Example 1: Factor $2x^2 + 15x + 18$.

In this example, $a = 2$, $b = 15$, and $c = 18$. You need to find two numbers that have a sum of 15 and a product of $2 \cdot 18$ or 36. Make a list of the factors of 36 and look for the pair of factors with a sum of 15.

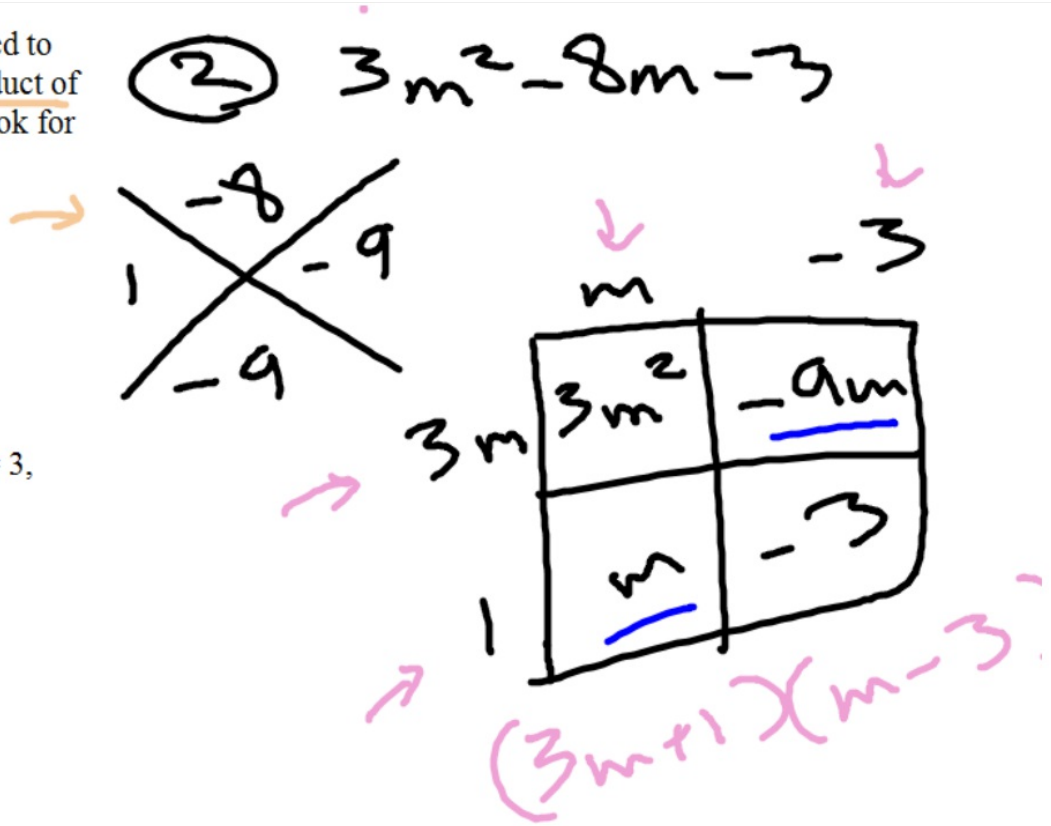
Factors of 36	Sum of Factors
1, 36	37
2, 18	20
3, 12	15

Use the pattern $ax^2 + mx + px + c$, with $a = 2$, $m = 3$, $p = 12$, and $c = 18$.

$$\begin{aligned} 2x^2 + 15x + 18 &= 2x^2 + 3x + 12x + 18 \\ &= (2x^2 + 3x) + (12x + 18) \\ &= x(2x + 3) + 6(2x + 3) \\ &= (x + 6)(2x + 3) \end{aligned}$$

Therefore, $2x^2 + 15x + 18 = (x + 6)(2x + 3)$.

Exercises



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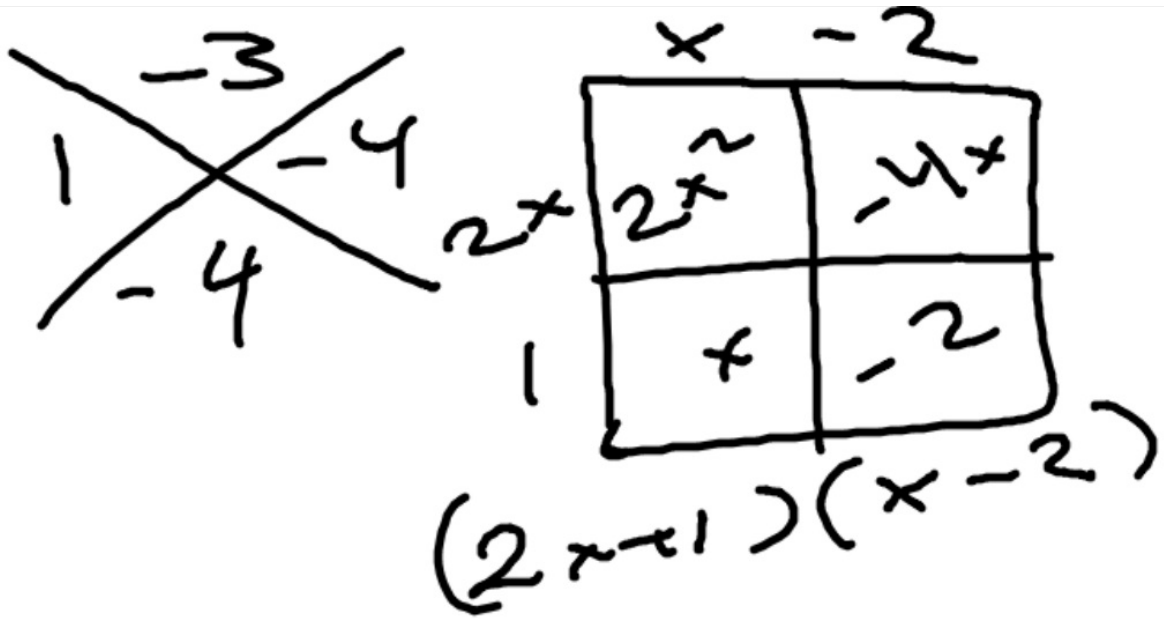
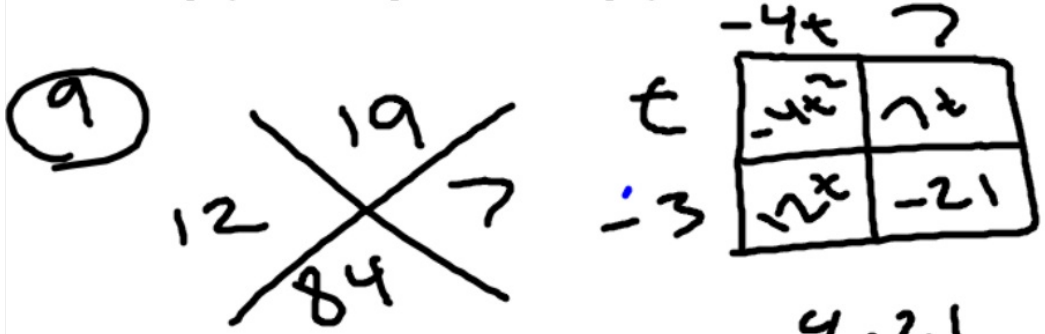


$(2x+1)(x-2)$

Factor each polynomial, if possible. If the polynomial cannot be factored using integers, write *prime*.



(t-3)(-4t+7)

check:
$-4t^2+7t+12t-21$
$-4t^2+19t-21$

3. $16r^2 - 8r + 1$

$(4r-1)(4r-1)$

6. $18x^2 - 27x - 5$

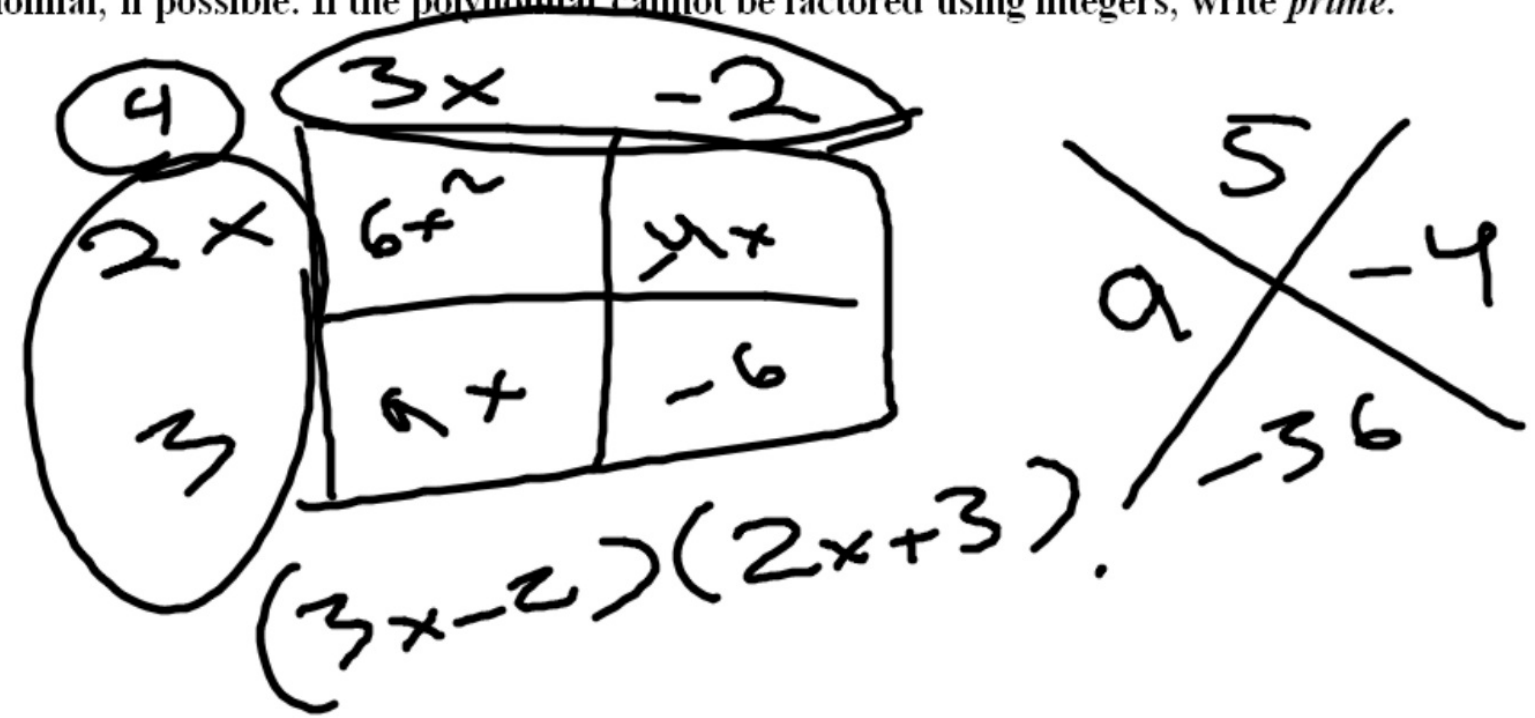
9. $-4t^2 + 19t - 21$

12. $48x^2 + 22x - 15$

15. $8m^2 - 44m + 48$

18. $18 + 11y + 2y^2$

nomial, if possible. If the polynomial cannot be factored using integers, write *prime*.



$A = l \times w$

$l = 8 - 2x$

$24 = (8-2x)(6-2x)$

$w = 6 - 2x$

$24 = 48 - 16x - 12x + 4x^2$

$-24 \quad -24$

$0 = 4x^2 - 28x + 24$

$0 = 4(x-1)(x-6)$

$x = 1$ $\quad x = 6$

$-24 \quad -4 \quad -24 \quad 6$

$-12 \div -8$

$-24 \div -4$

can't use

6? 6?

18. GEOMETRY A rectangle with an area of 24 square inches is formed by cutting strips of equal width from a rectangular piece of paper. Find the dimensions of the new rectangle if the original rectangle measures 8 inches by 6 inches.