Sequences, Fractions and Percentages, Laws of Indices

Year 8 Term 4

(1) Key Terms

Sequence	A list of numbers or items in a given order that follow a rule.
Decimal Multiplier	Calculates a percentage of an amount or percentage change with one single multiplication.
nth term	A sequence written as an algebraic rule, e.g 2n +1.
Linear Sequence	A sequence whose terms are changing by a constant difference, e.g 3, 7, 10 . . .
Non-Linear Sequence	A sequence whose terms are <u>not</u> changing by a constant difference, e.g 1, 4, 9 . . .

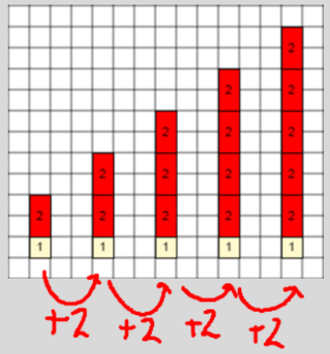
(2) nth Term

Find the nth term of the sequence

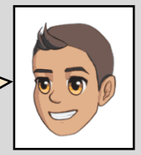
3, 5, 7, 9, 11

+2 +2 +2 +2

$2n+1$



In the sequence **2n+1**, the number in front of the variable is the **constant difference**.



(3) Generate Terms in a Sequence

$4n - 11$

1st term: $n = 1$

$4 \times 1 - 11 = 4 - 11 = -7$

2nd term: $n = 2$

$4 \times 2 - 11 = 8 - 11 = -3$

3rd term: $n = 3$

$4 \times 3 - 11 = 12 - 11 = 1$

Each **term** of any sequence can be generated by substituting **1,2,3 . . .** in place of 'n'.

(4) Laws of Indices

Law 1 — When **multiplying** numbers with the same base **add the indices**.

$h^5 \times h^3 \times h = h^{5+3+1} = h^9$

Law 2 — When **dividing** numbers with the same base **subtract** the indices.

$y^8 \div y^5 = y^{8-5} = y^3$

Law 3 — When raising a power to a power **multiply** the indices.

$(a^5)^3 = a^{5x3} = a^{15}$

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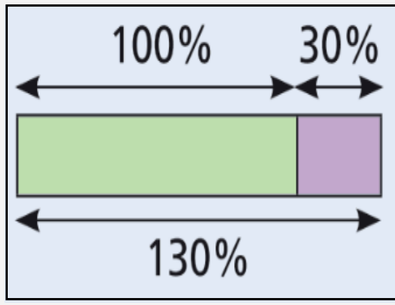
For more help, visit Trinity TV

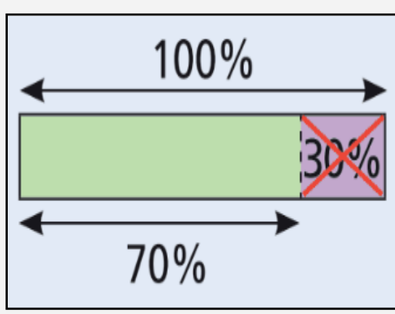
(5) Percentage Increase and Decrease



A 30% percentage **increase.**

Find 30% and then **add** it on to the original amount.

Use a **decimal multiplier** of **x 1.3.**



A 30% percentage **decrease.**

Find 30% and then **subtract** it from the original amount.

Use a **decimal multiplier** of **x 0.7.**

(6) Percentage Profit or Loss

Profit is when you buy something and sell it for **more** money.

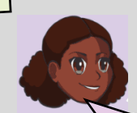
$\text{Percentage profit} = \frac{\text{profit}}{\text{original}} \times 100$

Cost price £160

Selling price £200

Profit = £200 – £160 = £40

Percentage profit = $\frac{£40}{£160} \times 100\% = 25\%$



You can calculate percentage **loss** too.

$\text{Percentage loss} = \frac{\text{loss}}{\text{original}} \times 100$