Factoring Trinomial when a = 1

ax^2+bx+c

$b=-4$ $c=3$

Guess & Check

$x^2 - x - 2$

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

$+1x$ $-1x$

$+2x$

X method

$x^2 - 4x + 3$

c: 3, b: -4

$(x-1)(x-3)$

Box Method

$c^2 + 7c - 8$

$(c-1)(c+8)$

length • width

	c	$+8$
c	c^2	$8c$
-1	$-1c$	-8

$x^2 + 5x = -6$

$+6$ $+6$

$x^2+5x+6=0$

$(x+3)(x+2)=0$

$x+3=0$ $x+2=0$

$x=-3$ $x=-2$

$x^4 + 6 = 5x^2$

$-5x^2$ $-5x^2$

$x^4-5x^2+6=0$

6: -2, -3; -5

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

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

$\sqrt{x^2}=\sqrt{2}$ $\sqrt{x^2}=\sqrt{3}$

$x=\pm\sqrt{2}$ and $x=\pm\sqrt{3}$

Quadratic Form Trinomials

middle exponent half biggest exponent

$x^6 = 24 - 10x^3$

$x^6+10x^3-24=0$

-24: -2, 12; 10

$(x^3+12)(x^3-2)=0$

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

$x^3=-12$ $x^3=2$

$x=\sqrt[3]{-12}$ $x=\sqrt[3]{2}$

$x=-2.289$ $x=1.260$ and 4 imaginary solutions

Factoring Trinomial when a is not 1

Bottoms Up Method $a=16$ $b=-8$ $c=1$

$16r^2 - 8r + 1$

1) $a \cdot c$, b

$16 \cdot 1$: 16, 1; -4, -4; -8

$(r-4)(r-4)$

16 16

$\left(r-\frac{1}{4}\right)\left(r-\frac{1}{4}\right)$

2) Write Factors

$(4r-1)(4r-1)$

3) Divide by a

4) Simplify or Bottoms Up

$18x^2 - 27x - 5$

AC Method

1) $a \cdot c$, b

$18 \cdot -5$: -90, 3; -30

$18x^2-30x+3x-5$

$6x(3x-5)+1(3x-5)$

$(3x-5)(6x+1)$

2) Split middle term

3) Factor by grouping

$18 + 12y^4 + 2y^8$

Factor out GCF

$2y^8+12y^4+18$

9: 3, 3; 6

$2(y^8+6y^4+9)$

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

$48x^2 + 22x = 15$

$48x^2+22x-15=0$

-720: 40, -18; 22

$\frac{(x+40)(x-18)}{48}$

$\frac{(x+\frac{5}{6})(x-\frac{3}{8})}{}=0$

$(6x+5)(8x-3)=0$

$6x+5=0$ $8x-3=0$

$x=-\frac{5}{6}$ $x=\frac{3}{8}$

$8m^6 - 44m^3 + 48 = 0$

$4(2m^6-11m^3+12)=0$

$4\left(\frac{m^3-8}{2}\right)\left(\frac{m^3-3}{2}\right)=0$

$4(m^3-4)(2m^3-3)=0$

-8: $2 \cdot 12$, $2 \cdot 4$; -3, -11

$m^3-4=0$ $2m^3-3=0$

$m^3=4$ $m^3=3/2$

$m=\sqrt[3]{4}$ $m=\sqrt[3]{3/2}$

$m=1.587$ $m=1.145$ and 4 imaginary solutions

$-4c^4 + 20c^2 = 21$

$0=4c^4-20c^2+21$

84: -6, -14; -20

$0=4c^4-6c^2-14c^2+21$

$0=2c^2(2c^2-3)-7(c^2-3)$

$0=(2c^2-3)(2c^2-7)$

$2c^2-3=0$ $2c^2-7=0$

$c^2=\frac{3}{2}$ $c^2=\frac{7}{2}$

$c=\pm\sqrt{3/2}$ $c=\pm\sqrt{7/2}$

$c=1.225$ $c=1.871$

$c=-1.225$ $c=-1.871$

Difference of Squares

$x^2 - 144$

$25d^2 - 100$

$4a^3 - 64a$

$3b^3 - 27b = 0$

$9x^3 = 25x$

$7a^3 = 175a$