Name: _____ Date: _____

Unit 8: Factoring
Study Guide

Greatest Common Factor (GCF)

Factor each polynomial completely.

1) $9x^2 + 12x^3$

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

2) $-10x^9 - 30y - 30x$

$-10x(x^9 + 3y + 3x)$

3) $28xy - 32y^2 - 12y$

$4y(7x - 8y - 3)$

4) $54a^{12}b^3c^2 + 6a^6b^5c^8 + 24a^6b^4c^2 + 6a^6b^3c^2$

$6a^6b^3c^2(9a^6 + b^2c^6 + 4b + 1)$

Factoring Trinomials, $a = 1$

Factor each trinomial completely. *Always check for a GCF*

5) $x^2 + 7x + 10$

1·10
2·5

$(x+5)(x+2)$

6) $n^2 + 11n + 18$

1·18
2·9
3·6

$(n+2)(n+9)$

7) $4x^2 - 60x + 200$

$4(x^2 - 15x + 50)$

1·50
2·25
5·10

$\boxed{4(x-10)(x-5)}$

8) $3x^2 + 12x - 36$

$3(x^2 + 4x - 12)$

1·12
2·6
3·4

$\boxed{3(x+6)(x-2)}$

Factoring Trinomials, $a > 1$

Factor each trinomial completely. (Use the Slip and Slide method) *Always check for a GCF*

9) $-9n^2 - 30n - 16$

1·9
3·3

$-1(9n^2 + 30n + 16)$

1·16
2·8
4·4

$\boxed{-1(3n+2)(3n+8)}$

10) $24b^2 - 117b - 162$

$3(8b^2 - 39b - 54)$

1·54
2·27
3·18
6·9

1·8
2·4

$\boxed{3(b-6)(8b+9)}$

11) $5x^2 + 58x + 80$

1·80
2·40
4·20
5·16
8·10

$\boxed{(1x+10)(5x+8)}$

12) $-15r^2 + 81r + 54$

$-3(5r^2 - 27r + 18)$

1·18
2·9
3·6

$\boxed{-3(5r+3)(r-6)}$

Factoring by a Difference of Two Squares, DOTS

Factor each binomial completely. *Always check for a GCF*

13) $25x^2 - 4y^2$

$(5x-2y)(5x+2y)$

14) $4x^2 - 36y^2$

$(2x+6y)(2x-6y)$

15) $125u^2 - 20v^2$

$5(25u^2 - 4v^2)$

$5(5u+2v)(5u-2v)$

16) $4a^4 + 9b^4$

prime

17) $2x^4 - 50y^4$

$2(x^4 - 25y^4)$

$\boxed{2(x^2+5y^2)(x^2-5y^2)}$

Factor by Grouping

Factor each polynomial completely. *Always check for the GCF*

18) $(10v^3 - 14v^2)(+35v - 49)$

$2v^2(5v-7)+7(5v-7)$

$(2v^2+7)(5v-7)$

19) $(56p^3 - 7p^2)(+24p - 3)$

$7p^2(8p-1)+3(8p-1)$

$(7p^2+3)(8p-1)$

20) $(35x^3 + 56x^2)(-10x - 16)$

$7x^2(5x+8)-2(5x+8)$

$(7x^2-2)(5x+8)$

21) $b^4 - 10a^2b^2 + 25a^4$ ← not factor by grouping

$(b^2-5a^2)(b^2-5a^2)$

$(b^2-5a^2)^2$

Mixed Factoring Practice

Factor each polynomial completely.

22) $(4x^3 + 12x^2)(-25x - 75)$

$4x^2(x+3)-25(x+3)$

$(4x^2-25)(x+3)$

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

23) $54x^3y - 18x^2y^2 + 27xy^2$

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

24) $3k^2 - 57k + 180$

$3(k^2-19k+60)$

$\boxed{3(k-4)(k-15)}$

1·60
2·30
3·20
4·15

25) If the area of a rectangle can be represented by $(x^2 - 5x - 14)$, what two expressions could represent the dimensions of the rectangle?

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