8.5 "AC" Method of Factoring

(Factoring a Trinomial ax^2+bx+c)

ax^2+bx+c * Completing FOIL in Reverse

x^2+5x+6

$a=1$ $b=5$ $c=6$

Step #1 : Set-up your answer with your signs

→ The sign of the last term tells you if the signs will be the same (+) or if the signs will be different (-)

→ If the sign of the last term is positive then the signs in the 2 quantities will be the same. Look at the sign of the 2nd term to see what the signs will be

Examples: $x^2+bx+c = (x+\_)(x+\_)$

both addition signs — same signs

$$x^2 - bx + c = (x - \_)(x - \_)$$

both subtraction signs

same signs

$$x^2 +/- bx - c = (x + \_)(x - \_)$$

different signs

Step #2 : Find factors of "ac" that have a sum of "b". Use the table to help you.

Factors of "ac" or $(1 \cdot 6 = 6)$	Sum of "b" (5)
1, 6	7
-1, 6	5
1, -6	-5
2, 3	5
-2, 3	1
2, -3	-1

Step #3 Rewrite the polynomial

$x^2 + 5x + 6$

$x^2 + 3x + 2x + 6$

* Use the two factors you found to rewrite your middle term

Step #4 Factor by Grouping

$x^2 + 3x + 2x + 6$

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

* Group the first 2 terms

* Group the last 2 terms

Step #5 Factor the GCF from each group

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

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

Step #6 Rewrite your factored answer (the GCFs form your 1st quantity & the quantity that repeats forms your 2nd quantity)

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

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

Step #7 : FOIL to check your answer

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

F O I L

$$x^2 + 2x + 3x + 6$$

$$x^2 + 5x + 6$$ ✓

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8-5 Practice

Form G

Factoring $x^2 + bx + c$

Complete.

1. $k^2 + 11k + 30 = (k + 5)(k + \square)$
2. $x^2 + 6x + 9 = (x + 3)(x + \square)$
3. $t^2 + 7t + 10 = (t + 2)(t + \square)$
4. $n^2 + 9n + 14 = (n + 7)(n + \square)$
5. $w^2 + 13w + 36 = (w + 4)(w + \square)$
6. $y^2 + 18y + 65 = (y + 13)(y + \square)$
7. $s^2 - 12s + 32 = (s - 8)(s - \square)$
8. $g^2 - 14g + 45 = (g - 9)(g - \square)$
9. $v^2 - 17v + 60 = (v - 12)(v - \square)$
10. $q^2 - 13q + 42 = (q - 6)(q - \square)$
11. $d^2 - 9d + 8 = (d - 8)(d - \square)$
12. $r^2 - 9r + 20 = (r - 5)(r - \square)$

Factor each expression. Check your answer.

13. $y^2 + 5y + 6$
14. $t^2 + 9t + 18$
15. $x^2 + 16x + 63$
16. $n^2 - 12n + 35$
17. $r^2 - 12r + 27$
18. $q^2 - 12q + 20$
19. $w^2 + 19w + 60$
20. $b^2 - 11b + 24$
21. $z^2 - 13z + 12$

Complete.

22. $q^2 + q - 56 = (q - 7)(q + \square)$
23. $z^2 - 3z - 18 = (z - 6)(z + \square)$
24. $n^2 - 6n - 40 = (n + 4)(n - \square)$
25. $y^2 + 3y - 4 = (y + 4)(y - \square)$
26. $v^2 - 5v - 36 = (v - 9)(v + \square)$
27. $d^2 + 2d - 15 = (d - 3)(d + \square)$
28. $m^2 - 5m - 14 = (m + 2)(m - \square)$
29. $p^2 - 6p - 16 = (p - 8)(p + \square)$

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8-5 Practice (continued) Form G

Factoring $x^2 + bx + c$

Factor each expression. Check your answer.

30. $r^2 + 3r - 10$

31. $w^2 + 2w - 8$

32. $z^2 + 3z - 40$

33. $d^2 - 4d - 12$

34. $p^2 - 7p - 8$

35. $s^2 - 5s - 24$

36. $x^2 + 5x - 6$

37. $v^2 + 3v - 28$

38. $n^2 + 2n - 63$

39. $t^2 - 2t - 24$

40 $a^2 - 7a - 18$

41. $c^2 - c - 30$

42. The area of a rectangular door is given by the trinomial $x^2 - 14x + 45$. The door's width is $(x - 9)$. What is the door's length?

43. The area of a rectangular painting is given by the trinomial $a^2 - 6a - 16$. The painting's length is $(a + 2)$. What is the painting's width?

Write the correct factored form for each expression.

44. $k^2 + 4kn - 96n^2$

45. $g^2 - 13gh + 42h^2$

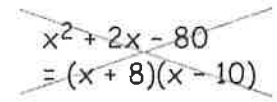
46. $m^2 - 4mn - 32n^2$

47. $x^2 + 5xy - 14y^2$

48. $s^2 + 17st + 72t^2$

49. $h^2 + 3hj - 88j^2$

50. Error Analysis Describe and correct the error made in factoring the trinomial.



51. A rectangular pool cover has an area of $p^2 + 9p - 36$. What are possible dimensions of the pool cover? Use factoring.

Name Key Class Date

8-5 Practice

Form G

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Complete.

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    $(y + 3)(y + 2)$
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    $(w + 15)(w + 4)$
20. $b^2 - 11b + 24$
    $(b - 8)(b - 3)$
21. $z^2 - 13z + 12$
    $(z - 12)(z - 1)$

Complete.

22. $q^2 + q - 56 = (q - 7)(q + \boxed{8})$
23. $z^2 - 3z - 18 = (z - 6)(z + \boxed{3})$
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Name _____ Class _____ Date _____

8-5 Practice (continued) Form G

Factoring $x^2 + bx + c$

Factor each expression. Check your answer.

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49. $h^2 + 3hj - 88j^2$ — $(h + 11j)(h - 8j)$

50. **Error Analysis** Describe and correct the error made in factoring the trinomial.

$x^2 + 2x - 80$
$= (x + 8)(x - 10)$

The operation signs are wrong. The answer should be $(x - 8)(x + 10)$.

51. A rectangular pool cover has an area of $p^2 + 9p - 36$. What are possible dimensions of the pool cover? Use factoring.

$(p + 12)$ and $(p - 3)$