SUBJECT: Maths – Y9 Higher

UNIT: Algebra -sequences

SANDHILL VIEW
EST. 1953
ACHIEVE · ASPIRE · ENJOY

Key Concepts

Arithmetic sequences increase or decrease by a common amount each time.

Quadratic sequences have a common 2nd difference.

Fibonacci sequences Add the two previous terms to get the next term

Geometric series has a common multiple between each term

Examples

Linear sequences:

4 , 7, 10, 13, 16.....

a) State the nth term

$3n + 1$

Difference — The 0th term

b) What is the 100th term in the sequence?

$3n + 1$

$3 \times 100 + 1 = 301$

c) Is 100 in this sequence?

$3n + 1 = 100$

$3n = 99$

$n = 33$

Yes as 33 is an integer.

Quadratic sequences:

$a+b+c$	3	9	19	33	51	
$3a+b$	6	10	14	18		First difference
$2a$	4	4	4			Second difference

$2a = 4$
$a = 2$

$3a + b = 6$
$3 \times 2 + b = 6$
$b = 0$

$a + b + c = 3$
$2 + 0 + c = 3$
$c = 1$

$2n^2 + 0n + 1 \rightarrow 2n^2 + 1$

Key Concepts

A **formula** involves two or more letters, where one letter equals an **expression** of other letters.

An **expression** is a sentence in algebra that does NOT have an equals sign.

An **identity** is where one side is the equivalent to the other side.

When **substituting** a number into an expression, replace the letter with the given value.

Examples

1) $5(y + 6) \equiv 5y + 30$ is an identity as when the brackets are expanded we get the answer on the right hand side
2) $5m - 7$ is an expression since there is no equals sign
3) $3x - 6 = 12$ is an equation as it can be solved to give a solution
4) $C = \frac{5(F - 32)}{9}$ is a formula (involves more than one letter and includes an equal sign)
5) Find the value of $3x + 2$ when $x = 5$

   $(3 \times 5) + 2 = 17$
6) Where $A = b^2 + c$, find A when $b = 2$ and $c = 3$

   $A = 2^2 + 3$

   $A = 4 + 3$

   $A = 7$

Key Concepts

Solving equations: Working with inverse operations to find the value of a variable.

Rearranging an equation: Working with inverse operations to isolate a highlighted variable.

In solving and rearranging we **undo the operations** starting from the last one.

Examples

Solve:

$7p - 5 = 3p + 3$

$-3p \qquad -3p$

$4p - 5 = 3$

$+5 \qquad +5$

$4p = 8$

$\div 2 \qquad \div 2$

$p = 2$

Solve:

$5(x - 3) = 4(x + 2)$

expand expand

$5x - 15 = 4x + 8$

$-4x \qquad -4x$

$x - 15 = 8$

$+15 \qquad +15$

$x = 23$

Rearrange to make r the subject of the formulae :

$Q = \frac{2r - 7}{3}$

$\times 3 \qquad \times 3$

$3Q = 2r - 7$

$+7 \qquad +7$

$3Q + 7 = 2r$

$\div 2 \qquad \div 2$

$\frac{3Q + 7}{2} = r$