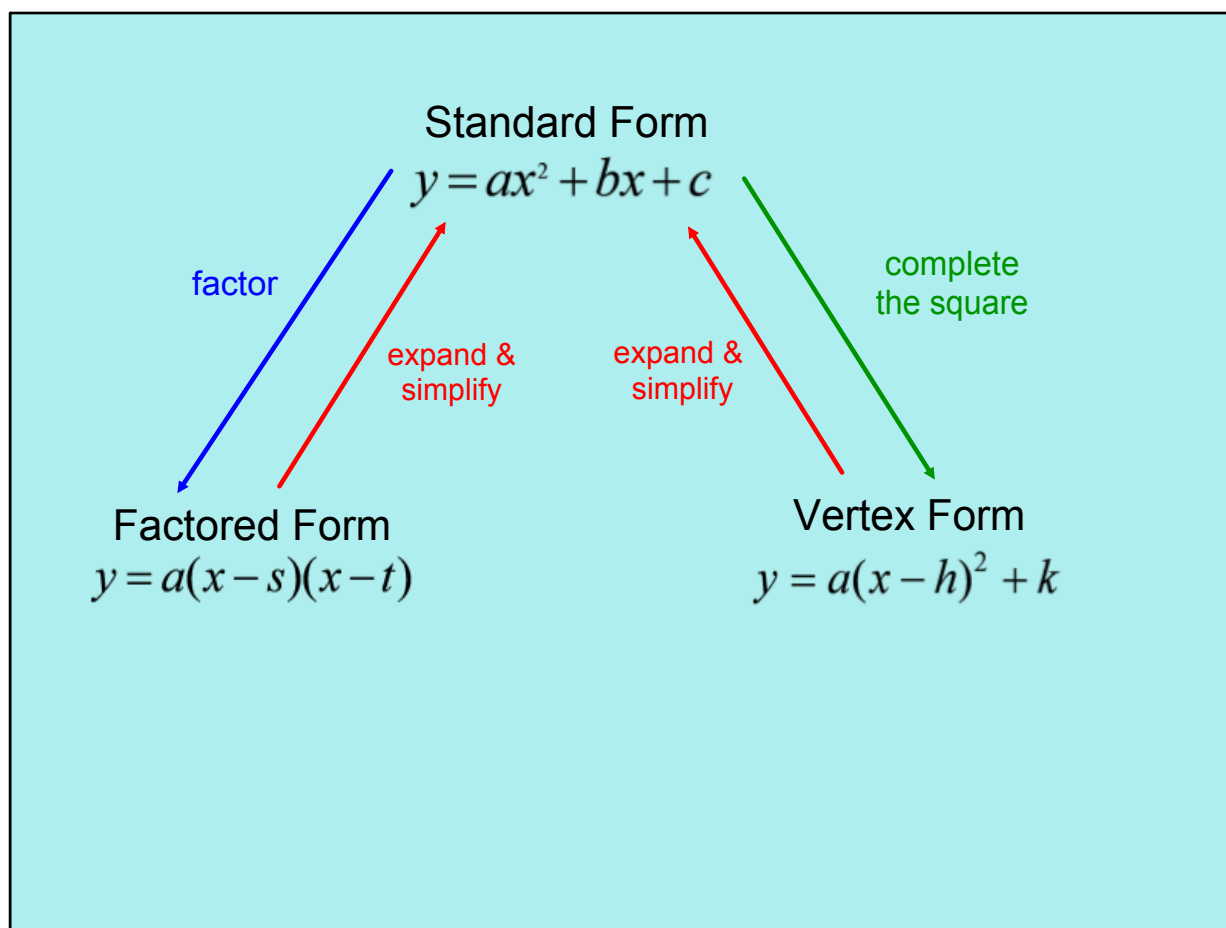


Feb 4/2011

# Review - Part 4

## Completing the Square

Jan 31-2:27 PM



Feb 2-6:19 PM

Recall: vertex form is  $y = a(x - h)^2 + k$

$(x - h)^2$  is a perfect square

Perfect Squares:  $a^2 + 2ab + b^2 = (a + b)^2$

$a^2 - 2ab + b^2 = (a - b)^2$

(a)  $x^2 + 10x + \underline{25} = (x + 5)^2$

(b)  $x^2 - 18x + \underline{81} = (x - 9)^2$

May 3-7:51 PM

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$x^2 + 6x + \underline{9} = (x + 3)^2$

Mar 25-8:02 AM

$x^2 - 4x + 4 = (x - 2)^2$

Mar 25-8:02 AM

$x^2 + 6x + 3 = (x + 3)^2 - 6$

Mar 25-8:02 AM

$x^2 - 4x - 3 = (x-2)^2 - 7$

$(x-2)^2 - 7$

Mar 25-8:02 AM

To go from standard form to vertex form, we force a perfect square into our equation.

(c)  $y = x^2 + 12x - 7$

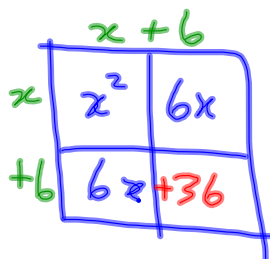
$$x^2 + 12x + 36 - 36 - 7$$

$$= (x+6)^2 - 36 - 7$$

$$y = x^2 + 12x + 36 - 36 - 7$$

$$\frac{12}{2} = 6 \quad b^2 = 36$$

$$y = (x+6)^2 - 43$$



$$y = (x+6)^2 - 43$$

$$-7$$

$$-36$$

$$\hline -43$$

May 3-7:51 PM

$$(d) y = x^2 - 20x + 15$$

$$y = \underbrace{x^2 - 20x + 100}_{(x-10)^2} - 100 + 15$$

$$y = (x-10)^2 - 85$$

$x$	$x^2$	$-10x$
$-10$	$-10x$	$+100$

$$\begin{array}{r} +15 \\ -100 \\ \hline -85 \end{array}$$

$$y = (x-10)^2 - 85$$

$$\begin{array}{l} x^2 - 20x + 100 - 100 \\ \downarrow \\ -\frac{20}{2} = -10 \\ (-10)^2 = 100 \end{array}$$

Feb 4-9:41 AM

For complex trinomials, where  $a \neq 1$ , factor the  $a$  value out of the variable terms ( $x^2$  and  $x$ ) first.

$$(e) y = -x^2 + 6x + 13$$

coefficient of  $x^2$  is  $-1$

factor out  $-1$

$$y = (-1)(x^2 - 6x) + 13$$

complete the square

$$y = -(x^2 - 6x + 9 - 9) + 13$$

factor

$$y = -((x-3)^2 - 9) + 13$$

expand constant term

$$y = -(x-3)^2 + 9 + 13$$

$$y = -(x-3)^2 + 22$$

May 3-7:51 PM

$$(f) y = 3x^2 + 12x + 11$$

$$y = 3(x^2 + 4x) + 11$$

$$y = 3(x^2 + 4x + 4 - 4) + 11$$

$$y = 3((x+2)^2 - 4) + 11$$

$$y = 3(x+2)^2 - 12 + 11$$

$$y = 3(x+2)^2 - 1$$

① factor 3 from  
x-terms

② create a perfect  
square using  
x-terms

③ factor perfect square

④ expand outer  
parentheses

⑤ collect like constants

Feb 4-9:56 AM

Homework:

p.99 # 7odd, 8odd, 9odd

Feb 1-7:30 PM