Compound Interest and Depreciation

Compound Interest

Suppose £1000 is in invested in a bank for 4 years at 3% interest per annum.

	£1000
	30
yr 1	1030
	30.90
yr 2	1060.90
	31.83
yr 3	1092.73
	32.78
yr 4	£1125.51

$$\text{Amount} = P\left(1+\frac{r}{100}\right)^n$$

where P = Principal invested
r = rate % per annum
n = number of years

$$\text{Amount} = 1000 \times 1.03^4$$
$$= £1125.51$$

Ex 2

What is the final amount when £250 is invested for 20 years at 5% per annum

$$= 250 \times 1.05^{20}$$
$$= £663.32$$

Depreciation

Suppose a new car depreciates by 20% each year. If it cost £10000 new, what is it worth after 3 years?

	10000
20%	2000 –
yr 1	8000
20%	1600 –
yr 2	6400
20%	1280 –
yr 3	£5120

Worth £5120 after 3 years

Ex 2 If a new car costs £25000 and depreciates by 15% per annum, find its value after 7 years

$= 25000 \times 0.85^7$

$= £8014$

To reduce by 15% we multiply by 0.85
Doing this 7 times is achived by multiplying by 0.85^7

Final Example

How much do you have in the bank if you invest £500 for 3 years and you receive interest of 5% in year1, 6% in year2 and 7% in year3

$500 \times 1.05 \times 1.06 \times 1.07 = £595.46$

3. Find the amount when £750 is invested for 4 years at 8% per annum

4. Find the amount when £15000 is invested for 9 years at 3% per annum

3) $£750 \times 1.08^4 = £1020.37$

4) $£15000 \times 1.03^9 = £19571.60$

Depreciation

7. Find the value of a 5 year old machine that cost £65000 new and depreciates at 25% per annum.

8. Find the value of a 7 year old machine that cost £35000 new and depreciates at 32% per annum

7) $£65000 \times 0.75^5 = £15424.80$

8) $£35000 \times 0.68^7 = £2353.05$