AChor/MBF3C **Name:** _____

Date: _____

Worksheet 3-3: Factoring Trinomials of the Form $x^2 + bx + c$

For a trinomial of the form $x^2 + bx + c$,
the factors are of the form $(x + m)(x + n)$, where $m + n = b$ and $mn = c$.

Therefore:

$$x^2 + bx + c \;=\; x^2 + (m + n)x + (mn) = (x + m)(x + n)$$

To factor a trinomial means writing $x^2 + bx + c$ as $(x + m)(x + n)$.

How do we find m and n to factor the trinomial?
We need to find two factors when multiplied equals c but added to b.

x^2	$mn = c$
x	m
x	n

$m + n = b$

Example 1:
Factor each trinomial.
(Hint: Find two factors of c when added together equals b. **Watch for the signs!)**

(a) $x^2 + 5x + 6$ $\quad b = 5$ $\quad c = 6$

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

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

(You may check your answer by expanding the brackets to see if the brackets multiplied to $x^2 + 5x + 6$.)

(b) $a^2 - 3a - 18$ $\quad b = -3$ $\quad c = -18$

= $(a - 6)(a + 3)$

a^2	-18
a	-6
a	$+3$

(c) $y^2 - 8y + 15$ $\quad b = -8$ $\quad c = 15$

= $(y - 3)(y - 5)$

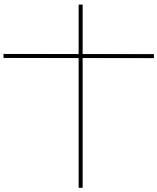
y^2	$+15$
y	-3
y	-5

Assigned Work: WS 3-3; p. 253 #3, #8, #11, #14, #15

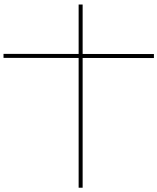
AChor/MBF3C **Name:** _____ WS 3-3

Date: _____

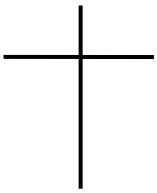
1. Factor $x^2 + 6x$. $b =$ $c =$



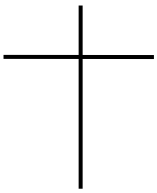
2. Factor $a^2 - 13a + 36$. $b =$ $c =$



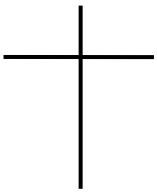
3. Factor $y^2 - 2y - 24$. $b =$ $c =$



4. Factor $x^2 + 7x + 12$. $b =$ $c =$

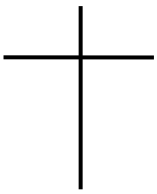


5. Factor $a^2 - 64$ $b =$ $c =$

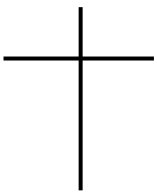


IMPORTANT NOTE: $(x+a)(x+a) = (x+a)^2$ and $(x-a)(x-a) = (x-a)^2$

6. Factor $x^2 + 14x + 49$. $b =$ $c =$

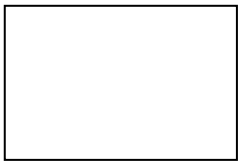


7. Factor $y^2 - 10y + 25$. $b =$ $c =$

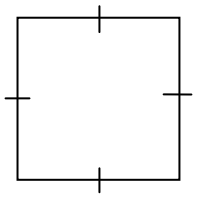


8. Find an expression, in factored form, for the area of each given figure.

(a) Area = $x^2 - 12x + 32$



(b) Area = $x^2 + 14x + 49$



9. The area of a $10 bill can be represented by the expression $x^2 - 25$.

(a) Find the expressions for the length and width of the $10 bill.

(b) Find the dimensions of the $10 bill when $x = 12\,\text{cm}$.

(c) If the area of the $10 bill is 75 cm², find the length and width of the $10 bill.

Answers: **1.** $x(x+6)$; **2.** $(x-4)(x-9)$; **3.** $(x+4)(x-6)$; **4.** $(x+3)(x+4)$; **5.** $(a+8)(a-8)$; **6.** $(x+7)^2$; **7.** $(y-5)^2$; **8.** (a) $(x-4)(x-8)$, (b) $(x+7)^2$; **9.** (a) $(x+5)(x-5)$, (b) 17 cm by 7 cm, (c) 15 cm by 5 cm