Name: _____ Date: _____ Hour: ____Alg 1____

Unit 7C Day 30: Factoring when a = 1

Focus Question: How do I factor $ax^2 + bx + c$ when $a = 1$?

A. Review: Multiply each set of binomials:

1. $(x + 5)(x - 3)$

	x	$+5$
x	x^2	$+5x$
-3	$-3x$	-15

$x^2 + 2x - 15$

2. $(x - 4)(x - 2)$

$x(x-2) - 4(x-2)$
$x^2 - 2x - 4x + 8$
$x^2 - 6x + 8$

3. $(x + m)(x + k)$

$x(x+k) + m(x+k)$
$x^2 + kx + mx + mk$
$x^2 + (k+m)x + mk$

4. When you were simplifying, what did you notice about the first (or a) term?

it didn't have a like term a=1 x^2

5. What did you notice about the constant (or c) term?

it doesn't have a like term

6. What did you notice about the middle (or b) term?

it was a combination of 2 "like terms"

B. So when we try to turn standard form into factored (or intercept) form, we will be turning the trinomial into the two binomials that were multiplied to make the trinomial.

*****When a = 1, which term (a, b, or c) do we really need to factor?** c ******a will not always be 1**

Will *c* only have 1 pair of factors? No So it's a little bit of trial and error because we need two factors that multiply to make *c* AND ALSO combine to make b.

Just a reminder…will every trinomial factor? No!

Turn each of the functions into intercept form by factor each of the following trinomials (fill in the blanks and then use the box)

1) $f(x) = x^2 - 7x + 10$

10
1·10
2·5
-2-5

$x^2 - 2x - 5x + 10$
$x(x) + x(-2) - 5(x) - 5(-2)$
$x(x-2) - 5(x-2)$
$(x-2)(x-5)$

	x	-2
x	x^2	$-2x$
-5	$-5x$	$+10$

$f(x) = (x-2)(x-5)$

2) $g(x) = x^2 + 2x - 35$

-35
1·35
5·7
7-5

$x^2 + 7x - 5x - 35$
$x(x) + x(7) - 5(x) - 5(7)$
$x(x+7) - 5(x+7)$
$(x+7)(x-5)$

	x	$+7$
x	x^2	$+7x$
-5	$-5x$	-35

$g(x) = (x+7)(x-5)$

3) $h(x) = x^2 + 7x - 8$

-8
1·8
2·4
8-1

$x^2 + 8x - 1x - 8$
$x(x) + x(8) - 1(x) - 1(8)$
$x(x+8) - 1(x+8)$
$(x+8)(x-1)$

	x	$+8$
x	x^2	$+8x$
-1	$-1x$	-8

$h(x) = (x+8)(x-1)$

4) $k(x) = x^2 - 13x - 48$

$x^2 - 16x + 3x - 48$

$x(x) + x(-16) + 3(x) + 3(-16)$

$x(x-16) + 3(x-16)$

$(x-16)(x+3)$

-48: 1·48, 2·24, 3·16, 4·12, 6·8 → −16 + 3

	x	−16
x	x^2	−16x
+3	+3x	−48

5) $m(x) = x^2 + 10x + 36$

$x^2 + \_\_\_\_ + \_\_\_\_ + 36$

$b^2 - 4ac$

$10^2 - 4(1)(36)$

$100 - 144$

-44

i x int.

Does not factor!

36: 1·36, 2·18, 3·12, 4·9, 6·6

6) $n(x) = x^2 + 13x + 40$

$x^2 + 5x + 8x + 40$

$x(x) + 5(x) + 8(x) + 8(5)$

$x(x+5) + 8(x+5)$

$(x+5)(x+8)$

40: 1·40, 2·20, 4·10, 5·8 → 5 + 8

	x	+5
x	x^2	5x
+8	8x	40

$k(x) = (x-16)(x+3)$ $m(x) =$ _____ $n(x) = (x+5)(x+8)$

7. What it looks like without the box….Remember that we could also multiply binomials with the distributive property rather than with the box. Go back and use grouping to see how to perform factoring without a box.

C: Solve each function using factoring rather than the quadratic formula

1) $f(x) = x^2 + 5x - 24$

$0 = x^2 + 5x - 24$

$0 = x^2 + 8x - 3x - 24$

$x(x) + x(8) - 3(x) - 3(8)$

$x(x+8) - 3(x+8)$

$0 = (x+8)(x-3)$

$x+8=0$ or $x-3=0$

$-8\ -8$ $+3\ +3$

$x=-8$ $x=3$

-24: 1·24, 2·12, 3·8, 4·6 → 8 − 3

2) $f(x) = x^2 + 6x - 40$

$0 = x^2 + 6x - 40$

$0 = x^2 + 10x - 4x - 40$

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

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

$0 = (x+10)(x-4)$

$x+10=0$ or $x-4=0$

$-10\ -10$ $+4\ +4$

$x=-10$ $x=4$

-40: 1·40, 2·20, 4·10, 5·8 → 10 − 4

3) $f(x) = x^2 + 8x + 12$

$0 = x^2 + 8x + 12$

$x^2 + 2x + 6x + 12$

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

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

$0 = (x+2)(x+6)$

$x+2=0$

$-2\ -2$

$x=-2$

$x+6=0$

$-6\ -6$

$x=-6$

12: 1·12, 2·6, 3·4

4. Do an algebra II problem: Simplify $\frac{x^2-x-12}{x^2+2x-24}$

$$\frac{x^2-x-12}{x^2+2x-24}$$

$$\frac{(x-4)(x+3)}{(x-4)(x+6)}$$

$$\frac{x+3}{x+6}$$

x^2-x-12 $\quad -12 = 1\cdot12,\ 2\cdot6,\ 3\cdot4$ $\quad -4+3$

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

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

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

$x^2+2x-24$ $\quad -24 = 1\cdot24,\ 2\cdot12,\ 3\cdot8,\ 4\cdot6$ $\quad 6-4$

$x^2+6x-4x-24$

$x(x+6)-4(x+6)$

$(x+6)(x-4)$