

### Dealing With Indexes

If Odd then nothing happens

If Even then use absolute value bars

If term power is even and index is odd then use absolute bars if answer is negative

Put absolute value bars on variables

### Exponents

$$(a^n)^m = a^{n \cdot m} \quad a^m / a^n = a^{m-n}$$

$$a^0 = 1 \quad a^{-n} = 1/a^n$$

### FOIL Method

**EXAMPLE 2** Multiplying Binomials

When multiplying a binomial by a binomial, we can use a special order of multiplying terms called the FOIL order. The letters of FOIL stand for "First, Outer, Inner, Last." To illustrate this method, let's multiply  $(2x - 3)$  by  $(x + 1)$ .

Multiply the First terms of each binomial.  $(2x - 3)(x + 1) \quad 2x(x) = 6x^2$

Multiply the Outer terms of each binomial.  $(2x - 3)(x + 1) \quad 2x(1) = 2x$

Multiply the Inner terms of each binomial.  $(2x - 3)(x + 1) \quad -3(x) = -3x$

Multiply the Last terms of each binomial.  $(2x - 3)(x + 1) \quad -3(1) = -3$

Combine like terms.

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

**EXAMPLE 3** Use the FOIL order to multiply:  $(x - 1)(x + 2)$

**Solution**

|   |       |       |      |
|---|-------|-------|------|
| First   | Outer | Inner | Last |
| $(x - 1)(x + 2) = x^2 + 2x + (-1)x + (-1)(2)$ |       |       |      |
| $= x^2 + 2x - x - 2$                          |       |       |      |
| $= x^2 + x - 2$                               |       |       |      |

Combine like terms.

**EXAMPLE 4** Multiply.

a.  $(2x - 7)(3x - 4)$

**Solution**

|  |       |       |      |
|--|-------|-------|------|
| First  | Outer | Inner | Last |
| $(2x - 7)(3x - 4) = 2x(3x) + 2x(-4) + (-7)(3x) + (-7)(-4)$ |       |       |      |
| $= 6x^2 - 8x - 21x + 28$                                   |       |       |      |
| $= 6x^2 - 29x + 28$  |       |       |      |

b.  $(3x^2 + y)(5x^2 - 2y)$

|   |       |       |      |
|---|-------|-------|------|
| First   | Outer | Inner | Last |
| $(3x^2 + y)(5x^2 - 2y) = 3x^2(5x^2) - 6x^2y + 5x^2y - 2y^2$ |       |       |      |
| $= 15x^4 - 6x^2y + 5x^2y - 2y^2$                            |       |       |      |

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### Factoring $x^2+bx+c$

Find a 2 numbers whose sum is b and products of c

### More factoring

- $3xy-4x-12y+16$
- $x(3y-4) - 4(3y-4)$
- $(3y-4)(x-4)$

\*Between 1&2: factor first 2 terms and last 2 terms separately  
Between 2&3: remove the numbers on the outside and put them in parenthesis

### Greatest common Factor

letters: each term has to have one  
Numbers: the highest number all of terms can multiply into

letters: Chose the one with the lowest exponent

### Complex Fractions

Simplify the numerator and the denominator of the complex fraction so that each is a single fraction.

Perform the indicated division by multiplying the numerator of the complex fraction by the reciprocal of the denominator of the complex fraction.

Simplify if possible.

### Rational function

$$f(x) = p(x)/q(x)$$

Solve it like a function

Finding domain:

Demoninator=0

Solve

Those values are the excluded values

Solve the rest of the equation

if you get the excluded value your answer is no real solution

### Rational expressions

Multiplication Factor denominator, multiply, reduce

Division flip 2nd equation and multiply

Unlike denominators + & - Factor denominator, Find LCD, simplify top

$$x+2/x^2 + x - 42 * x+7/x^2 - 4$$

$$x+2/(x-6)(x+7) * x+7/(x-2)(x+2)$$

$$x-2/x-6$$

$$8/x-2+x - 6/x^2-4+2/x+2$$

$$8/x-2+x - 6/(x+2)(x-2)+2/x+2$$

$$8+x-6+2$$

$$x-16$$

### Solving with Scientific notation

separate between the operation for each term then solve each, then combine

$$(2 \times 10^3)(1.8 \times 10^{-7})$$

$$2 \times 1.8 = 3.6$$

$$10^3 \times 10^{-7} = 10^{-4}$$

$$\text{Answer: } 3.6 \times 10^{-4}$$

### Special case and FACTORING

$$1. (a+b)(a-b) = a^2 - b^2$$

Perfect Square Trinomial

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

$$4. (a-b)^2 = a^2 - 2ab + b^2$$

Sum & Difference of Cubes

$$3. a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

$$5. a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

Difference of Square

$$6. (a - b)^2 = (a - b)(a + b)$$


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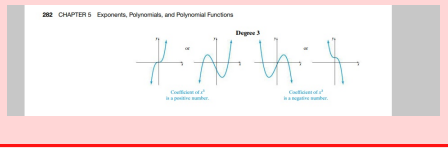
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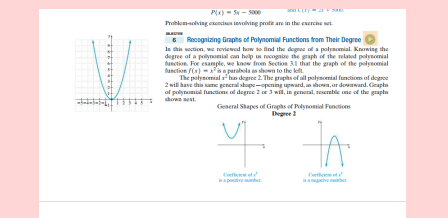
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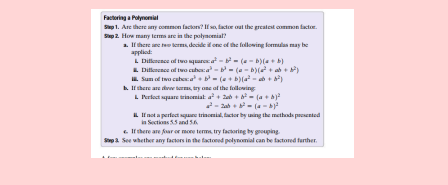
### Equations And Graphs



### Equations and Graphs 2



### MORE Factoring



### Functions

$f(x)=x+4$  solve by replacing the x with when  $x=4$ - the one inside the  $f()$

### Graphing

it'll ask for you to solve the equation then graph your solutions, they should be x

### Rational equations

Factor Denominators find excluded values

Find LCD of all terms multiply by LCD

check solution

\*always have at least 1 fraction

### Solving f(x)

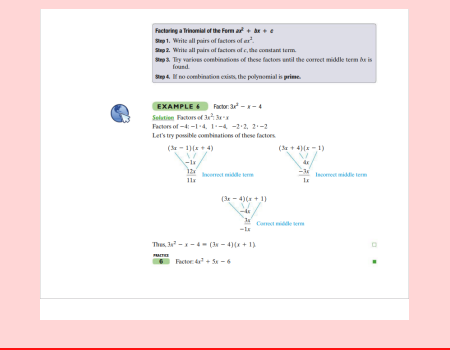
#### Examples

Let  $f(x) = 4x^{-1}$  and  $g(x) = 5x - 2$ . Find the following.

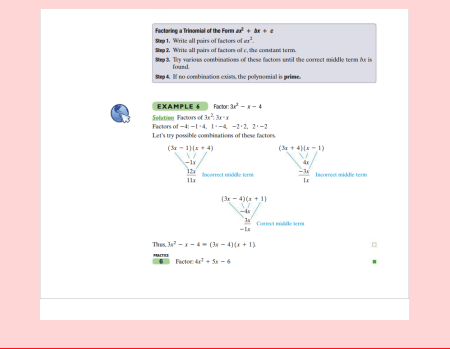
- a.  $f(g(x))$   
 Plug in equation  
 $= f(5x - 2)$   
 Plug  $g(x)$  into the equation  
 $= 4(5x - 2)^{-1}$   
 Plug in the coefficient and power of  $f(x)$
- b.  $g(f(x))$   
 Plug in equation  
 $= g(4x^{-1})$   
 Plug  $g(x)$  into the equation  
 $= 5(4x^{-1}) - 2$   
 Distribute the 5  
 $= -20x^{-1} - 2$   
 Simplify  
 $= \frac{20}{x} - 2$   
 Andy

Replace the x in the equation (next to the letter) with the equation that comes after the equal sign

### Factoring Trinomials



### Factoring trinomials 2



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