.

The following equation can be used to calculate the future value (book value) of a depreciating item:

$$V_n = V_0R^n$$

Where V_n is the value of the asset (book value)

n is the time since purchase

R is the rate of depreciation (= 1 - $\frac{r}{100}$)

V_0 is the cost price

Example.1

Let's repeat the previous example where James purchases a new car valued at $50 000. Only this time for taxation purposes James chooses to depreciate his car using the **reducing balance method**. The depreciation was 10% of the previous book value.

1. Draw a depreciation schedule for the first 5 years of the car
2. What is the book value after 5 years
3. Construct a graph of book value against time

Part.1

$d_1 = 10\%$ of 50000
$= \$5000$

$\therefore V_1 = 50000 - 5000$
$= \$45000$

$d_2 = 10\%$ of 45000
$= \$4500$

$\therefore V_1 = 45000 - 4500$
$= \$40500$

$d_3 = 10\%$ of 40500
$= \$4050$

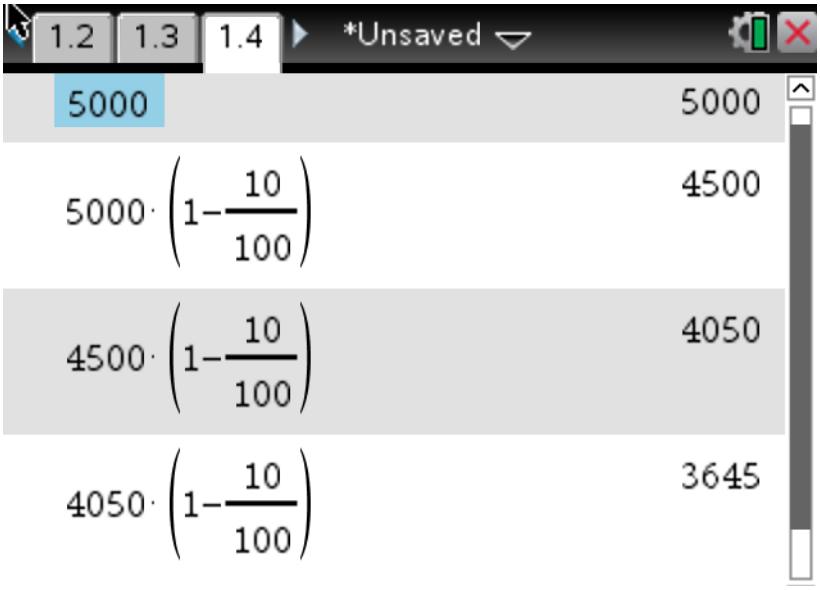
$\therefore V_1 = 40500 - 4050$
$= \$36450$

$d_4 = 10\%$ of 36450
$= \$3645$

$\therefore V_1 = 36450 - 3645$
$= \$32805$

$d_5 = 10\%$ of 32805
$= \$3280.50$

$\therefore V_1 = 32805 - 3280.50$
$= \$29524.50$

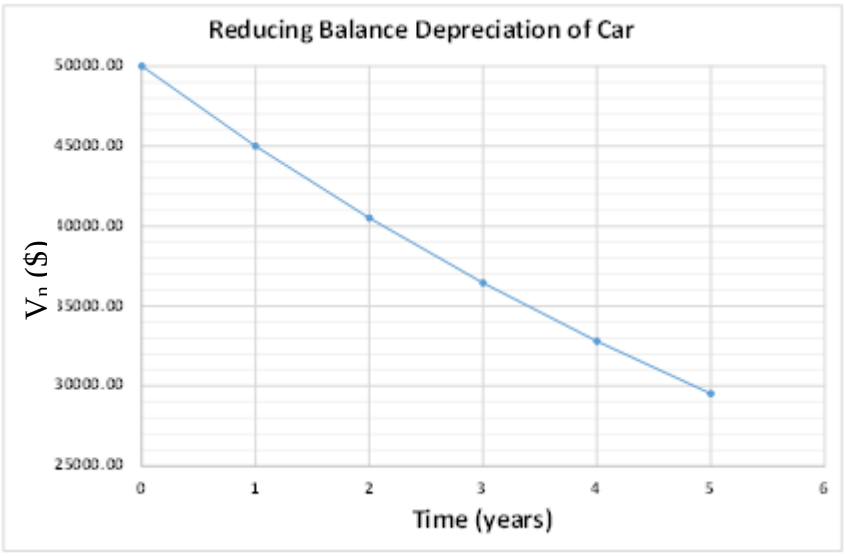


Part.2

The book value of the car after 5 years is $29524.50

Part.3

Graph showing future value (V_n) against time



Example.2

Let's repeat the previous example where Naomi originally purchased her car for $5000. Given it is now depreciating via the reducing balance method at 20% p.a., what will be the book value and total depreciation of the car after 4 years?

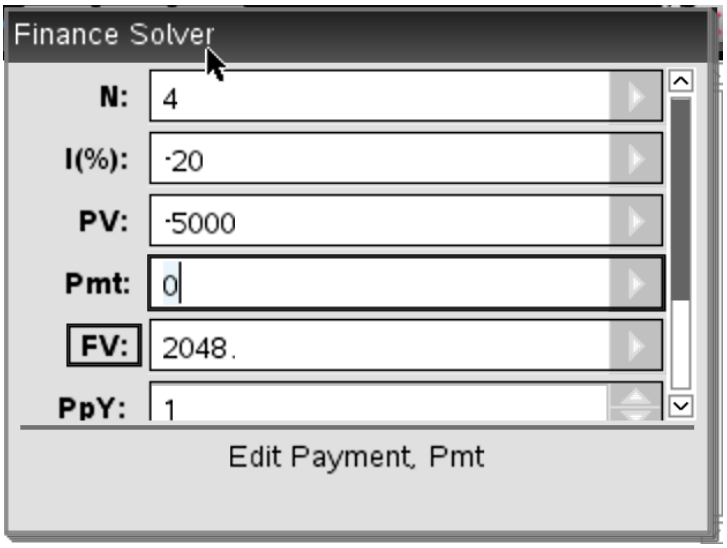
Part.1

V_4 = ?
P = $5000
r = 20% p.a.
n = 4 years

$$V_n = P(1 - \frac{r}{100})^n$$

$$V_4 = 5000(1 - \frac{20}{100})^4$$

$$= \$2048$$



The car's book value after 4 years of reducing balance depreciation is $2048

Part.2

Total depreciation = V_0 - V_n
= 5000 - 2048
= $2952

The total depreciation after 4 years will be $2952