Secondary II-Unit 2.2 Quadratics Notes Name________________

Day 1: Factoring Quadratics

Date________________ Period____

1) Factoring is taking a quadratic expression and writing it in the form $(x + m)(x + n)$.

It is often referred to as undistributing.

STandard Form.
$ax^2 + bx + c$

Notice that in our quadratic expression:

The middle term is always mx + nx.

The constant term is always m * n.

Factored Form
$a(x+m)(x+n)$
$x^2 + nx + mx + mn$

Factor each completely.

2) $p^2 + 11p + 28$

$(p+4)(p+7)$

28
1 • 28
2 • 14
4 • 7

3) $x^2 - 8x + 16$

$(x-4)(x-4)$

16
±1 • ±16
±2 • ±8
±4 • ±4

4) $a^2 - 7a - 28$

$(a+\ )(a-\ )$

28
±1 ±28
±2 ±14
±4 ±7

Not Factorable

5) $v^2 - 1v - 20$

$(v+4)(v-5)$

$(v-5)(v+4)$

20
1 20
2 10
4 5

6) $x^2 + 8x + 12$

$(x+2)(x+6)$

12
1 12
2 6
3 4

7) $r^2 + 7r + 6$

$(r+1)(r+6)$

6
1 · 6
2 · 3

8) $n^2 + 15n + 56$

$(n+7)(n+8)$

9) $v^2 + 2v - 20$

$(v+\ )(v-\ )$

20
1 20
2 10
4 5

Not Factorable.

10) $a^2 - 3a + 0$

$(a+0)(a-3)$

$a(a-3)$

11) $\frac{r^2}{r} - \frac{9r}{r}$

$r(r-9)$

12) This process only works if the Leading Coeffecient is 1. When we get a leading coeffecient that is not 1 we must get our leading coeffecient to be 1.

For example in the polynomial $\frac{5x^2}{5} + \frac{25x}{5} + \frac{30}{5}$ the leading coefficient is a 5, so can we divide 5 from all of the terms?

$5(x^2 + 5x + 6)$

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

~~$5(x+1)(x+6)$~~

$\frac{6}{1 \cdot 6}$, $2 \cdot 3$

In the resulting quadratic expression all three terms are divisible by 5, so we need to "undistribute" that 5 before we factor the remaining expression.

Factor each completely.

13) $\frac{5m^2}{5} + \frac{75m}{5} + \frac{280}{5}$

$5(m^2+15m+56)$

$5(m+7)(m+8)$

$\frac{56}{1 \cdot 56}$, $2 \cdot 28$, $4 \cdot 14$, $7 \cdot 8$

14) $\frac{4x^2}{4} - \frac{8x}{4} - \frac{32}{4}$

$4(x^2-2x-8)$

$4(x+2)(x-4)$

$\frac{8}{1 \cdot 8}$, $2 \cdot 4$

15) $\frac{-6r^2}{-6} - \frac{42r}{-6} + \frac{48}{-6}$

$-6(r^2+7r-8)$

$-6(r+8)(r-1)$

$\frac{8}{1 \cdot 8}$, $2 \cdot 4$

16) $\frac{-3x^2}{-3} - \frac{18x}{-3} + \frac{120}{-3}$

$-3(x^2+6x-40)$

$-3(x+10)(x-4)$

$\frac{40}{1\ 40}$, $2\ 20$, $4\ 10$, $5\ 8$

17) $\frac{-2r^2}{-2} + \frac{10r}{-2} + \frac{72}{-2}$

$-2(r^2-5r-36)$

$-2(r+4)(r-9)$

$\frac{36}{1\ 36}$, $2\ 18$, $3\ 12$, $4\ 9$, $6\ 6$

18) $\frac{-x^2}{-1} + \frac{9x}{-1} - \frac{20}{-1}$

$-(x^2-9x+20)$

$-(x-4)(x-5)$

$1\ 20$, $2\ 10$, $4\ 5$

19) $2v^2 + 12v + 18$

20) $3x^2 - 30x + 75$

Special Cases

21) Multiply $(x+2)(x-2)$

$x^2 - 2x + 2x - 4$

$x^2 - 4$ $x^2 + 0x - 4$

Multiply $(x+10)(x-10)$

$x^2 - 10x + 10x - 100$

$x^2 - 100$ $x^2 + 0x - 100$

What patterns do you notice?

Difference of Squares

22) If you have to factor any quadratic in the form $a^2 - b^2$ it will always factor to be $(a+b)(a-b)$.

Factor each completely.

23) $k^2 - 1$

$(k+1)(k-1)$

$(k-1)(k+1)$

24) $n^2 - 16$

$(n+4)(n-4)$

25) $a^2 - 25$

$(a+5)(a-5)$

26) $v^2 - 4$

$(v-2)(v+2$

27) $\frac{45a^2}{5} - \frac{20}{5}$

$5(9a^2-4)$

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

28) $16x^2 - 100$

$(4x+10)(4x-10)$

29) $\frac{12n^2}{3} - \frac{27}{3}$

$3(n^2-9)$

$3(n+3)(n-3)$

30) $4r^2 - 25$

$(2r+5)(2r-5)$

31) $49r^2 - 25$

$(7r+5)(7r-5)$

32) $121b^2 - 4$

$(11b+2)(11b-2)$

