Name:…… Date……

GAYAZA HIGH SCHOOL

S.3 MATHS WORKSHEET

REVISION TOPIC: DIFFERENCE OF TWO SQUARES

Difference of two squares:

This is one of the three important identities we commonly use in the study of Algebra.

When the sum of two numbers multiplies their difference, then the product is the difference of their squares.

$$(a+b)(a-b) = \boldsymbol{a^2 - b^2}$$

Note the order of the factors does not matter

$$(a-b)(a+b) = \boldsymbol{a^2 - b^2}$$

When we re-write the above as

$$\boldsymbol{a^2 - b^2} = (a+b)(a-b) = (a-b)(a+b)$$

$(a-b), (a+b)$ are factors and the process is called **factorising the difference of two squares**

Example 1

Simplify(i) $(x-3)(x+3)$

$(x-3)(x-3) = x^2 - 3^2$ (*recognize immediately that the product will be* $\boldsymbol{a^2 - b^2}$)

$= x^2 - 9$

(ii) $(2n+5)(2n-5)$

$(2n+5)(2n-5) = (2n)^2 - 5^2$ (*recognize immediately that the product will be* $\boldsymbol{a^2 - b^2}$)

$= 4n^2 - 25$

TRY OUT ! Simplify

1 . $(x-9)(x+9)$	2. $(y-z)(y+z)$	3. $(5x+4)(5x-4)$
4. $(7y+1)(7y-1)$	5. $(pq-10)(pq+10)$	6. $\left(a-\frac{1}{a}\right)\left(a+\frac{1}{a}\right)$
7. $(3ab+2)(3ab-2)$	8. $(1+4p)(1-4p)$	9. $(m^3+n^2)(m^3-n^2)$

Example 2

Factorise completely

(i) $y^2 - 100$ $y^2 - 100 = y^2 - 10^2$ $=(y-10)(y+10)$	**(ii)**	$\boldsymbol{16x^2 - 49}$ $\boldsymbol{16x^2 - 49} = (4x)^2 - 7^2$ $=(4x-7)(4x+7)$	**(iii)**	$\boldsymbol{z^2 - 1}$ $\boldsymbol{z^2 - 1} = (z)^2 - 1^2$ $=(z-1)(z+1)$
(iv) $\boldsymbol{p^4 - 1}$ $\boldsymbol{p^4 - 1} = (p^2)^2 - 1^2$ $=\left(p^2-1\right)\left(p^2+1\right)$ $= (p-1)(p+1)\left(p^2+1\right)$	**(v)**	$\boldsymbol{8n^2 - 18}$ $\boldsymbol{8n^2 - 18} = \boldsymbol{2(4n^2 - 9)}$ *(first factorise the common factor 2)* $= 2((2n)^2 - 3^2)$ *then recognise the difference of two squares* $=\boldsymbol{2}(2n-3)(2n+3)$	**(vi)**	$\boldsymbol{16 - (x-3)^2}$ $\boldsymbol{16 - (x-3)^2} = (4)^2 - (x-3)^2$ $= \left(4-(x-3))(4+(x-3)\right)\right)$ $= \left(4-x+3)(4+x-3)\right)$ $= (7-x)(1+x)$	

EXERCISE

Factorise completely

1.(i) $q^2 - 81$ (ii) $v^2 - \frac{1}{4}$ **(iii)** $64 - x^2$ (iv) $x^2 - 900$	**2.**	**(i)** $\boldsymbol{16}m^2 - 121$ **(ii)** $\boldsymbol{144}a^2 - 169b^2$ (iii) $25x^2 - 9y^2$ (iv) $\boldsymbol{4}r^2 - 81$	**3**	(i) $2x^2 - 72$ (ii) $3x^2 - 3$ (iii) $10x^2 - 90y^2$ (iv) $200x^2 - 1250$
4) $(i)\boldsymbol{b^4 - 25}$ **(ii)** $\boldsymbol{x^4 - 81}$ **(iii)** $\boldsymbol{4d^4 - 9}$ **(iv)** $\boldsymbol{a^4 - b^4}$	**5.**	**(i)** $\boldsymbol{64z} - z^3$ (ii) $\boldsymbol{3}p^2 - 12q^2$ (iii) $\boldsymbol{x} - x^3$ (iv) $\boldsymbol{75} - 3b^2$	**6.**	(i) $\boldsymbol{9 - (a+3)^2}$ **(ii)** $\boldsymbol{16x^2 - (x+2)^2}$ **(iii)** $\boldsymbol{(x+y)^2 - 9a^2}$ **(iv)** $\boldsymbol{(a+b)^2 - (a-b)^2}$
