Algebra II Name________________________

Factoring: Great Common Factor & Trinomials where a = 1 Period_____Date_______________

Factoring is the reverse of multiplying. To factor an expression means to write an equivalent expression that is a product of two or more expressions.
To find the **prime factorization of a monomial**, write it as a product of only prime numbers and/or first-degree variables.

Examples of prime factorization:

- $225 = 15 \cdot 15 = 5 \cdot 3 \cdot 5 \cdot 3$
- $48x^3 = 8 \cdot 6 \cdot x^3 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot x \cdot x \cdot x$
- $18x^2y^4 = 2 \cdot 3 \cdot 3 \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y$

Write the **prime factorization** of the following monomials. Do not use exponents.

1.) 108 2.) $52ab^3$ 3.) $32x^5y^2$

To factor polynomials, we first look for a **Greatest Common Factor (GCF)**. That is, the factor common to each term with the largest possible coefficient and the variable(s) to the largest power. In factoring polynomials, remember that we always look first for a **Greatest Common Factor (GCF)**.

Examples of Greatest Common Factors:

- $5x^2 - 5 = \underline{5}(x^2) - \underline{5}(1) = 5(x^2 - 1)$
- $3x^4 + 12x^3 = \underline{3x^3}(x) + \underline{3x^3}(4) = 3x^3(x + 4)$
- $6ab^2 + 9a^2b - 27a^3 = \underline{3a}(2b^2) + \underline{3a}(3ab) - \underline{3a}(9a^2) = 3a(2b^2 + 3ab - 9a^2)$

Factor the following polynomials by using the **Greatest Common Factor.**

4.) $4a^2 + 8$ 5.) $7x + 42$ 6.) $2y - 6xy$

7.) $8ax + 56a$ 8.) $36x^2y - 48xy^2$ 9.) $t^2n - 3t$

10.) $15cd - 30c^2d^2$ 11.) $a^3b^3 - b^2$ 12.) $35x^3y + 105xy$

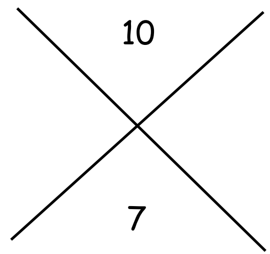
13.) $17x^5 + 34x^3 + 51x$ 14.) $2x^7 - 2x^6 - 64x^5 + 4x^3$ 15.) $6e^3f - 11ef$

To **factor a trinomial** like $x^2 + 7x + 10$ in general, think of FOIL in reverse. The first term, x^2, is the result of x times x. Thus the first term of each binomial factor is x:

$(x + \_\_)\ (x + \_\_)$

The coefficient of the middle term and the last term of the trinomial are two numbers whose product is 10 and whose sum is 7. Those numbers are 2 and 5. Thus, the factorization is: $(x + 2)\ (x + 5)$

Try X-Games to find your factors….



Solve each by factoring.

16.) $(a + 6)(a + 2) = 0$

17.) $z(z - 1)^2 = 0$

18.) $(3y + 7)(y + 5) = 0$

19.) $x^2 - 11x=0$

20.) $2a^3 + 10a^2=0$

21.) $x^2 - 12x + 36=0$

22.) $n^2 - 2n = 15$

23.) $x^2 - 7x = 18$

24.) $x^2 + 2x = 99$

25.) $x^2 = 4x - 4$

26.) $x^2 = 14x - 48$

27.) $x^2 = 14x - 45$

28.) $x^2 - 10x + 24=0$

29.) $y^2 + y = 42$

30.) $-x^2 + 6x =- 72$

31.) $30 + 11x + x^2=0$

32.) $x^2 + 29x + 100=0$

33.) $x^3 + 16x^2 + 64x=0$

34.) As an object is propelled upwards, gravity pulls it back to Earth. This relationship can be expressed by the formula $s = v_i t - \frac{1}{2}gt^2$, where s is the distance above the starting point, v_i is the initial velocity, t is time elapsed, and g is the acceleration of gravity. Find how long it will take a model rocket propelled into the air at an initial velocity of 80 ft/s to return to ground level, if the acceleration of gravity is $32 ft/s^2$.