

Write the factors the following numbers

1. 15 (1, 3, 5, 15)
2. 24 (1, 2, 3, 4, 6, 8, 12, 24)
3. 60 (1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60)
4. 7 (1, 7)
5. 18 (1, 2, 3, 6, 9, 18)

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**Factoring  $x^2 + bx + c$**  |  $x^2 + bx + c = (x + m)(x + n)$ .  
where  $m + n = b$  and  $mn = c$ .

 **Difference of Squares** |  $a^2 - b^2 = (a - b)(a + b)$

**Perfect Square Trinomial**

$$a^2 + 2ab + b^2 \text{ or } a^2 - 2ab + b^2$$

$$(a + b)^2 \qquad (a - b)^2$$

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standard  
form of  
Quadratic

$$ax^2 + bx + c$$

including -1  
when -a

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are the signs the same

$a=1$

	<u>Larger Constant</u>	<u>Smaller Constant</u>
$(x^2 + x + c)$	$(x + c)$	$(x + c)$
$(x^2 - x + c)$	$(x - c)$	$(x - c)$
$(x^2 + x - c)$	$(x + c)$	$(x - c)$
$(x^2 - x - c)$	$(x - c)$	$(x + c)$

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$$x^2 + 9x + 14$$

When the constant term is positive, its factors have the same sign.

What is the value of the  $c$  term? 14 What is the value of the  $b$  term? 9

Factors of 14	Sum
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1 and <u>14</u>	15
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2 and <u>7</u>	<u>9</u>
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What are the factors of  $c$  whose sum is  $b$ ? 2 and 7

Complete:  $(x + \underline{2})(x + \underline{7})$

Check using FOIL  $(x + \underline{2})(x + \underline{7}) = x^2 + \underline{7x} + 2x + \underline{14}$

$$x^2 + \underline{9x} + \underline{14}$$

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### Factoring $x^2 + bx + c$ When $c$ is Negative

Factor the trinomial  $x^2 + 3x - 18$ . Check your answer.

When the constant term of a trinomial is negative, its factors have \_\_\_\_\_ signs.

What is the value of the  $c$  term? \_\_\_\_\_ What is the value of the  $b$  term? \_\_\_\_\_

Factors of -18	Sum
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-1 and <u>18</u>	17
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-2 and <u>9</u>	<u>7</u>
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-3 and <u>6</u>	<u>3</u>
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What are the factors of  $c$  whose sum is  $b$ ? -3 and 6

Complete:  $(x - \underline{3})(x + \underline{6})$

Check using FOIL  $(x - \underline{3})(x + \underline{6}) = x^2 + \underline{6x} - 3x - \underline{18}$

$$x^2 + \underline{3x} - \underline{18}$$

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$$c^2 - 4c - 12$$

$$\begin{array}{r} 1 - 12c - 11 \\ 2 - 6 = -4 \\ 3 - 4 \end{array}$$

$$(c+2)(c-6)$$

$$\begin{array}{l} (c+2)(c-6) \\ c^2 - 6c + 2c - 12 \\ \hline c^2 - 4c - 12 \end{array}$$

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$$a^2 + 8a - 9$$

$$(a+9)(a-1)$$

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$$\frac{2a^2}{2} - \frac{14a}{2} + \frac{18}{2}$$

$$2(a^2 - 7a + 9) \quad \begin{matrix} 19 \\ 33 \end{matrix}$$

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**$6ax + 3ay + 2bx + by$  by grouping.**

$$6ax + 3ay + 2bx + by \quad \text{---}$$

$$= (6ax + 3ay) + (2bx + by)$$

$$= \underline{3a(2x + y)} + \underline{b(2x + y)} \quad \text{Like term}$$

$$= \underline{(3a + b)(2x + y)}$$

$$6ax + 3ay + 2bx + by$$

$$2x + 3x$$

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$$(12a^2 + 3a)(-8a - 2)$$

$$\underline{3a}(4a+1) - \underline{2}(4a+1)$$

$$(3a-2)(4a+1)$$

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$$\underline{3x^2} + 2x - 8$$

$$(-24x^2)$$

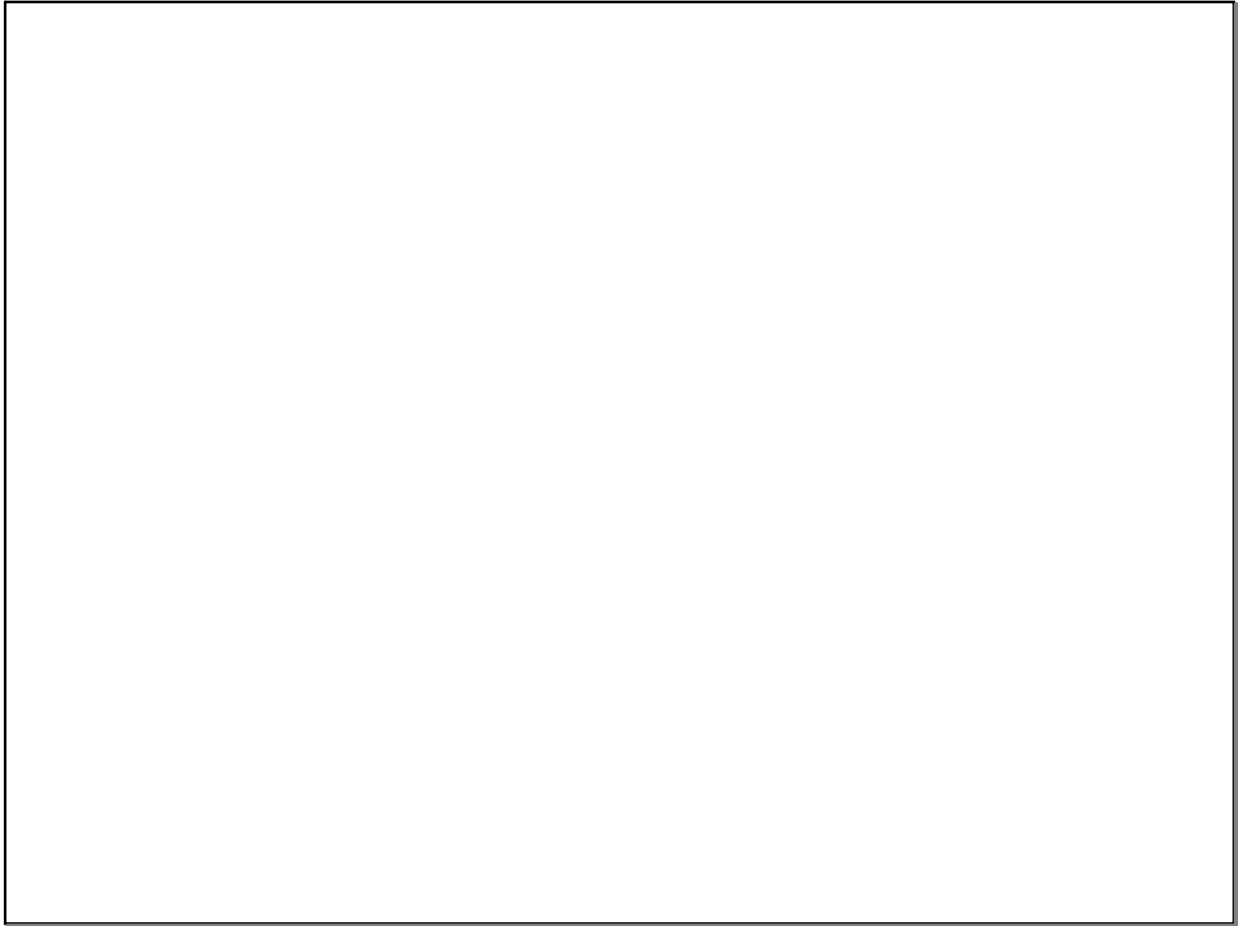
$$\begin{array}{r} \wedge \\ 1 \quad 24 \\ 2 \quad 12 \\ 3 \quad 8 \\ \boxed{-4+6} \end{array}$$

$$(3x^2 + 6x)(4x - 8)$$

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

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

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