Date 8.1.5: Is there a shortcut? Factoring shortcuts

8-45)

perfect square trinomials	difference of squares	normal factorable quadratics	non factorable
$x^2-10x+25=(x-5)^2$	$9x^2-1=(3x+1)(3x-1)$	$x^2+2x-24=(x+6)(x-4)$	x^2+4
$x^2+6x+9=(x-3)^2$	$x^2-36=(x+6)(x-6)$	$5x^2-4x-1=(x+1)(5x-1)$	x^2+9
$4x^2+20x+25=(2x+5)^2$	$4x^2-25=(2x-5)(2x+5)$	$7x^2-20x-3=(7x+1)(x+3)$	$4x^2+25$
$9x^2+12x+4=(3x+2)^2$	$x^2-49=(x+7)(x-7)$	$x^2-2x-124=(x-6)(x+4)$	$9x^2+4$
$x^2+8x+16=(x+4)^2$	$25x^2-1=(5x+1)(5x-1)$	$x^2-5x-36=(x-9)(x+4)$	
$9x^2-12x+4=(3x-2)^2$	$9x^2-100=(3x-10)(3x+10)$		

8-46) Factor, using the shortcuts if possible. If not, use a box + diamond

then, add these to the list in 8-45!

a) $25x^2-1$

$\boxed{(5x+1)(5x-1)}$

difference of squares!

b) $x^2-5x-36=\boxed{(x-9)(x+4)}$

	x	4	
-9	$-9x$	-36	-9
x	x^2	$4x$	x
	x	4	

$-36x^2$, $-9x$, $4x$, $-5x$

"not special"

c) $x^2+8x+16$ perfect square!

$(x+4)(x+4)$

$\boxed{(x+4)^2}$

d) $9x^2-12x+4$

perfect square trinomial

$(3x-2)(3x-2)$

$\boxed{(3x-2)^2}$

e) $9x^2+4$

$\boxed{\text{not factorable!}}$

would need to be $9x^2-4$ to be a difference of squares

f) $9x^2-100$

difference of squares!

$\boxed{(3x-10)(3x+10)}$

8-47) Why do these patterns work? Use a generic rectangle to prove.

a) Difference of squares

$$a^2x^2-b^2=(ax+b)(ax-b)$$

	ax	$-b$	
b	abx	$-b^2$	b
ax	a^2x^2	$-abx$	ax
	ax	$-b$	

$a^2x^2+abx-abx-b^2$

$=\boxed{a^2x^2-b^2}$

b) Perfect square trinomial

$$a^2x^2+2abx+b^2=(ax+b)^2$$

	ax	b	
b	abx	b^2	b
ax	a^2x^2	abx	ax
	ax	b	

$=a^2x^2+abx+abx+b^2$

$\boxed{a^2x^2+2abx+b^2}$

8-48) Learning Log: Factoring Shortcuts