

Notes: 12.5.D1 ~ Special Products

Find each product.

1)  $(r+2)(r-2)$

$r^2 - 4$

	r	2
r	$r^2$	2r
-2	-2r	-4

2)  $(k-8)(k+8)$

$k^2 - 64$

	k	-8
k	$k^2$	-8k
8	8k	-64

3)  $(2n-9)(2n+9)$

$4n^2 - 81$

	2n	-9
2n	$4n^2$	-18n
9	18n	-81

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

$25x^2 - 9$

	5x	-3
5x	$25x^2$	-15x
3	15x	-9

5) What do you observe about the TERMS of the binomial FACTORS?

Same terms  
different signs

6) What do you observe about the TERMS of the PRODUCT?

Binomial  
 $a^2 - b^2$  — perfect square

7) This is a special product known as the Difference of Two Squares (D.O.T.S). Both terms are perfect squares; difference means subtraction. A difference of two squares can be factored using a pattern.

$a^2 - b^2 = (a+b)(a-b)$

$a = \sqrt{a^2}$      $b = \sqrt{b^2}$

Factor each polynomial completely. Remember to look for a GCF first!

8)  $4p^2 - 1$

$(2p+1)(2p-1)$

9)  $49v^2 - 4$

$(7v+2)(7v-2)$

10)  $m^2 - 4$

$(m+2)(m-2)$

11)  $16m^2 - 9$

$(4m+3)(4m-3)$

12)  $54n^2 - 6$

GCF →  $6(9n^2 - 1)$   
 $6(3n+1)(3n-1)$

13)  $72v^2 - 50$

GCF →  $2(36v^2 - 25)$   
 $2(6v+5)(6v-5)$

Find each product.

14)  $(3n - 4)(3n - 4)$

	$3n$	$-4$
$3n$	$9n^2$	$-12n$
$-4$	$-12n$	$16$

$9n^2 - 24n + 16$

15)  $(v - 6)(v - 6)$

	$v$	$-6$
$v$	$v^2$	$-6v$
$-6$	$-6v$	$36$

$v^2 - 12v + 36$

16)  $(n + 7)(n + 7)$

	$n$	$7$
$n$	$n^2$	$7n$
$7$	$7n$	$49$

$n^2 + 14n + 49$

17)  $(2x + 1)(2x + 1)$

	$2x$	$1$
$2x$	$4x^2$	$2x$
$1$	$2x$	$1$

$4x^2 + 4x + 1$

18) What do you observe about the TERMS of the binomial FACTORS?

same terms  
same signs

19) What do you observe about the TERMS of the PRODUCT?

\* 1st & last are POS.  
perfect squares  
\* sign of middle term is the sign in the factor

20) This is a special product known as a Perfect Square Trinomial. The first and last terms are positive perfect squares. The middle term is twice the product of  $ab$ ;  $a$  is the square root of the first term and  $b$  is the square root of the last term.

A perfect square trinomial can be factored using a pattern.

$a^2 + 2ab + b^2 = (a + b)^2$  OR  $a^2 - 2ab + b^2 = (a - b)^2$

$\frac{\text{middle term}}{2 \cdot \sqrt{a^2} \cdot \sqrt{b^2}}$   
 $2 \cdot a \cdot b$

Factor each polynomial completely. Remember to look for a GCF first!

21)  $16n^2 - 72n + 81$

$(4n - 9)^2$

\* check the middle \*  
 $72n = 2(4n)(9)$

22)  $100b^2 + 60b + 9$

$(10b + 3)^2$

\* check the middle \*  
 $60b = 2(10b)(3)$

23)  $81p^2 - 90p + 25$

$(9p - 5)^2$

\* check the middle \*  
 $-90p = 2(9p)(-5)$

24)  $4v^2 + 28v + 49$

$(2v + 7)^2$

\* check the middle \*  
 $28v = 2(2v)(7)$