1. How do you Math problems like $3y^2 - 15y - 252$ or $2x^2 + 11x + 12$ or $xw - yw - xz - yz$ by factoring the polynomials?

Explanation

First problem $3y^2 - 15y - 252$

First we will notice that we can factor a 3 out of every term.

$3(y^2 - 5y - 84)$

We can always check our factoring by multiplying the terms back out to make sure we get the original polynomial. Here is the form of a quadratic trinomial with argument y $[(y^2 - 5y - 84)]$. To solve this problem we multiplying a and c $(a = 1, c = -84)$. We get $(1)(-84) = -84$

factor pairs	the differences
1,84	$84 - 1 = 83$
2,42	$42 - 2 = 40$
3,28	$28 - 3 = 25$
4,21	$21 - 4 = 17$
6,14	$14 - 6 = 8$
7,12	$12 - 7 = 5$

We can subtract the pairs to find the differences. If there is a pair of factors with a difference of 5, then we can factor the quadratic. Now that we have factor pair (with the larger number having the "minus" sign), factor the quadratic:

	y	-7
y	y^2	$-7y$
12	$12y$	-84

$3(y^2 - 12y + 7y - 84) = 3\big(y(y + 7) - 12(y + 7)\big) = 3((y + 7)(y - 12))$

Also we can solve a quadratic equation $y^2 - 5y - 84$ in the form: $ay^2 + by + c$

$$y_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{5 \pm \sqrt{25 + 4 \cdot 84}}{2} = \frac{5 \pm 19}{2}$$

$$y_1 = 12, y_2 = -7$$

$3y^2 - 15y - 252 = 3((y - 12)(y + 7))$

1. Another math problem $2x^2 + 11x + 12$ also can be solved by ac-method.

Multiplying a and c $(a = 2, c = 12)$. We get$(2)(12) = 24$.

factor pairs	the sum
8,3	$8 + 3 = 11$

Substitute the obtained values:$2x^2 + 8x + 3x + 12$. Apply the method of grouping

$2x^2 + 8x + 3x + 12 = 2x(x + 4) + 3(x + 4) = (x + 4)(2x + 3)$

$$x_1 = -4, x_2 = -\frac{3}{2}$$

Similarly, the problem can be solved by finding the roots of a quadratic equation.

2. Math problem $xw - yw - xz - yz$. Apply the method of grouping $xw - yw - xz - yz = w(x-y) - z(x+y)$ can't be factored.

$xw - yw - xz + yz$ can be factoring $xw - yw - xz + yz = w(x-y) - z(x-y) = (w-z)(x-y)$