

**Advanced Algebra II Honors: Factoring Review Day 2**

Some polynomials are "Special" and should be treated as such!



This first type of special polynomial is called a Perfect Square Trinomial.

If a Polynomial is a perfect square trinomial, the polynomial can be factored using the pattern:

$$a^2 + 2ab + b^2 = (a + b)^2$$

Test: Is 1<sup>st</sup> term P.S.?  
Is last term P.S.? → Write 1 factor (a+b)  
Then test: Is middle term result of 2ab?

$$a^2 - 2ab + b^2 = (a - b)^2$$

Try a few:

1.  $25x^2 + 90x + 81 = (5x + 9)^2$

2.  $x^2 - 14x + 49$

3.  $25x^2 + 20x + 4$

$(5x + 9)(5x + 9)$

$(x - 7)^2$

$(5x + 2)(5x + 2)$

$(5x + 2)^2$

This second type of special polynomial is called a Difference of Squares.

If a binomial is a difference of perfect squares, it can be factored using a pattern

$$a^2 - b^2 = (a + b)(a - b)$$

Determine whether  $64x^2 - 25$  is a difference of perfect squares. If so, factor it. If not, explain why.

**Difference?**

**First term... Perfect square?**

**a =**

**Factor it!**

**Third term... Perfect Square?**

**b =**

4.  $25x^2 - 81$

5.  $30x^2 - 49$

6.  $4x^2 - 121$

$(5x + 9)(5x - 9)$

$(2x + 11)(2x - 11)$

7.  $x^2 - 100$

8.  $x^2 - y^2$

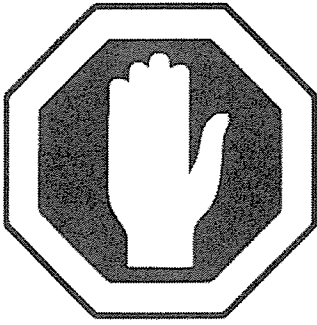
9.  $9x^2 - 64$

$(3x^2 + 8)(3x^2 - 8)$

$(x + 10)(x - 10)$

$(x + y)(x - y)$

$(3x^2 + 8)(3x^2 - 8)$



Sometimes you will need to use more than one method when factoring in the same problem!!



Factor each polynomial completely. Remember to look for a GCF first!

1.  $3x^2 - 300$

$$3(x^2 - 100)$$

$$3(x+10)(x-10)$$

2.  $4x^2 - 20x - 24$

$$4(x^2 - 5x - 6)$$

$$4(x-6)(x+1)$$

3.  $8x^2 - 40x + 50$

$$(4x-10)(2x-5)$$

$$2(2x-5)(2x-5)$$

$$2(2x-5)^2$$

OR  $2(4x^2 - 20x + 25)$   
 $2(2x-5)(2x-5)$

4.  $-7x^2 - 21x + 28$

$$-7(x^2 + 3x - 4)$$

$$-7(x+4)(x-1)$$

5.  $8x^2 - 18$

$$2(4x^2 - 9)$$

$$2(2x+3)(2x-3)$$

6.  $20x^2 + 50x + 30$

$$10(2x^2 + 5x + 3)$$

$$10(2x+3)(x+1)$$

7.  $45g^2 - 20$

$$5(9g^2 - 4)$$

$$5(3g+2)(3g-2)$$

8.  $3w^3 + 30w^2 + 75w$

$$3w(w^2 + 10w + 25)$$

$$3w(w+5)^2$$

9.  $12x^2y - 48xy + 48y$

$$12y(x^2 - 4x + 4)$$

$$12y(x-2)^2$$

10.  $-3d^3 + 300d$

$$-3d(d^2 - 100)$$

$$-3d(d+10)(d-10)$$

11.  $2a^2 - 32$

$$2(a^2 - 16)$$

$$\boxed{2(a+4)(a-4)}$$

12.  $5m^2 - 5m - 60$

$$5(m^2 - m - 12)$$

$$\boxed{5(m-4)(m+3)}$$

13.  $c^2 + 7c - 18$

$$(c+9)(c-2)$$

14.  $2x^2 + 8x + 6$

$$2(x^2 + 4x + 3)$$

$$\boxed{2(x+3)(x+1)}$$

15.  $f^3 - 3f^2 + 4f - 12$

$$f^2(f-3) + 4(f-3)$$

$$\boxed{(f^2+4)(f-3)}$$

16.  $-6k^2 + 39k - 18$

$$-3(2k^2 - 13k + 6)$$

$$\boxed{-3(2k-1)(k-6)}$$

Do you remember what to do when you have an Equation, rather than an expression?

Use the Zero Product Property to solve each equation by filling in the boxes below. Then find the solutions. Check your answer.

1.  $(x-6)(x-3) = 0$

$$x-6=0 \quad x-3=0$$

$$\boxed{x=6} \quad \boxed{x=3}$$

2.  $3x(x-7) = 0$

$$3x=0 \quad | \quad x-7=0$$

$$\boxed{x=0} \quad | \quad \boxed{x=7}$$

Sometimes you need to factor before using the Zero Product Property.

Solve each quadratic equation by factoring.

3.  $x^2 + x - 12 = 0$

$$(x+4)(x-3) = 0$$

$$\boxed{x=-4} \quad \boxed{x=3}$$

4.  $x^2 + 10x + 25 = 0$

$$(x+5)(x+5) = 0$$

$$\boxed{x=-5}$$

5.  $x^2 + 7x - 8 = 0$

$$(x+8)(x-1) = 0$$

$$\boxed{x=-8} \quad \boxed{x=1}$$

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

Advanced Algebra II Honors: Factoring Review Day 2: HOMEWORK

**Factor Completely!**

1.  $6n^5 + 18n^4 - 24n$

$6n(n^5 + 3n^3 - 4)$

2.  $x^2 - 16x + 48$

$(x-12)(x-4)$

3.  $-5m^4 - 5m^3 + 5m^2$

$-5m^2(m^2 + m - 1)$

4.  $b^2 + 11b - 42$

$(b+14)(b-3)$

5.  $5b^4 - 15b^3 - b + 3$

$(5b^4 - 15b^3) - (b - 3)$   
 $5b^3(b-3) - 1(b-3)$

$(5b^3 - 1)(b-3)$

6.  $(x^3 - 5x^2) + (10 - 2x)$

$x^2(x-5) + 2(5-x)$

$x^2(x-5) + 2(-1)(-5+x)$

$(x^2 - 2)(x-5)$

$x^3 - 5x^2 - 2x + 10$

$x^2(x-5) - 2(x-5)$

7.  $24x + 40$

$8(3x+5)$

8.  $5r^3 - 10r$

$5r(r^2 - 2)$

9.  $3x^3y + x^2y^2$

$x^2y(3x + y)$

10.  $-3a^2b + 12ab - 12b$

$-3b(a^2 - 4a + 4)$

$-3b(a-2)^2$

11.  $(5t^3 - 45t) + (3t^2 - 27)$

$5t(t^2 - 9) + 3(t^2 - 9)$

$(5t+3)(t^2 - 9)$

$(5t+3)(t+3)(t-3)$

12.  $2y^2 - 6y - 56$

$2(y^2 - 3y - 28)$

$2(y-7)(y+4)$

13.  $6a^3 + 39a^2 + 45a$

$3a(2a^2 + 13a + 15)$

$3a(2a+3)(a+5)$

14.  $x^3 - 9x$

$x(x^2 - 9) \rightarrow x(x+3)(x-3)$

$$15. 12n^3 - 48$$

$$12(n^3 - 4)$$

$$16. 3c^4 + 24c^3 + 48c^2$$

$$3c^2(c^2 + 8c + 16)$$

$$\boxed{3c^2(c+4)^2}$$

$$17. x^2 - 49 = 0$$

$$(x+7)(x-7) = 0$$

$$x = -7 \quad x = 7$$

$$18. 4x^2 + 25x = 0$$

$$x(4x + 25) = 0$$

$$x = 0 \quad x = -\frac{25}{4}$$

$$19. 5x^2 - 15x - 50 = 0$$

$$5(x^2 - 3x - 10) = 0$$

$$5(x-5)(x+2) = 0$$

$$x = 5 \quad x = -2$$

$$20. x^2 + 10x + 21 = 0$$

$$(x+7)(x+3) = 0$$

$$x = -7 \quad x = -3$$

$$21. 4 - x^2 = 0$$

$$(2+x)(2-x) = 0$$

$$x = -2 \quad x = 2$$

$$22. 3x^2 - 6x - 9 = 0$$

$$3(x^2 - 2x - 3) = 0$$

$$3(x-3)(x+1) = 0$$

$$x = 3 \quad x = -1$$

