NAME _____ DATE _____ SECTION _____ **6-4**

Factoring the Difference of Squares

A *perfect square* or a *square number* is a number or term that has two factors that are the same. An example of a square number is 1, whose factors are $1 \cdot 1$. Another example is 4, whose factors are $2 \cdot 2$. Still other examples are 9, 16, 25, 36, and so on.

Some monomials are also perfect squares. An example is x^2, whose factors are $x \cdot x$. Another example is x^{10}, whose factors are $x^5 \cdot x^5$, and yet another is $49x^6$, whose factors are $7x^4 \cdot 7x^4$.

The difference of two square numbers can always be factored using the formula $(a^2 - b^2) = (a - b)(a + b)$. This formula only applies to square numbers, and you can always check your answer by multiplying the binomials.

Directions: State whether or not each binomial can be factored. If it can be factored, factor it. If it cannot be factored, write "cannot be factored." Hint: The total number of binomials that cannot be factored can be expressed as the difference of two square numbers.

1. $x^2 - 36 =$ _____
2. $x^2 - 64 =$ _____
3. $x^2 - 1 =$ _____
4. $x^2 + 16 =$ _____
5. $4x^2 - 121 =$ _____
6. $2x^2 - 25 =$ _____
7. $x^4 - 4 =$ _____
8. $16x^2 - 49 =$ _____
9. $x^2y^2 - 9 =$ _____
10. $x^3 - 144 =$ _____
11. $25x^2y^2 - 36 =$ _____
12. $10x^4 - 81 =$ _____
13. $x^6y^4 - 169 =$ _____
14. $x^6y^8 - 100 =$ _____
15. $8x^4y^2 - 25 =$ _____

NAME _____ DATE _____ SECTION _____ **6-7**

Factoring Trinomials II

To factor trinomials you must find factors and their sums and differences. If the leading coefficient of a trinomial is a number other than 1, find the factors of the coefficient and the third term. Then examine combinations of the factors to find the sum that is the same as the second term.

For example, to factor $2x^2 - 11x - 12$, first find the factors of 2, then find the factors of -12. Combine these factors so that their products and sums equal -11. $(2 \times -4) + (-3 \times 1) = -11$. Therefore $2x^2 - 11x - 12$ can be factored as $(2x - 3)(x - 4)$. Check this by multiplying the binomials.

Directions: Factor each trinomial. Hint: One factor of each polynomial is a factor of the polynomial in the next problem. Always check your work.

1. $3x^2 - 11x - 4 =$ _____
2. $6x^2 - x - 1 =$ _____
3. $2x^2 + 13x - 7 =$ _____
4. $x^2 - x - 56 =$ _____
5. $x^2 - 5x - 24 =$ _____
6. $4x^2 + 11x - 3 =$ _____
7. $2x^2 + 11x + 15 =$ _____
8. $6x^2 + 11x - 10 =$ _____
9. $12x^2 + x - 6 =$ _____
10. $4x^2 + 15x + 9 =$ _____
11. $x^2 + 12x + 27 =$ _____
12. $5x^2 + 52x + 63 =$ _____
13. $10x^2 - x - 21 =$ _____
14. $12x^2 - 28x + 15 =$ _____
15. $18x^2 - 3x - 10 =$ _____