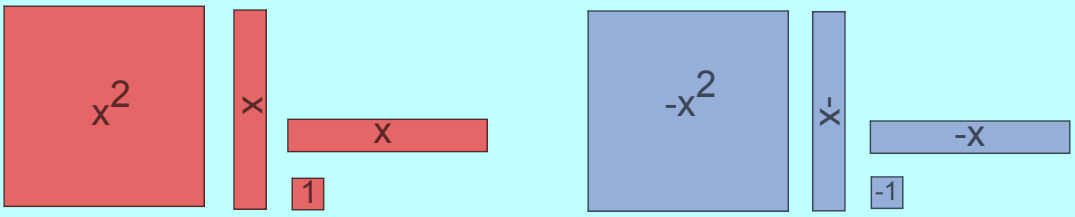
Standard Form to Vertex Form - Completing the Square

Lets look at the vertex form again: $y = a(x - h)^2 + k$ Apr. 18/ 2011

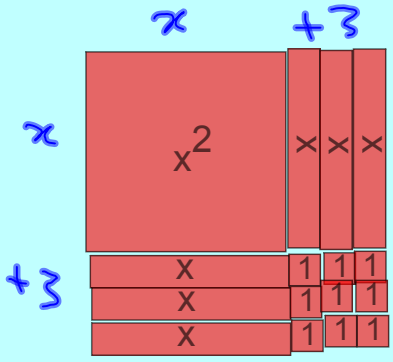
The first part: $a(x - h)^2$ originates from
a perfect square trinomial (PST)

Apr 12-2:42 PM

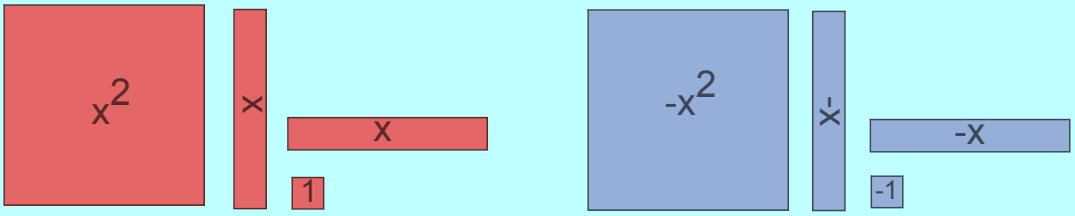


Identify the missing constant so that the trinomial is a PST. Then factor it.

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

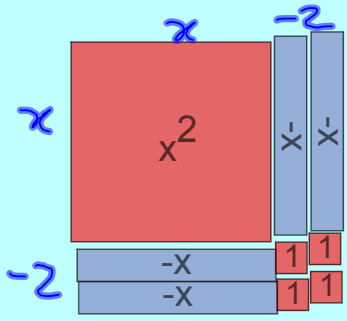


Mar 25-8:02 AM



Identify the missing constant so that the trinomial is a PST. Then factor it.

$x^2 - 4x + \underline{4} = (x-2)^2$



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Ex: Identify the missing constant so that the trinomial is a PST. Then factor it.

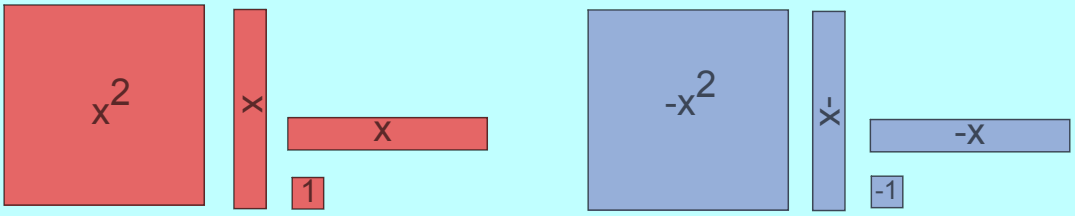
(a) $x^2 + 10x + \underline{25} = (x+5)^2$

$\frac{10}{2} = 5$, 5^2

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

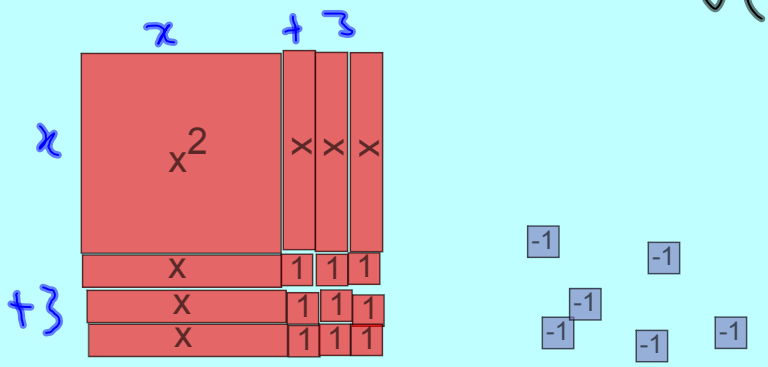
$-\frac{18}{2} = -9$, $(-9)^2$

May 3-7:46 PM



Identify the missing constant so that the trinomial is a PST, you will have some tiles "left over".

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



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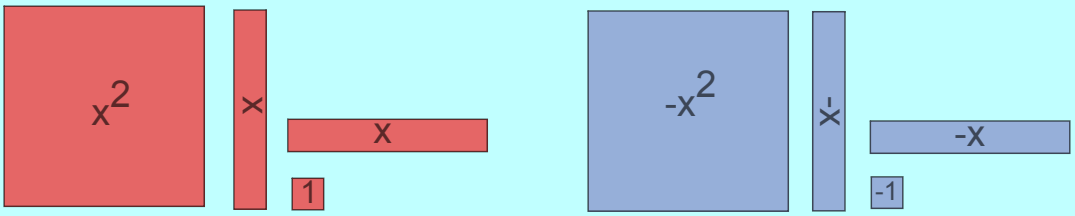
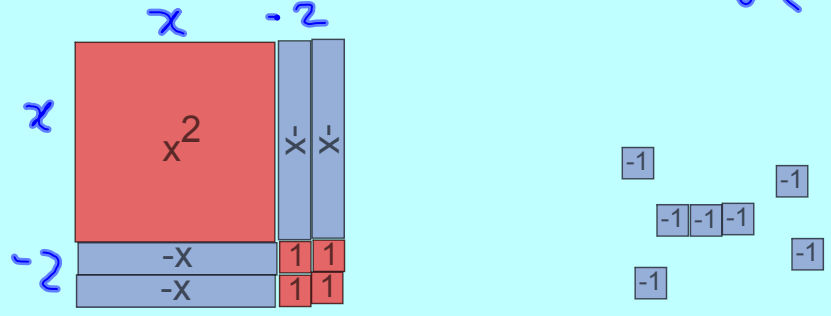


Identify the missing constant so that the trinomial is a PST, you will have some tiles "left over".

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



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Method 3: Complete the square

1) Factor out 'a' from the first two terms.

2) Force a perfect square for the factored first two terms.

3) Collect the constants.

Ex: Complete the square for each of the following

a) $y = x^2 + 12x - 7$ $\quad b = 12 \quad \frac{12}{2} = 6 \quad 6^2 = 36$

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

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

b) $y = x^2 - 20x + 15$ $\quad \frac{-20}{2} = -10 \quad (-10)^2 = 100$

$y = x^2 - 20x + 100 - 100 + 15$

$(x-10)^2 \qquad -85$

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

May 3-7:51 PM

c) $y = 3x^2 + 12x + 11$

① factor $a = 3$

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

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

$(x+2)^2$

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

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

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

d) $y = -x^2 + 6x + 13$

$a = -1$

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

$y = (-1)[x^2 - 6x + 9 - 9] + 13$

$y = (-1)[(x-3)^2 - 9] + 13$

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

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

(3,4)

(3,22)

May 4-8:48 AM

Assigned Work:

PST practice: p.230 #3bef, 4ad, 6

p. 331 # 1, 2, 3, 4, 5abcf, 7ade,

Mar 20 - 4:57 PM

Apr 15-10:45 AM