Match the domains

1. $[-3, \infty)$ B
2. $(-\infty, -3]$ A
3. $(-\infty, \infty)$ D $\mathbb{R}$
4. $(-3, \infty)$ C

A. $x \leq -3$
B. $x \geq -3$
C. $x > -3$
D. all real #

Factoring

10|22

Factoring

- Reverses the multiplication process
- Think of “unfoiling”

GCF

- Check to see if there is a common factor in each term
- Factor it out

$2x+4$

$2(x+2)$

x^3+x^2

$x^2(x+1)$

$2x^5-4x^3$

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

$-3x+9$

$-3(x-3)$

$$27b^5c^2 - 18b^8c$$

$9b^5c(3c - 2b^3)$

Factoring the Difference of Perfect Squares

$36x^4-4x^2$

① GCF

$4x^2(9x^2-1)$

② 2 sets of parentheses

$4x^2(3x+1)(3x-1)$

factored form.

③ $\sqrt{}$ of the 1st term

④ $\sqrt{}$ of last term

⑤ Make one ( ) plus & the other minus

⑥ Check to see if it can factor again.

$256x^4-1$

$(16x^2+1)(16x^2-1)$

$(16x^2+1)(4x+1)(4x-1)$

Factoring Difference of Squares

Degree must be even #
of Terms must be 2 (Binomial)
Must be able to take The √ of a & C

$ax^2 - c$

Must be a minus sign

Steps for Factoring Success
1. GCF?
2. Sq. root of 1st & Last
3. Make one addition & One Subtr.

Example: $162x^2 - 72$

$18(9x^2 - 4)$

$18(3x+2)(3x-2)$

Factor by grouping

(4 terms)

$2x^3+8x^2-8x-32$

① GCF

Rewrite!!!

$2((x^3+4x^2)(-4x-16))$

② Group into 2 sets of ( )

$2[x^2(x+4)-4(x+4)]$

③ Pull out a GCF from both sets of parenth.

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

Check to make sure the ( ) are identical twins.

$2(x+2)(x-2)(x+4)$

④ Rewrite

⑤ Can you factor anything else?

Factor:

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

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

check

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

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

$10x^2+5x-4x-2$

$10x^2+x-2$

$(9x^3-9x^2-4x+4)$

$9x^2(x-1)-4(x-1)$

$(9x^2-4)(x-1)$

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

Factoring by Grouping

a.k.a. Factoring in "Pairs"

Who? 4 terms

What? Polynomials

How? Very Carefully

Steps
** GCF!
1) Pair up terms
2) Factor out GCF from Pairs
3) Check that the parentheses are identical
4) Rewrite

Example: $9x^3-9x^2-4x+4$

1. $(9x^3-9x^2)(-4x+4)$
2. $9x^2(x-1)-4(x-1)$
3. $(9x^2-4)(x-1)$
4. $(3x+2)(3x-2)(x-1)$

Factor again if you can!

Factor: $x^2 + 7x + 10$

a b c

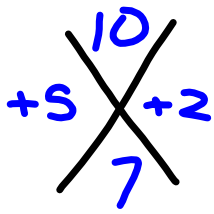
When $a = 1$

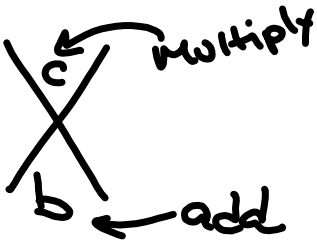
$(x + 5)(x + 2)$

① GCF

② 2( )

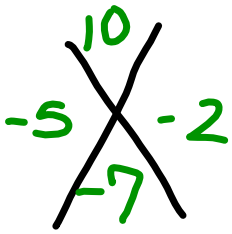
③





Factor: $x^2 - 7x + 10$

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



Factor: $8-2x-x^2$

$-x^2-2x+8$

$-1(x^2+2x-8)$

$-(x+4)(x-2)$

-8, $+4$, -2, 2

Factoring Polynomials When...

The degree is 2 (Quadratic)
The # of terms is 3 (Trinomial)
The leading Coefficient is 1 (a)

$ax^2 + bx + c$

$(x \quad)(x \quad)$

c ← multiply

b ← Add

GCF! Steps for Factoring Success
1. Draw Parentheses & fill in X
2. What # multiply to get c and add or subtract to get b
3. What are your signs?

Example:

Factor r^2+4r+3

$(r+1)(r+3)$

factored form

+1 × +3 → 3, 4

Check:

$(r+1)(r+3)$

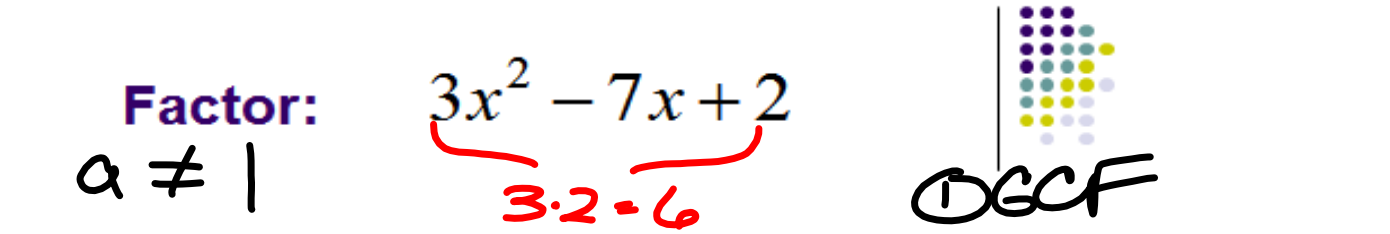
$r^2+3r+r+3$

r^2+4r+3 ✓

Factor: $3x^2 - 7x + 2$

$a \neq 1$

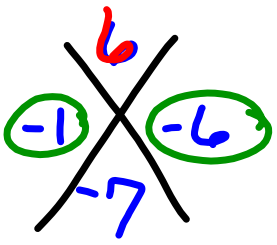
$3 \cdot 2 = 6$



① GCF

② Multiply $a \cdot c$

③ use the X method w/ the answ to step 2 & "b"



$3x^2 - x - 6x + 2$

④ Rewrite the problem as 4 terms

$(3x^2 - x)(-6x + 2)$

$x(3x-1) - 2(3x-1)$

$(x-2)(3x-1)$

⑤ factor by grouping