Factoring using Decomposition ($ax^2 + bx + c$)

Suppose your trinomial has a number in front of the x^2 (that is NOT a GCF)
Then this number needs to be part of the expansion and part of the brackets

We use a method called factoring by decomp to handle this

$2x^2 + 9x - 5$

Step 1: multiply first and last (2 x 5)

Step 2: find 2 numbers that multiply to this and add to middle (in this case 10 x 1)

$2x^2 + 10x - 1x - 5$

Step 3: decompose the middle term using these 2 numbers

(notice I still put the big # first)

$2x(x + 5) - 1(x + 5)$

Step 4: factor GCF from first 2 and last 2 terms

(notice … if the brackets are the same you did it correctly)

Step 5: factor new GCF and state answer

Answer: $(x + 5)(2x - 1)$

It looks like a lot of work … but the built-in check step makes it worth the effort …

Factor the following

a) $9x^2 - 15x + 4$

36 — 12 x 3 works

$9x^2 - 12x - 3x + 4$

$3x(3x - 4) - 1(3x - 4)$ **Answer:** $(3x - 4)(3x - 1)$

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b) $8x^2 - 10x - 3$

24 — 12 x 2 works

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

$4x(2x - 3) + 1(2x - 3)$ **Answer:** $(2x - 3)(4x + 1)$

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c) $18x^2 - 7x - 1$

18 — 9 x 2 works

$18x^2 - 9x + 2x - 1$

$9x(2x - 1) + 1(2x - 1)$ **Answer:** $(2x - 1)(9x + 1)$

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10) $24x^2 - xy - 3y^2$

72 — 9 x 8 works

Notice xy middle terms

$24x^2 - 9xy + 8xy - 3y^2$

$3x(8x - 3y) + y(8x - 3y)$ **Answer:** $(8x - 3y)(3x + y)$

Assignment - worksheet

Factoring $ax^2 + bx + c$

What do you call drawing squares on Dracula? *(cross off 2 boxes per question)*

BI $(4m - 9)$	TH $(3x + 1)$	TE $(m - 2)$	CH $(m - 3)$	OP $(2x - 5)$	AR $(3m - 10)$	AN. $(14m - 11)$	EC $(2m - 3)$	HS $(5x + 1)$
SU $(6x + 1)$	KI $(15m + 1)$	LL $(x + 3)$	SS $(m + 2)$	NG $(x + 4)$	NE $(5m + 3)$	SU $(x - 2)$	CK $(3m + 2)$	AC $(9x + 2)$
AB $(7x + 8)$	EN $(3x + 4)$	OU $(7x + 2)$	GH $(8m + 3)$	PI $(m + 3)$	NT $(7m + 2)$	LO $(x - 8)$	VE $(m - 1)$	OD $(x - 1)$

1 $6x^2 + 19x + 3$	***2*** $5x^2 - 9x - 2$	***3*** $9x^2 + 15x + 4$
4 $7x^2 + x - 8$	***5*** $2x^2 - 21x + 40$	***6*** $15m^2 + 19m + 6$
7 $8m^2 - 5m - 3$	***8*** $4m^2 - 17m + 18$	***9*** $14m^2 + 17m - 22$
10 $3m^2 - m - 30$	***State 2 integers for the □ so that the question can be factored***	

a) $x^2 + \square x - 10$ ***b)*** $3x^2 - \square x + 10$

Now try Page 178 #15,20