Steps to Factoring $Ax^2 + Bx + C$ Factor: $24x^2 - 2x - 15$ 1. Find the factors of the first term. $24x^2 - 2x - 15$ 2. Find the factors of the last term. $12x \cdot 2x - 8x \cdot 3x - 6x \cdot 4x$ 2. Find the factors of the last term. $12x \cdot 2x - 8x - 3x - 6x \cdot 4x$ 3. Find the factors of the last term. $12x \cdot 2x - 8x - 3x - 6x \cdot 4x$ 4. First part of each parentheses and stel ast term in the last part of each parentheses.Possible FactorsDo not put any signs in this step. $(24x - 1)(x - 15) - (24x - 5)(x - 3) - (12x - 5)(2x - 3) - $	Steps to Factoring $Ax^2 + Bx + C$		Example	
1. Find the factors of the first term. $\frac{24x^2}{24x \cdot x}$ 1. Find the factors of the first term. $12x \cdot 2x$ $8x \cdot 3x$ $6x \cdot 4x$ 2. Find the factors of the last term. $\frac{-15}{1 \cdot 15}$ $3 \cdot 5$ 2. Find the factors of the last term. $\frac{-15}{1 \cdot 15}$ $3 \cdot 5$ Write out the two sets of parentheses with the factors of the first term in the first part of each parentheses and parentheses.Possible Factors $(24x \ 3)(x \ 5)$ $(12x \ 1)(2x \ 15)(2x \ 1)$ $(12x \ 1)(2x \ 15)$ $(12x \ 1)(2x \ 15)(2x \ 1)$ $(12x \ 1)(2x \$			Factor: $24x^2 - 2x - 15$	
2. Find the factors of the last term. $-15$ $1 \cdot 15$ $3 \cdot 5$ 2. Find the factors of the last term. $-15$ $1 \cdot 15$ $3 \cdot 5$ Possible FactorsWrite out the two sets of parentheses with the factors of the first term in the first part of each parentheses and at the last term in the last part of each parentheses.Do not put any signs in this step. $(24x \ 1)(x \ 15)$ $(12x \ 1)(2x \ 15)$ $(12x \ 1)(2x \ 15)$ $(12x \ 5)(2x \ 3)$ $(12x \ 3)(2x \ 5)$ $(12x \ 5)(2x \ 3)$ $(8x \ 1)(3x \ 15)$ $(8x \ 15)(3x \ 1)$ $(8x \ 3)(3x \ 5)$ $(6x \ 1)(4x \ 15)$ $(24x \ 1)(x \ 15)$ $(12x \ 1)(2x \ 1)$ $(24x \ 1)(2x \ 1)$ 	1.	Find the factors of the first term.	$\frac{24x^2}{24x \cdot x}$ $12x \cdot 2x$ $8x \cdot 3x$ $6x \cdot 4x$	
Possible FactorsWrite out the two sets of parentheses with the factors of the first term in the first part of each parentheses and parentheses. $(24x \ 3)(x \ 5)$ $(24x \ 5)(x \ 3)$ 3.the last term in the last part of each parentheses. $(12x \ 3)(2x \ 5)$ $(12x \ 15)(2x \ 1)$ Do not put any signs in this step. $(8x \ 3)(3x \ 5)$ $(8x \ 5)(3x \ 3)$ $(6x \ 1)(4x \ 15)$ $(6x \ 5)(4x \ 3)$ Checking all these combinations can be a daunting task, but there are a few things we can do to cut down on the amount of work.Possible Factors(1) Eliminate possible factors where the binomials have common factors. $(12x \ 3)(2x \ 5)$ $(12x \ 5)(2x \ 3)$ (2) Start the checking process with the factors whose numbers are closest to one-another since these will work out the majority of the $(8x \ 3)(3x \ 5)$ $(8x \ 15)(3x \ 1)$ (6x \ 3)(4x \ 5) $(6x \ 15)(4x \ 1)$ $(6x \ 5)(4x \ 3)$ (6x \ 1)(4x \ 15) $(24x \ 5)(2x \ 3)$ (6x \ 1)(4x \ 15) $(24x \ 5)(x \ 3)$ (6x \ 1)(4x \ 15) $(24x \ 15)(x \ 1)$ (6x \ 3)(3x \ 5) $(8x \ 15)(3x \ 1)$ (6x \ 3)(4x \ 5) $(6x \ 15)(4x \ 1)$ (6x \ 5)(4x \ 3)	2.	Find the factors of the last term.	$-15$ $1 \cdot 15$ $3 \cdot 5$	
Write out the two sets of parentheses with the factors of the first term in the first part of each parentheses and parentheses. $(24x \ 1)(x \ 15)$ $(24x \ 5)(x \ 1)$ 3. the last term in the last part of each parentheses. $(12x \ 1)(2x \ 15)$ $(12x \ 5)(2x \ 3)$ Do not put any signs in this step. $(8x \ 3)(3x \ 5)$ $(8x \ 5)(3x \ 3)$ Checking all these combinations can be a daunting task, but there are a few things we can do to cut down on the amount of work.Possible Factors1 Eliminate possible factors where the binomials have common factors. $(12x \ 1)(2x \ 15)$ $(12x \ 5)(2x \ 3)$ 2 Start the checking process with the factors whose numbers are closest to one-another since these will work out the majority of the $(8x \ 3)(3x \ 5)$ $(8x \ 15)(3x \ 1)$ (2 Start the checking process with the factors whose numbers are closest to one-another since these will work out the majority of the $(8x \ 3)(3x \ 5)$ $(8x \ 5)(3x \ 3)$ (6x \ 1)(4x \ 15) (6x \ 3)(4x \ 5) $(8x \ 5)(3x \ 3)$ (6x \ 1)(4x \ 15) (6x \ 3)(4x \ 5) $(8x \ 5)(3x \ 3)$ (6x \ 1)(4x \ 15) (6x \ 3)(4x \ 5) $(8x \ 5)(3x \ 3)$			Possible Factors	
Checking all these combinations can be a daunting task, but there are a few things we can do to cut down on the amount of work. (1) Eliminate possible factors where the binomials have common factors. (2) Start the checking process with the factors whose numbers are closest to one-another since these will work out the majority of the (24x 1)(x 15) (24x 5)(x 1) (24x 5)(x 3) (12x 1)(2x 15) (12x 3)(2x 5) (12x 3)(3x 5) (8x 3)(3x 5) (6x 1)(4x 15) (6x 3)(4x 5) (6x 5)(4x 3)	3.	Write out the two sets of parentheses with the factors of the first term in the first part of each parentheses and the last term in the last part of each parentheses. Do not put any signs in this step.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
	4.	<ul> <li>Checking all these combinations can be a daunting task, but there are a few things we can do to cut down on the amount of work.</li> <li>(1) Eliminate possible factors where the binomials have common factors.</li> <li>(2) Start the checking process with the factors whose numbers are closest to one-another since these will work out the majority of the</li> </ul>	Possible Factors $(24x \ 1)(x \ 15)$ $(24x \ 15)(x \ 1)$ $(24x \ 3)(x \ 5)$ $(24x \ 5)(x \ 3)$ $(12x \ 1)(2x \ 15)$ $(12x \ 15)(2x \ 1)$ $(12x \ 3)(2x \ 5)$ $(12x \ 5)(2x \ 3)$ $(12x \ 3)(2x \ 5)$ $(12x \ 5)(2x \ 3)$ $(8x \ 1)(3x \ 15)$ $(8x \ 15)(3x \ 1)$ $(8x \ 3)(3x \ 5)$ $(8x \ 5)(3x \ 3)$ $(6x \ 1)(4x \ 15)$ $(6x \ 5)(4x \ 3)$	

## Trial & Error A.K.A. Guess & Check

Remember that when factoring trinomials, all we are really doing is un**FOIL**ing. Factor the **First** and **Last** terms making sure that the factors of the **First** term goes into the **First** part of each set of parentheses and the factors of the **Last** term goes into the **Last** part of each set. Be careful to never put common factors in the same set of parentheses. Now check to see if the **Outer** and **Inner** terms work out.





4.	Check $(6x \ 5)(4x \ 3)$ by multiplying the <b>Inner</b> and the <b>Outer</b>	(6x 5)(4x 3) 20x 18x
5.	Does the product of the inner and the product of the outer add to the middle term of the original trinomial? Yes, if $20x$ was negative and if $18x$ was positive. * Note: If this combination did not work out, then move on to the next set of $(8x \ 3)(3x \ 5)$ .	$(6x 5)(4x 3)$ $\begin{bmatrix} -20x \\ +18x \\ -2x \end{bmatrix}$
6.	The sign of the inner goes in the first set of parentheses and the sign of the outer goes in the second set of parentheses.	(6x-5)(4x+3) $-20x$ $+18x$ $-2x$
7.	Double check the signs of the last factors to ensure it multiplies to the $c$ term of $-15$ .	$-5 \cdot 3 = -15$

Step	Factor: 48x <sup>2</sup>	$x^{2} + 88x - 45$	
	$\frac{48x^2}{48x \cdot x}$		
1.	$24x \cdot 2x$		
	$   \begin{array}{r}     16x \cdot 3x \\     12x \cdot 4x   \end{array} $		
	$\frac{12x}{8x \cdot 6x}$		
	<u> </u>	45	
2.	$1 \cdot 45$ 3 \cdot 15		
	5.9		
	Possible	Factors	
	$(48x \ 1)(x \ 45)$	$(48x \ 45)(x \ 1)$	
	$(48x \ 3)(x \ 15)$	$(48x \ 15)(x \ 3)$	
	(48x 5)(x 9)	$(48x \ 9)(x \ 5)$	
	$(24x \ 1)(2x \ 45)$	$(24x \ 45)(2x \ 1)$	
	$(24x \ 3)(2x \ 15)$	$(24x \ 15)(2x \ 3)$	
	(24x 5)(2x 9)	$(24x \ 9)(2x \ 5)$	
3	$(16x \ 1)(3x \ 45)$	$(16x \ 45)(3x \ 1)$	
5.	$(16x \ 3)(3x \ 15)$	$(16x \ 15)(3x \ 3)$	
	(16x 5)(3x 9)	$(16x \ 9)(3x \ 5)$	
	$(12x \ 1)(4x \ 45)$	$(12x \ 45)(4x \ 1)$	
	$(12x \ 3)(4x \ 15)$	$(12x \ 15)(4x \ 3)$	
	(12x 5)(4x 9)	$(12x \ 9)(4x \ 5)$	
	$(8x \ 1)(6x \ 45)$	$(8x \ 45)(6x \ 1)$	
	$(8x \ 3)(6x \ 15)$	$(8x \ 15)(6x \ 3)$	
	(8x 5)(6x 9)	$(8x \ 9)(6x \ 5)$	
	Possible Factors		
	$(48x \ 1)(x \ 45)$	<del>(48x 45)(x 1)</del>	
	(48x - 3)(x - 15)	<del>(48x 15)(x 3)</del>	
	$(48x \ 5)(x \ 9)$	-(48x-9)(x-5)	
	$(24x \ 1)(2x \ 45)$	<del>(24x 45)(2x 1)</del>	
	<del>(24x 3)(2x 15)</del>	<del>(24x 15)(2x 3)</del>	
	$(24x \ 5)(2x \ 9)$	(24x - 9)(2x - 5)	
4	<del>(16x 1)(3x 45)</del>	$(16x \ 45)(3x \ 1)$	
4.	<del>(16x 3)(3x 15)</del>	<del>(16x 15)(3x 3)</del>	
	$\frac{(16x - 5)(3x - 9)}{(3x - 9)}$	$(16x \ 9)(3x \ 5)$	
	$(12x \ 1)(4x \ 45)$	<del>(12x 45)(4x 1)</del>	

## Here's Another Example...

