Least Common Multiple (LCM): Least (smallest) Common (must work for both) Multiple (the new term will be bigger than the original by some multiplier)

Ex. $6 and 8$ What is the smallest number that you could change these both into by multiplying them each by something? Hint: You can’t just find it by doing $6\*8=48$

$6: 6,12,18,24,30$ $6x^{2} and 8x^{5}$ Answer: $24x^{5}$ $4x^{3}y and 8x^{2}y^{4}$

$8: 8,16,24,32,40$ With exponents, since it has to be a multiple, Answer: $8x^{3}y^{4}$

Answer: $24$ choose the highest exponent

You try: $9 and 30$ $8x^{5} and 20x$ $15x^{5}y^{7} and 45x^{3}y^{12}$

Greatest Common Factor (GCF): Greatest (largest) Common (must work for both) Factor (must divide evenly into both)

Ex. $14 and 42$ What is the biggest number that divides into both

$14: 1,2,7,14$ $27x^{5} and 18x^{2}$ Answer: $9x^{2}$ $16x^{4}y^{2} and 8x^{3}y^{4}$

$42: 1,2,3,6,7,14,21,42$ With exponents, since it has to Answer: $8x^{3}y^{2}$

Answer: $14$ divide into it, choose the smaller

You try: $20 and 60$ $32x^{5} and 40x^{9}$ $24xy^{5} and 60x^{2}y^{2}$

Factoring: Breaking an expression into a product of its factors

2 terms: Take out the GCF and put the rest in ( ). If that’s not possible, check for a difference of squares. The expression must be subtraction, and the 2 terms must be square terms. $a^{2}-b^{2}=(a+b)(a-b)$

Ex. $16x+24$ $20x^{2}+5x^{3}$ $x^{2}-9$

 Answer: $8(2x+3)$ Answer: $5x^{2}(4+x)$ Answer: $(x+3)(x-3)$

You try: $24x^{3}-18x$ $40x+8$ $x^{2}-25$ $4x^{2}-81$

3 terms ($ax^{2}+bx+c)$, where $a=1$: Write as a product of 2 factors by finding 2 numbers that have a product of *c* and a sum of *b*. If directions just say to factor, the answer is $\left(x+factor1\right)\left(x+factor2\right)$. If the directions ask to solve, set those ( ) equal to zero and solve for x.

Ex. $x^{2}+7x+12$ Product: 12, Sum: 7 $x^{2}-3x-10$ Product: -10, Sum: -3

Answer: Factors $(x+3)(x+4)$ Answer: Factors $(x-5)(x+2)$

Solve: $x+3=0$ $x=-3$ Solve: $x-5=0$ $x=5$

 $x+4=0$ $x=-4$ $x+2=0$ $x=-2$

You try: $x^{2}-13x+22$ $x^{2}+5x-36$ $x^{2}-2x-48$

Factor.

Solve.

3 terms, where $a\ne 1$: The 2 numbers must have a product of *a\*c* and a sum of *b*. In order to find the 2 factors, you must change this into a 4 term problem and factor the pieces in groups.

Ex. $3x^{2}+11x+10$ Product: 30, Sum: 11 Numbers: 6 and 5 Add an x to each: 6x and 5x

$3x^{2}+6x+5x+10$ Factor the first 2, factor the last 2

$3x\left(x+2\right)+5(x+2)$ Write as 2 ( )

Answers: Factors $(3x+5)(x+2)$

Solve: $3x+5=0$ $3x=-5$ $x=-\frac{5}{3}$

 $x+2=0$ $x=-2$

2nd Ex. $6x^{2}+5x-4$ Product: -24, Sum: 5 Numbers: -3 and 8 Add an x to each: -3x and 8x

$6x^{2}-3x+8x-4$ Factor the first 2, factor the last 2

$3x\left(2x-1\right)+4(2x-1)$ Write as 2 ( )

Answers: Factors $\left(3x+4\right)\left(2x-1\right)$

Solve: $3x+4=0$ $3x=-4$ $x=-\frac{4}{3}$

 $2x-1=0$ $2x=1$ $x=\frac{1}{2}$

You try: $2x^{2}-3x-20$ $4x^{2}+16x+15$ $5x^{2}-19x+12$

Factor:

Solve:

BONUS: Solve. $14-2x=x^{2}-7x+18$ $3x^{2}+x=4-3x$