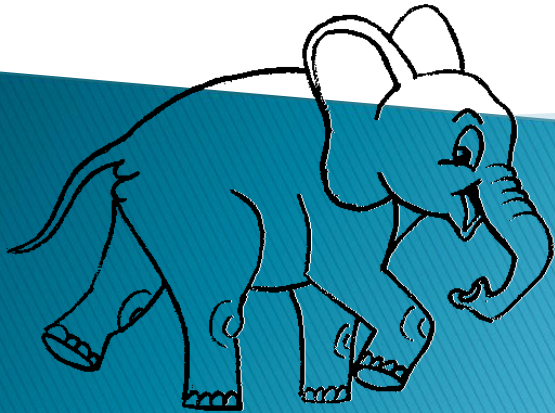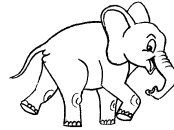# ELEPHANTS NEVER FORGET

Connect with Your Students using Math Mnemonics, Word Games, and Songs

Using Direct Instruction

How do you know if an elephant has been in your refrigerator?

- Telling
- Linking
- Modeling
- Providing guided practice (battle buddies)
- Giving feedback
- Evaluating (1-2-3-4)
- Providing independent practice (HLS)

Need for Mnemonics

- Memorizing factual information is absolutely essential for success in school

- It is also true that students with learning problems have been consistently shown to have particular difficulties remembering academic content
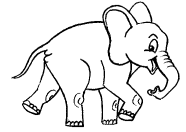
By the footprints in the butter

Mnemonics

- What are they, and how are they used?
- Need help spelling it?
  - ◦ **M**ary
  - ◦ **N**ever
  - ◦ **E**ver
  - ◦ **M**issed
  - ◦ **O**ne
  - ◦ **N**ight
  - ◦ **I**n
  - ◦ **C**lass
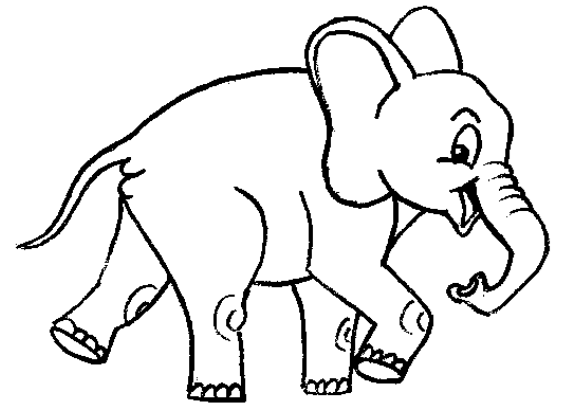
How do you get an elephant in the refrigerator?
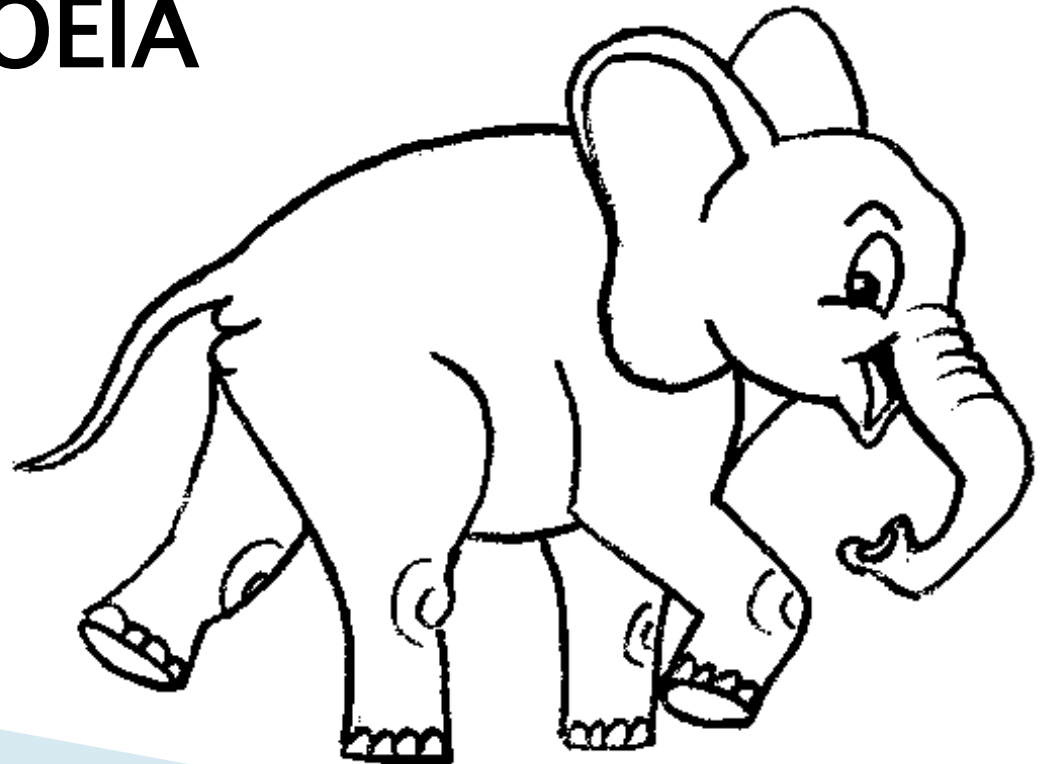
Open the refrigerator door, insert elephant, close door.

6 Points to Remembers When Creating Mnemonics

- Use positive, pleasant images
- Exaggerate the size
- Use humor
- Use similarly rude or sexual rhymes
- Use vivid, colorful images
- Use all five senses

The mnemonic should clearly relate to the thing being remembered
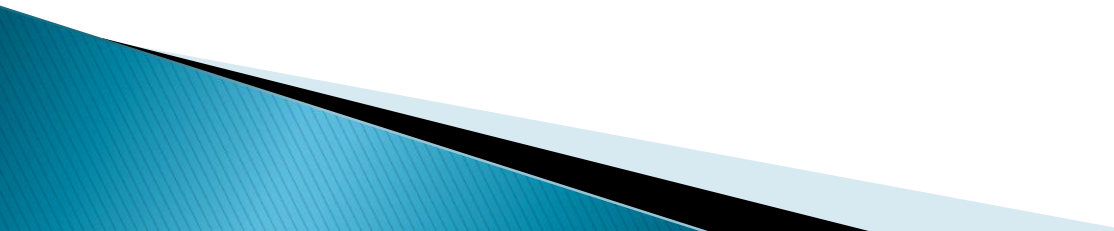
Mnemonic Successes

- ONOMATOPOEIA

What Mnemonics Strategies Are
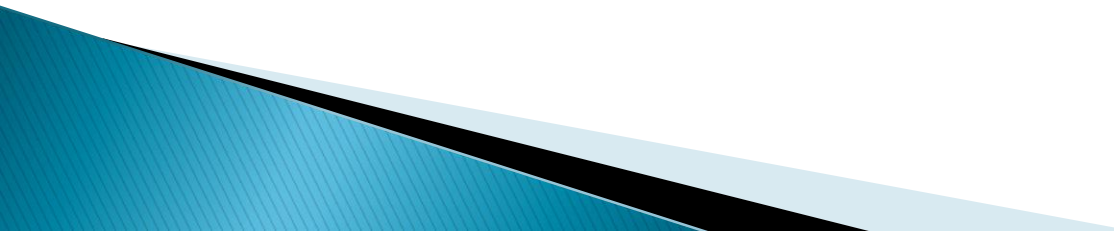
Systematic procedures for enhancing memory

- Developing better ways to take in (encode) information

- Finding a way to relate new information to information students already have locked in long-term memory

If we can make a firm enough connection, the memory will last a very long time.

Other General Techniques for Improving Memory

- Increase attention
- Enhance meaningfulness
- Use pictures
- Minimize interference
- Promote active manipulation
- Promote active learning
- Increase the amount of practice

Tips for Using Mnemonics

- Model when to use
- Model what each letter in the mnemonic stands for
- Model how to apply it to prior knowledge
- Provide students with cues
- Use rapid-fire-verbal-rehearsal

METRIC PREFIXES

▸ **King Herrod died Monday drinking chocolate milk**

Kilo (1000)
Hecto (100)
Deca (10)
Metric (1)
Deci (1/10)
Centi (1/100)
Milli (1/1000)

Any others out there?

Real Number Properties

- **Communicate** "Commutative Property"
  - A + (talks to) B = B + (talks to) A
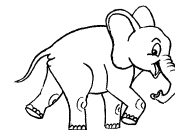- **Association** "Associative Property"
  - to be truly effective a good business may need to *regroup* every now and then
  - A + (B + C) = (A + B) + C
- **Paperboy** "Distributive Property"
  - The paperboy throws a paper to each house on the street

  - A (B + C) = A·B + A·C

Open door, remove elephant, insert giraffe, close door

Solving Equations

- Best friends 'til the end
- 2X – 5 = 11

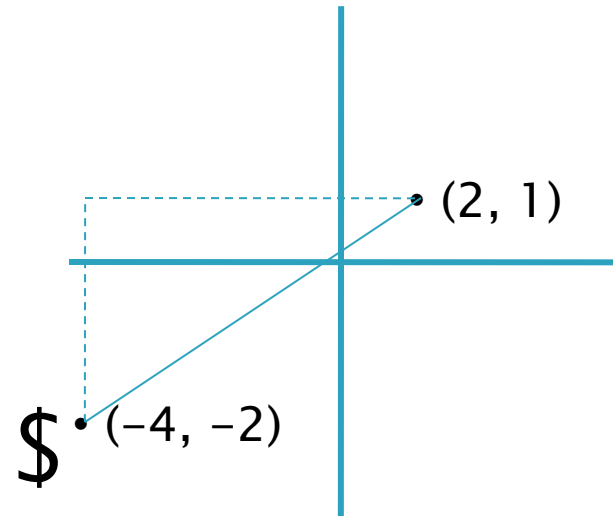$$\underline{+\ 5\quad +5}$$

$$2X\quad =\ 16$$

Diagonal Lines and Slope

▸ <u>Calculate slope using the slope formula</u>

  ◦ Format:

  $$\frac{\ \ -\ \ }{\ \ -\ \ }$$

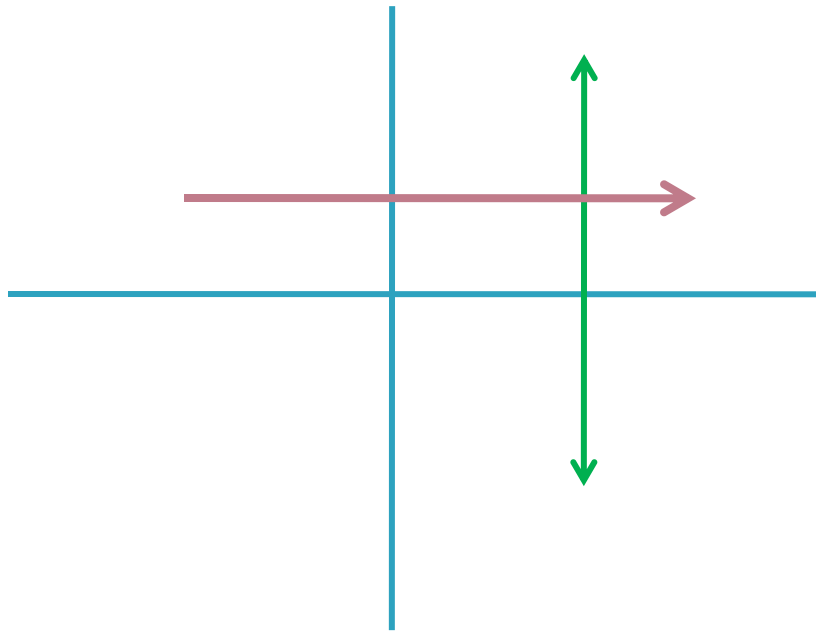 ◦ Substitute ordered pairs: (SING) x on the bottom, y on the top.

  $$\frac{1\ -\ (-2)}{2\ -\ (-4)}$$

(2, 1)

(−4, −2)

$

Special Lines and Slope

Undefined for the Up/Down Line

Horizontal (H) Zero slope (O)   HO

Finding the Equation of Diagonal Line

▸ From the slope formula, we get the point–slope form of the equation of a line

▸ Why not modify it?

▸ Modified "point–slope"

$$\mathbf{y} = m \; (\; \mathbf{x} - x_1 \;) + y_1$$

slope   (x , y)

◦ All it takes to find the equation of a line is the slope and a point

▸ So to find the equation of a diagonal line, we sing

$$y = \quad (x-$$

▸ Look at the connection to the standard form of a parabola $y = a \, (\, x - h \,)^2 + k$

if it's a polynomial with zeros use:

f(x).$y = (x- \; (x- \; (x-$

Graphing Lines in Slope Intercept
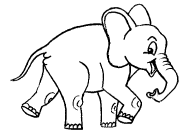
▸ y = **m**x + **b**

       b (the y-intercept)
       Is the b-ginning point then
       From there

m sideways is a 3, for 3 components:
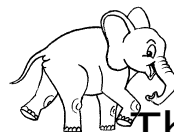•Direction up/down?
•Rise
•Run (right)

The lion, decided to have a party. He
invited all the animals in the jungle,
and they all came except one. Which one?

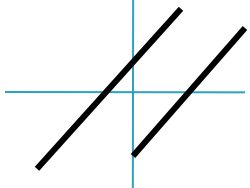# Graphing Lines in Double Intercept– The "Mitten" Method
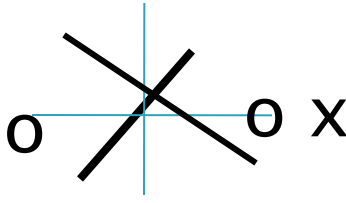
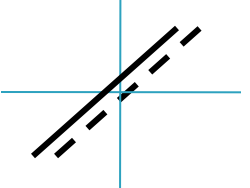- 4x + 3y = 12   4x + 3y = 12
  (0, ____) (____, 0)
  - Make your elephant ears
  - Then use your mittens
    - Cover the x and solve
    - Cover the y and solve

The giraffe, because he's still in the Refrigerator.

Systems of Equations

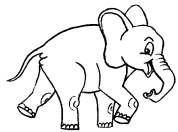| Types of systems	Algebra view	Graph view	solution
Inconsistent			
Consistent			
Dependent			

Multiplying Binomials–FOIL
First–Outers–Inners–Last

▸ So what is FOIL in picture form?
  ◦ It's a "garden girl" leg – leg – big butt, baby butt

6x

−24x

$$(2x - 4) (6x + 3$$

How do you know if
there are
2 elephants in your
'frig?

$12x^2$ −12

$12x^2−18x−12$

Great for multiplying complex numbers and
binomial with radicals

Solving quadratics

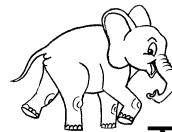▸ Solve using factoring and apply the zero product property

=0

F

S

▸ Solve using the quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The door won't close.

Complete the Square–Beer Song

- **Procedure** $ax^2 + bx + c = 0$:
  - 1. Divide by a and format $x^2 + bx +$ __$= c +$ __
  - 2. Bring down x, bring down the sign, bring down b/2, ( )²
  - 3. Square b/2 and put in both blanks
  - 4. Simplify the right side
  - 5. Radicalize–radicalize–$\pm$ and then solve
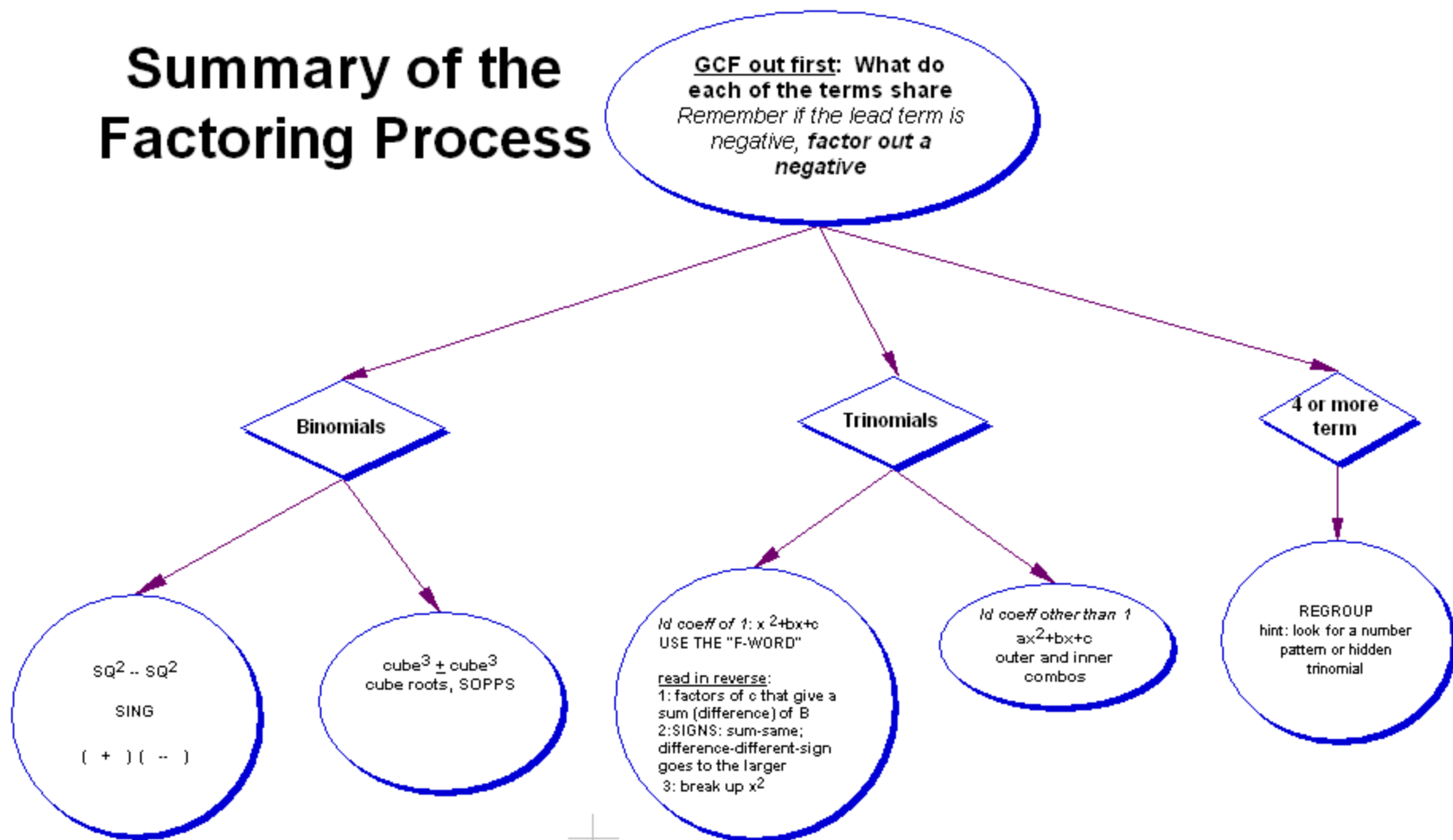- Ex. $x^2 - 6x + 3 = 0$ (notice a = 1 and b is an even number)

$$x^2 - 6x + \_9\_\_ = -3 + \_9\_\_$$

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

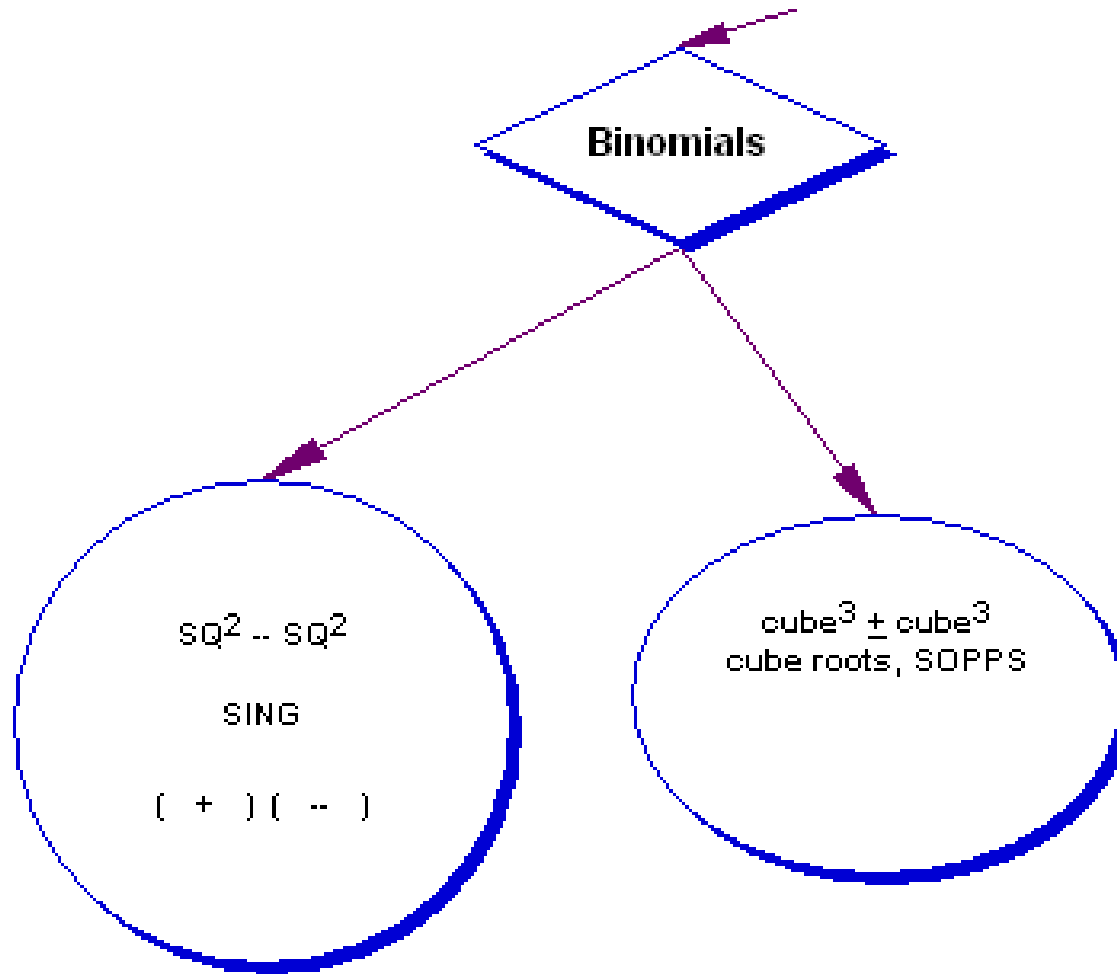$$\sqrt{(x-3)^2} = \pm\sqrt{6} \longrightarrow x = 3 \pm \sqrt{6}$$

FACTORING

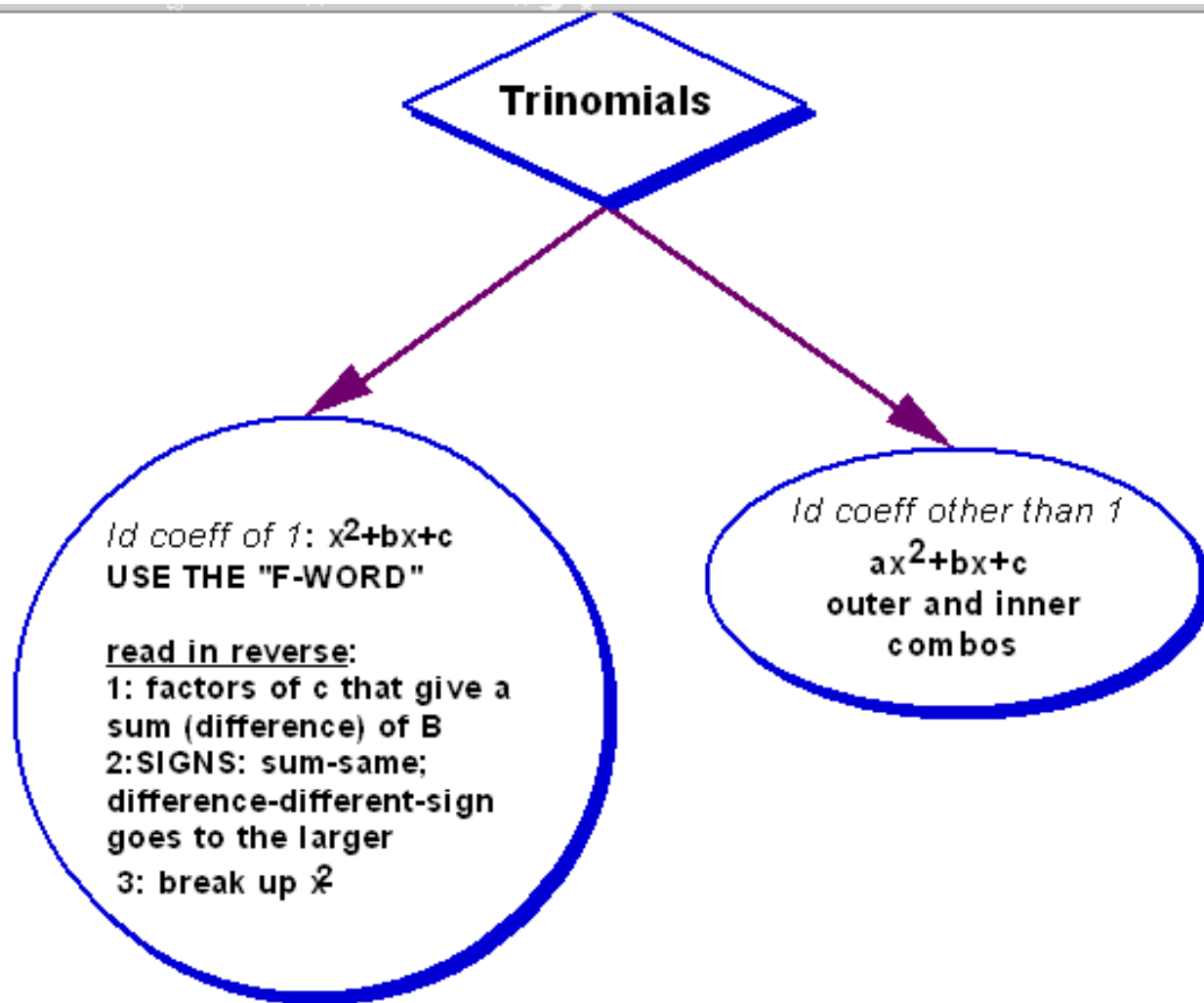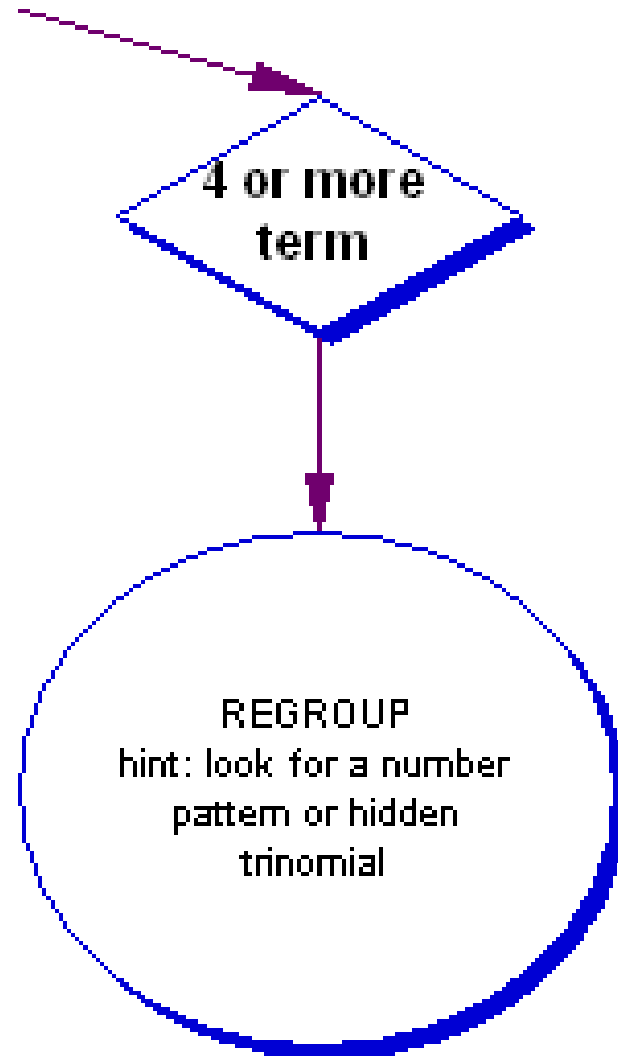## Summary of the Factoring Process

GCF out first: What do each of the terms share
*Remember if the lead term is negative, **factor out a negative***

Binomials

Trinomials

4 or more term

$SQ^2 -- SQ^2$

SING

$(\quad + \quad) (\quad -- \quad)$

$cube^3 \underline{+} cube^3$
cube roots, SOPPS

Id coeff of 1: x^2+bx+c
USE THE "F-WORD"

read in reverse:
1: factors of c that give a sum (difference) of B
2:SIGNS: sum-same; difference-different-sign goes to the larger
3: break up x^2

Id coeff other than 1
ax^2+bx+c
outer and inner combos

REGROUP
hint: look for a number pattern or hidden trinomial

FACTORING BINOMIALS

Binomials

$sq^2 - sq^2$

SING

$(\ +\ )(\ --\ )$

$cube^3 \pm cube^3$
cube roots, SOPPS

FACTORING TRINOMIALS

Trinomials

Id coeff of 1: x^2+bx+c
USE THE "F-WORD"

<u>read in reverse</u>:
**1: factors of c that give a
sum (difference) of B
2:SIGNS: sum-same;
difference-different-sign
goes to the larger
 3: break up x^2**

Id coeff other than 1
ax^2+bx+c
**outer and inner
combos**

FACTORING POLYNOMIALS WITH MORE THAN 3 TERMS

4 or more term

REGROUP
hint: look for a number pattern or hidden trinomial

FOLD
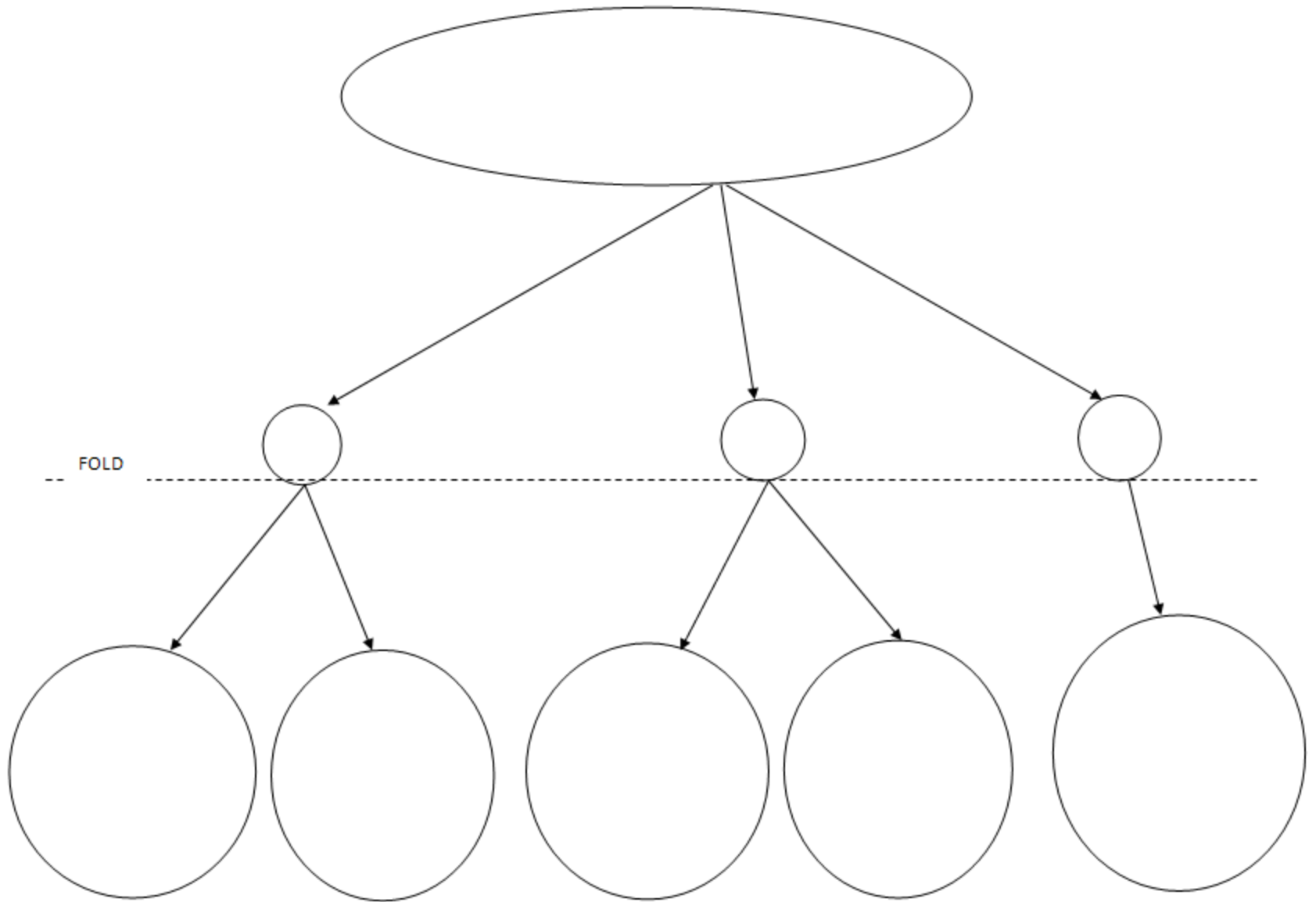
Simplifying radicals

- Good boys and bad boys that don't take their hats off in church

- $\sqrt{180\,x^5}$

good   bad

- $\sqrt{4 * 9 * 5\,x\,x^4} = \sqrt{4 * 9\,x^4} * \sqrt{5x}$

$= 2 * 3 * x^2 * \sqrt{5x}$

Solving radical equation
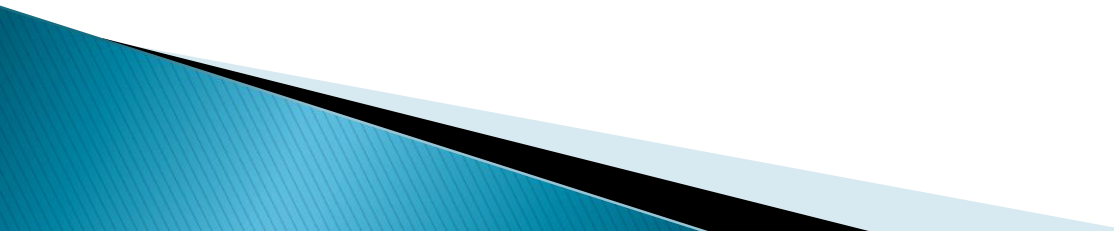
Square–square–check

$$(\sqrt{x-7})^2 = (5)^2$$

Solving equations with (x+a)²

▸ Radicalize–radicalize–plus and minus

Others
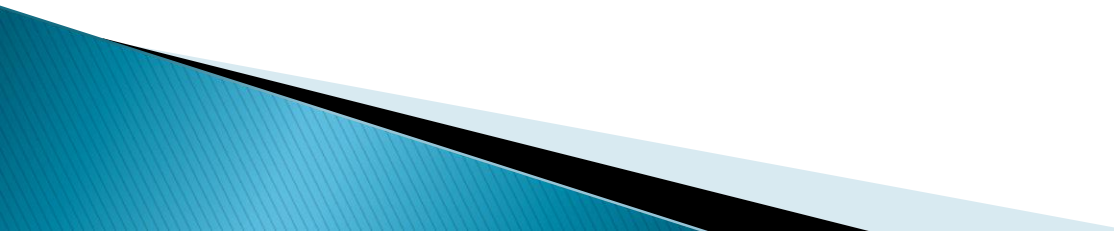
- SOH CAH TOA—a wise math teacher once said that when your foot gets smooshed one should "soak a toa"

- Please Excuse My Dear Aunt Sally

- Adding Integers—Water balloon fight

Connect with your students

- Tutor in the learning center–Blue slips for extra credit
- Student tracking system

In Conclusion

- Mnemonic strategies are simple but powerful.
- Mnemonics can be used to help students recall information.
- Mnemonics can assist students to remember and apply intellectual processes.
- Effective instruction for thinking will include a variety of mnemonic strategies, a variety limited only by the teacher's imagination.
- What mnemonic devices can you invent to promote thinking for your students with special needs?

Presentation Assessment

How much did you learn?
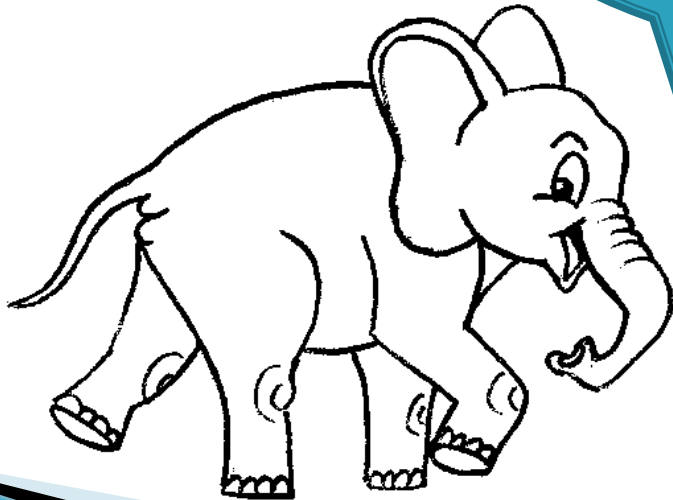
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