

Lesson 4



**Factor the following
Using the Appropriate method:**

1) $32m^4n^3 + 16m^2n^2 + 24m^2$

2) $k^2 - 2k - 15$

3) $2t^2 - 7t + 6$

4) $40b^2a^2 + 40b^2 + 16b$

5) $x^2 - 5x - 24$

6) $7x^2 + 17x + 10$

Warm Up Solutions



Factor the following
Using the Appropriate method:

1) $32m^4n^3 + 16m^2n^2 + 24m^2$ GCF
 $8m^2(4m^2n^3 + 2n^2 + 3)$

2) $k^2 - 2k - 15$ simple trinomial
 $(k + 3)(k - 5)$

mult add
 -15 -2
 +1x15
 +3x5

3) $2t^2 - 7t + 6$ hard tri
 $(2t^2 - 4t)(-3t + 6)$
 $2t(t-2) - 3(t-2)$
 $(t-2)(2t-3)$

mult | add
 +12 | -7
 -1x12
 -2x6
 -3x4 ✓

4) $40b^2a^2 + 40b^2 + 16b$ GCF ↓
 $8b(5a^2b + 5b + 2)$

5) $x^2 - 5x - 24$ simple
 $(x + 3)(x - 8)$

6) $7x^2 + 17x + 10$ hard tri
 $(7x^2 + 7x)(+10x + 10)$
 $7x(x+1) + 10(x+1)$
 $(x+1)(7x+10)$

3.6 Polynomials of the Form $ax^2 + bx + c$



Worksheet: GCF, Simple Trinomials & Hard Trinomials
Questions: 1-12

Math 10

Name _____

GCF, Simple Trinomials, Hard Trinomials

Date _____

Choose a factoring Method and factor each completely:

1) $-9n^5 + 6n^3$

2) $36r^6 + 54r - 45$

3) $-40 + 4b^2 - 32b^4$

4) $4xy^2 + 20x^2y + 16xy$

5) $x^2 + 13x + 42$

6) $x^2 + 13x + 36$

7) $k^2 + k - 12$

8) $a^2 + 4a - 45$

9) $2p^2 + 11p - 63$

10) $3n^2 + 11n - 20$

11) $4n^2 - 4n - 15$

12) $6n^2 - 29n + 20$

$$1) -9n^5 + 6n^3$$
$$3n^3(-3n^2 + 2)$$

$$2) 36r^6 + 54r - 45$$
$$9(4r^6 + 6r - 5)$$

$$3) -40 + 4b^2 - 32b^4$$
$$4(-10 + b^2 - 8b^4)$$

$$4) 4xy^2 + 20x^2y + 16xy$$
$$4xy(y + 5x + 4)$$

$$5) x^2 + 13x + 42$$
$$(x + 6)(x + 7)$$

$$6) x^2 + 13x + 36$$
$$(x + 9)(x + 4)$$

$$7) k^2 + k - 12$$
$$(k + 4)(k - 3)$$

$$8) a^2 + 4a - 45$$
$$(a - 5)(a + 9)$$

$$9) 2p^2 + 11p - 63$$
$$(2p - 7)(p + 9)$$

$$10) 3n^2 + 11n - 20$$
$$(3n - 4)(n + 5)$$

$$11) 4n^2 - 4n - 15$$
$$(2n + 3)(2n - 5)$$

$$12) 6n^2 - 29n + 20$$
$$(n - 4)(6n - 5)$$

3.8 Factoring Special Polynomials

Difference of Squares

- two terms that are perfect squares.
- must be a difference
- factor like this...

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

EXAMPLES...

1) $4x^2 - 49$

$$(2x + 7)(2x - 7)$$

2) $16x^2 - 9y^2$

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

3) $81z^4 - 625$

$$(9z^2 + 25)(9z^2 - 25)$$

4) $49w^2 - 4s^2$

$$(7w + 2s)(7w - 2s)$$

Perfect Square Trinomials

- three terms: the first and last are perfect squares.
- factors like this...

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

OR

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

- recognize them and you save yourself the decomposition steps!!!

EXAMPLES...

1) $25x^2 - 10x + 1$

$$(5x - 1)^2$$

2) $9x^2 + 24x + 16$

$$(3x + 4)^2$$

Factor using Perfect Squares Method

$$25x^2 - 120x + 144$$

$$(5x - 12)^2$$

$$81x^2 - 180x + 100$$

$$(9x - 10)^2$$

$$49x^2 + 84x + 36$$

$$(7x + 6)^2$$

$$36x^2 + 132x + 121$$

$$(6x + 11)^2$$

Make this a perfect square trinomial by filling in the blank

$$16x^2 + \underline{\quad}x + 9$$

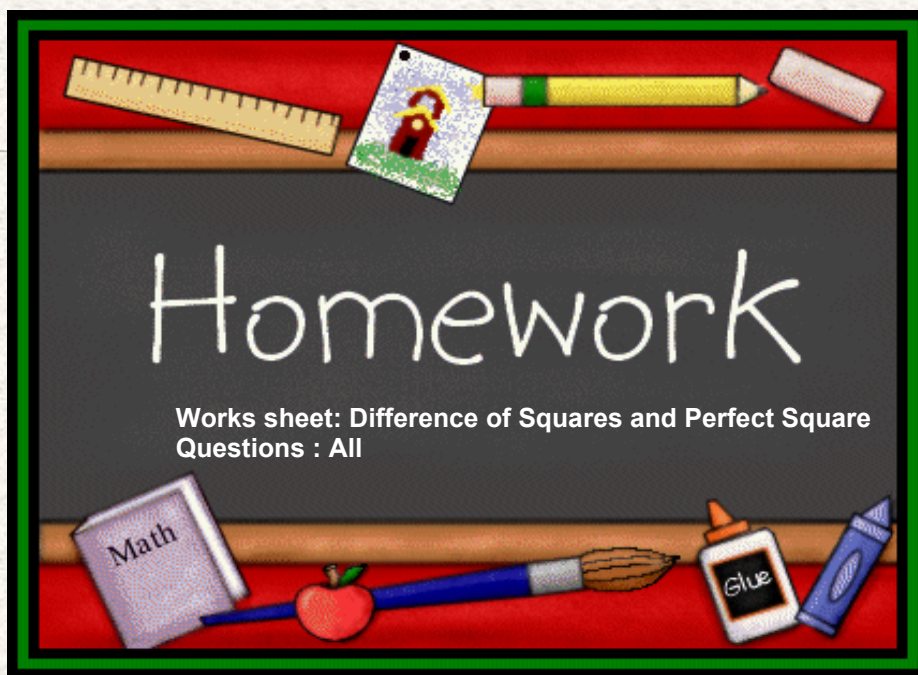
(Handwritten annotations in red and green)

Green arrows point from $16x^2$ to $4x$ and from 9 to 3 .
A red arrow points from the blank space to the calculation below.

$$2(4)(3)$$

(A red squiggle is drawn under the $(4)(3)$ part of the expression.)

$$2 \times 12$$
$$24$$



Math 10

Name _____

Factoring: Difference of Squares and Perfect Squares

Date _____

Factor each completely.

1) $n^2 - 9$

2) $25a^2 - 9$

3) $k^2 - 4$

4) $16x^2 - 9$

5) $x^2 - 25$

6) $25x^2 - 16y^2$

7) $u^2 - 16v^2$

8) $u^2 - 9v^2$

9) $4x^2 - y^2$

10) $a^2 - 25b^2$

11) $9m^2 + 12m + 4$

12) $16r^2 + 8r + 1$

13) $25x^2 - 20x + 4$

14) $16n^2 + 40n + 25$

15) $9b^2 - 24b + 16$

16) $16m^2 - 24mn + 9n^2$

17) $9x^2 - 6xy + y^2$

18) $25x^2 + 10xy + y^2$

19) $x^2 - 8xy + 16y^2$

20) $9x^2 + 24xy + 16y^2$

Answers to Factoring: Difference of Squares and Perfect Squares (ID: 1)

- | | | | |
|-------------------|---------------------|-------------------|-------------------|
| 1) $(n+3)(n-3)$ | 2) $(5a+3)(5a-3)$ | 3) $(k+2)(k-2)$ | 4) $(4x+3)(4x-3)$ |
| 5) $(x+5)(x-5)$ | 6) $(5x+4y)(5x-4y)$ | 7) $(u+4v)(u-4v)$ | 8) $(u+3v)(u-3v)$ |
| 9) $(2x+y)(2x-y)$ | 10) $(a+5b)(a-5b)$ | 11) $(3m+2)^2$ | 12) $(4r+1)^2$ |
| 13) $(5x-2)^2$ | 14) $(4n+5)^2$ | 15) $(3b-4)^2$ | 16) $(4m-3n)^2$ |
| 17) $(3x-y)^2$ | 18) $(5x+y)^2$ | 19) $(x-4y)^2$ | 20) $(3x+4y)^2$ |

$$1) \ n^2 - 9$$
$$(n + 3)(n - 3)$$

$$2) \ 25a^2 - 9$$
$$(5a + 3)(5a - 3)$$

$$3) \ k^2 - 4$$
$$(k + 2)(k - 2)$$

$$4) \ 16x^2 - 9$$
$$(4x + 3)(4x - 3)$$

$$5) x^2 - 25$$
$$(x + 5)(x - 5)$$

$$6) 25x^2 - 16y^2$$
$$(5x + 4y)(5x - 4y)$$

$$7) u^2 - 16v^2$$
$$(u + 4v)(u - 4v)$$

$$8) u^2 - 9v^2$$
$$(u + 3v)(u - 3v)$$

$$9) 4x^2 - y^2$$
$$(2x + y)(2x - y)$$

$$10) a^2 - 25b^2$$
$$(a + 5b)(a - 5b)$$

$$11) 9m^2 + 12m + 4$$
$$(3m + 2)^2$$

$$12) 16r^2 + 8r + 1$$
$$(4r + 1)^2$$

$$13) 25x^2 - 20x + 4$$
$$(5x - 2)^2$$

$$14) 16n^2 + 40n + 25$$
$$(4n + 5)^2$$

$$15) 9b^2 - 24b + 16$$
$$(3b - 4)^2$$

$$16) 16m^2 - 24mn + 9n^2$$
$$(4m - 3n)^2$$

$$17) 9x^2 - 6xy + y^2$$
$$(3x - y)^2$$

$$18) 25x^2 + 10xy + y^2$$
$$(5x + y)^2$$

$$19) x^2 - 8xy + 16y^2$$
$$(x - 4y)^2$$

$$20) 9x^2 + 24xy + 16y^2$$
$$(3x + 4y)^2$$

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