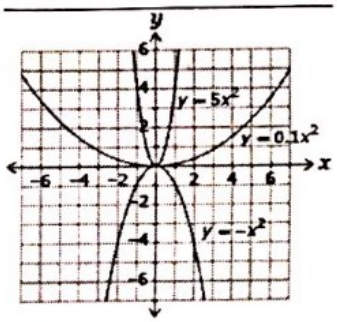
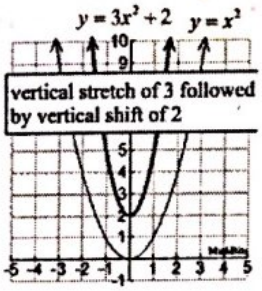
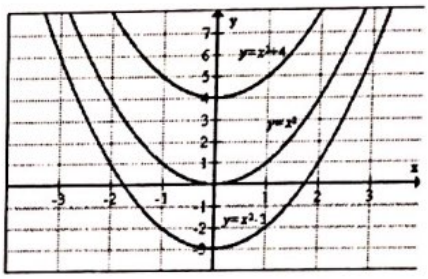
Cori's Copy

Quadratic Standard Form: $f(x) = ax^2 + bx + c$

- a, b and c are numbers
- a and b are coefficients (the value multiplying a variable)
- c is a constant (no variable)
- c is also the y-intercept of the parabola (where x = 0)
- When a is positive, the parabola opens up
- When a is negative, the parabola opens down
- When $|a| > 1$ the parabola is narrower, ie. a = 2
- When $0 < |a| < 1$ the parabola is wider, (a positive or negative fractional value--between 0 to 1 or 0 to -1) ie. a = 1/2 or a = -0.35

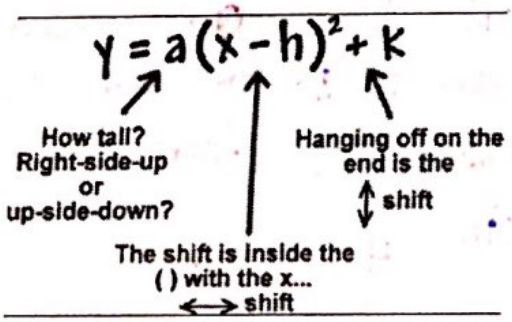


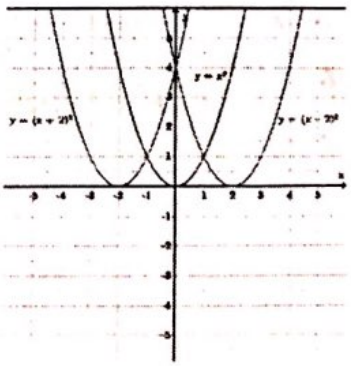


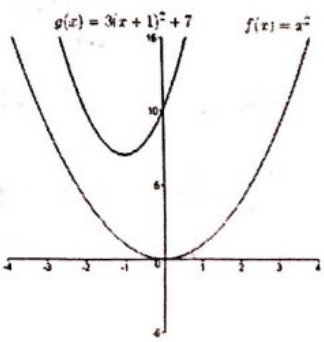


Vertex/Graphing Form: $f(x) = a(x - h)^2 + k$

- a has the same properties as in standard form (+ = opens up, - = opens down, affects the width/narrowness of the parabola)
- Notice that the h value is subtracted in this form and that the k value is added.
- k represents the vertical shift (how far up, or down, the graph has shifted from $y = 0$).
- h represents the horizontal shift (how far left, or right, the graph has shifted from $x = 0$).
- (h, k) is the vertex of the parabola
- $x = h$ is the axis of symmetry





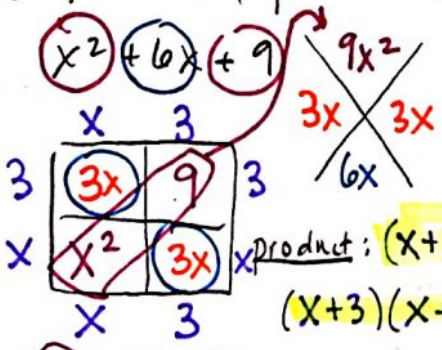


Date 8.1.3: How can I factor this? factoring with special cases.

Quadratic expressions

8-24) factor, if possible. Use a generic rectangle and diamond for each.

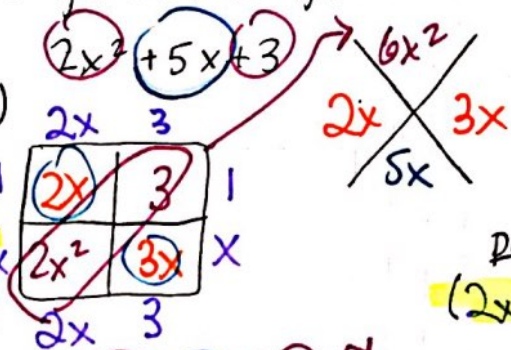
a) x^2+6x+9



product: $(x+3)^2$

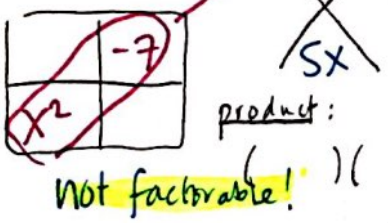
$(x+3)(x+3)$

b) $2x^2+5x+3$



product: $(2x+3)(1+x)$

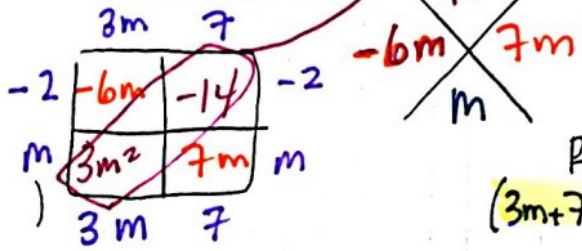
c) x^2+5x-7



product: ( )( )

not factorable!

d) $3m^2+m-14$



product: $(3m+7)(m-2)$

Standard form ax^2+bx+c

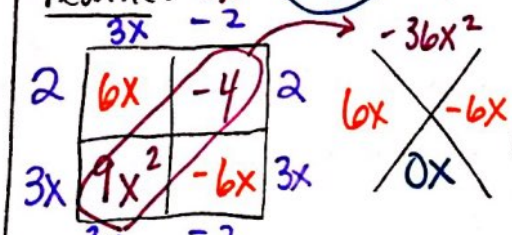
8-25) Special cases - Quadratic standard form: ax^2+bx+c

What if order is different?

What if terms are missing?

a) $9x^2-4$

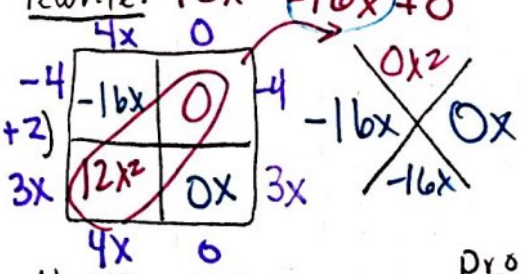
rewrite: $9x^2+0x-4$



product: $(3x-2)(3x+2)$

b) $12x^2-16x$ $= 4x(3x-4)$

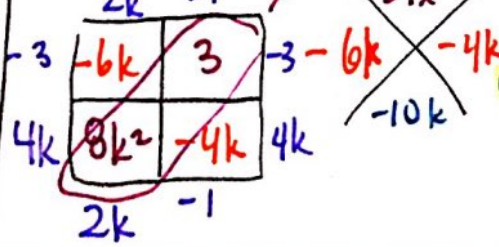
rewrite: $12x^2-16x+0$



product: $(3x-4)(4x+0)$

c) $3+8k^2-10k$

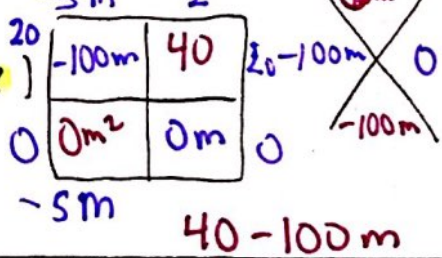
rewrite: $8k^2-10k+3$



product: $(2k-1)(4k-3)$

d) $40-100m$ $= 20(2-5m)$

rewrite: $0m^2-100m+40$



product: $(-5m+2)(20+0)$

$40-100m$

$20(2-5m)$

Date: 8.1.3: How Can I factor this? Factoring with special cases.

8-26) Factor (box + diamond), compare with teammates, and try to find more than 1 solution.

$4x^2 + 10x - 6$

	4x	2
-3	$-12x$	-6
x	$4x^2$	$2x$

$-24x^2$: $-12x$, $2x$; $-10x$

product: $(4x+2)(x-3)$

	2x	1
-6	$-12x$	-6
2x	$4x^2$	$2x$

$-24x^2$: $-12x$, $2x$; $-10x$

product: $(2x-6)(2x+1)$

8-27) Factors on top row and left column. Sum (their product) is where the row and column intersect. Find the missing boxes - complete table.

Bonus

multiply	$x-2$	
$x+7$		
	$3x^2-5x-2$	$6x^2+5x+1$

HW 8-28) Explain how to factor a quadratic expression.

Learning Log: Factoring Quadratics. include examples, special cases (missing term or wrong order)

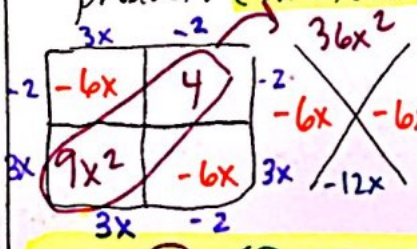
Date 8.1.4: Can it still be factored? Factoring completely.

factored completely:

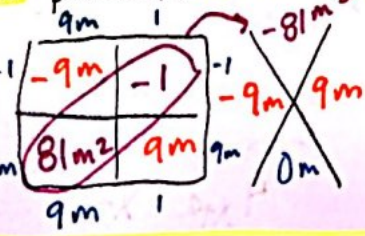
example: factor 12
1·12, 2·6
3·4...
only 2·3·3 is factored completely (prime!)

8-35) factor, if possible.

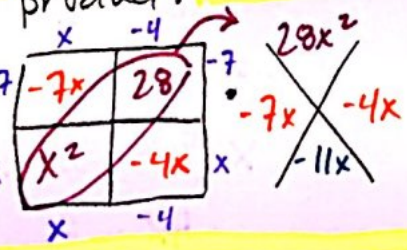
a) $9x^2 - 12x + 4$ product: $(3x-2)(3x-2)$



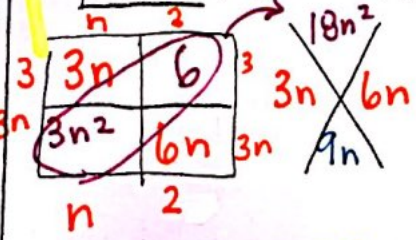
b) $81m^2 - 1$ product: $(9m-1)(9m+1)$



c) $28 + x^2 - 11x$ $x^2 - 11x + 28$ product: $(x-7)(x-4)$



d) $3n^2 + 9n + 6$ product: $(n+2)(3n+3)$



$(n+1)(3n+6)$

8-36) a+b) Is there more than one factored form for $3n^2+9n+6$? Why?
Yes - all terms are divisible by 3.

c) without factoring, predict which quadratic expressions will have more than one form. Justify.

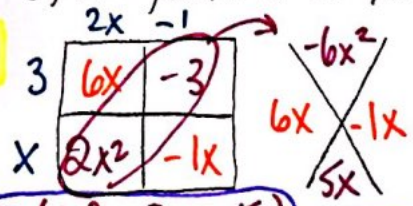
(i) $12t^2 - 10t + 2$ (ii) $5p^2 - 23p - 10$

(iii) $10x^2 + 25x - 15$ (iv) $3k^2 + 7k - 6$

8-37) a) an expression is considered completely factored if none of the factors can be factored any more. Rewrite with common factor factored out:

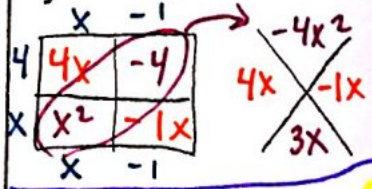
a) $10x^2 + 25x - 15 = 5(2x^2 + 5x - 3)$ b) now factor it completely.

b) product / factors: $5(2x-1)(x+3)$



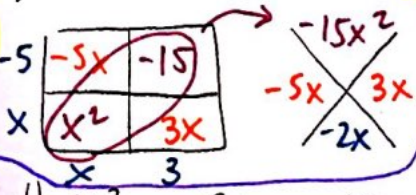
8-38)

a) $5x^2 + 15x - 20 = 5(x^2+3x-4)$ $= 5(4+x)(x-1)$

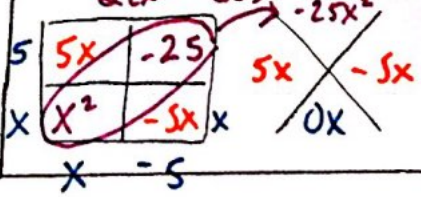


$5(x+4)(x-1)$

b) $3x^3 - 6x^2 - 45x = 3x(x^2 - 2x - 15) = 3x(x+3)(x-5)$



c) $2x^2 - 50 = 2(x^2-25) = 2(x+5)(x-5)$



d) $x^2y - 3xy - 10y = y(x^2 - 3x - 10) = y(x-5)(x+2)$