ST. JEAN DE BREBEUF MATHEMATICS

CHAPTER 4

FACTOR TRINOMIALS IN THE FORM $y = x^2 + bx + c$

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CHAPTER 7.4 FACTOR TRINOMIALS IN THE FORM $y = x^2 + bx + c$

KEY CONCEPTS

To find the factors of a trinomial in the form $\boldsymbol{x^2 + bx + c}$, look for the pair of numbers

→ when multiplied, the product is *c*.

→when added, the sum is *b*

Factoring is the opposite of expanding.

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CHAPTER 7.4 FACTOR TRINOMIALS IN THE FORM $y = x^2 + bx + c$

EXAMPLE 1 *Factoring Trinomials*

Factor each trinomial. Check your answers by expanding:

(a) $x^2 + 5x + 6$

$= (x + 3)(x + 2)$

$P = +6$

$S = +5$

$+3$

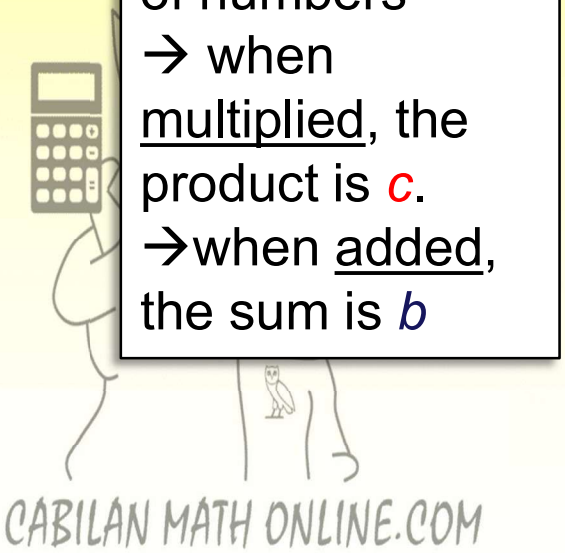
$+2$

Check: $(x + 3)(x + 2)$

$= x^2 + 2x + 3x + 6$

$= x^2 + 5x + 6$

To find the factors of a trinomial in the form $x^2 + bx + c$, look for the pair of numbers
→ when multiplied, the product is *c*.
→when added, the sum is *b*



CHAPTER 7.4 FACTOR TRINOMIALS IN THE FORM $y = x^2 + bx + c$

(b) $x^2 + 3x - 4$

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

P = -4 : $+4$, -1

S = $+3$

Check: $(x + 4)(x - 1)$

$= x^2 - 1x + 4x - 4$

$= x^2 + 3x - 4$ ✓

(c) $x^2 - 1x - 30$

$= (x - 6)(x + 5)$

P = -30 : -6, $+5$

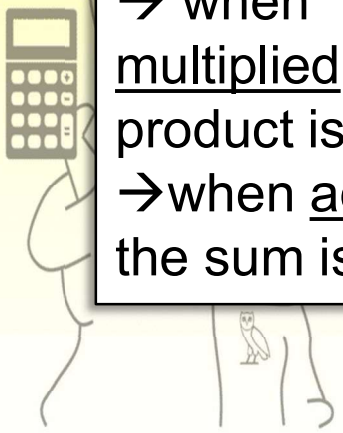
S = -1

Check: $(x - 6)(x + 5)$

$= x^2 + 5x - 6x - 30$

$= x^2 - 1x - 30$ ✓

To find the factors of a trinomial in the form $x^2 + bx + c$, look for the pair of numbers
→ when multiplied, the product is *c*.
→when added, the sum is *b*



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CHAPTER 7.4 FACTOR TRINOMIALS IN THE FORM $y = x^2 + bx + c$

(b) $x^2 + 3x - 4$

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

P = -4 : $+4$, -1

S = $+3$

Check: $(x + 4)(x - 1)$

$= x^2 - 1x + 4x - 4$

$= x^2 + 3x - 4$ ✓

SUMMARY

When the **product (P) is <u>negative</u>**
→One number will be **positive**
→One number will be **negative**

(c) $x^2 - 1x - 30$

$= (x - 6)(x + 5)$

P = -30 : -6, $+5$

S = -1

Check: $(x - 6)(x + 5)$

$= x^2 + 5x - 6x - 30$

$= x^2 - 1x - 30$ ✓

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CHAPTER 7.4 FACTOR TRINOMIALS IN THE FORM $y = x^2 + bx + c$

(d) $x^2 - 12x + 32$

$P = +32$

$S = -12$

-8

-4

$= (x - 8)(x - 4)$

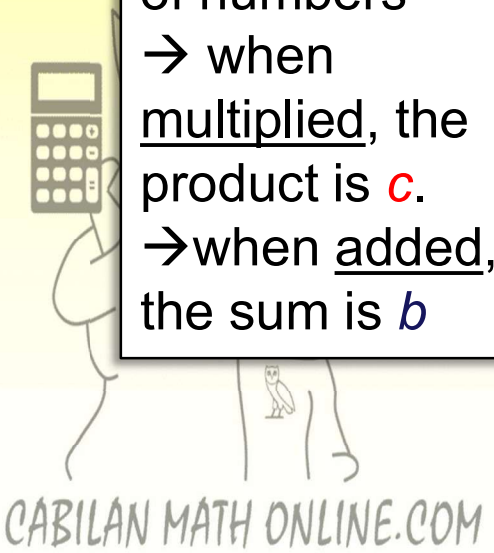
Check: $(x - 8)(x - 4)$

$= x^2 - 4x - 8x + 32$

$= x^2 - 12x + 32$ ✓

To find the factors of a trinomial in the form $x^2 + bx + c$, look for the pair of numbers
→ when multiplied, the product is *c*.
→when added, the sum is *b*

END OF DAY 1



CHAPTER 7.4 FACTOR TRINOMIALS IN THE FORM $y = x^2 + bx + c$

(d) $x^2 - 12x + 32$

$= (x - 8)(x - 4)$

P = $+ 32$: -8, -4

S = $- 12$

Check: $(x - 8)(x - 4)$

$= x^2 - 4x - 8x + 32$

$= x^2 - 12x + 32$ ✓

(a) $x^2 + 5x + 6$

$= (x + 3)(x + 2)$

P = $+ 6$: $+3$, $+2$

S = $+ 5$

END OF DAY 1

SUMMARY

When **product (P)** is **positive**
→**Both** numbers will have the *same* sign!

Positive product, positive sum
→ **Both** numbers will be **positive**

Positive product, negative sum
→ **Both** numbers will be **negative**

CHAPTER 7.4 FACTOR TRINOMIALS IN THE FORM $y = x^2 + bx + c$

EXAMPLE 2

Finding the Dimensions of a Rectangle

A rectangle has an area represented by the trinomial $\mathbf{x^2 + 2x - 24}$.

(a) Factor the trinomial to find expressions for the dimensions of the rectangle.

$A = x^2 + 2x - 24$

$P = -24$

$S = +2$

$+6$

-4

$A = (x + 6)(x - 4)$

Length Width

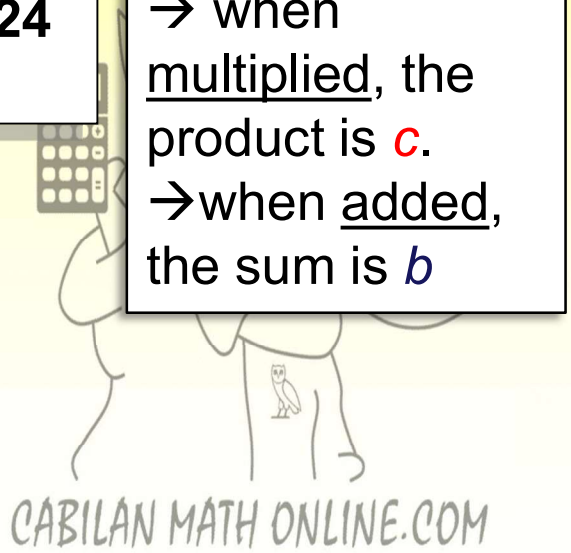
$x^2 + 2x - 24$

To find the factors of a trinomial in the form $x^2 + bx + c$, look for the pair of numbers
→ when multiplied, the product is *c*.
→when added, the sum is *b*

(b) Calculate the actual dimensions if $\mathbf{x = 40\ m}$.

Length = x + 6
= 40 + 6
= **46 m**

Width = x – 4
= 40 – 4
= **36 m**



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