Math 101

Group Work on Linear Equations: How Old Is The Rose-Red City?

(Adapted from: *My Best Mathematical and Logic Puzzles*, by Martin Gardner*)*

Two professors, one of English and one of Mathematics, were having drinks at the faculty club.

"It is curious," said the English professor, "how some poets can write one immortal line and nothing else of lasting value. John W. Burgon, for example. His poems are so mediocre that no one reads them now, yet he wrote one of the most marvelous lines in English poetry: *A rose-red city half as old as Time*."

The mathematician, who liked to annoy his friends with improvised brainteasers, thought for a moment or two, then raised his glass and recited:

A rose-red city half as old as Time.
One billion years ago the city's age
Was just two-fifths of what Time's age will be
A billion years from now. Can you compute
How old the crimson city is today?

The English professor had long ago forgotten his algebra, so he quickly shifted the conversation to another topic. But you are eager to practice your algebra. Follow the four steps listed below to answer the question posed in this poem:

1. UNDERSTAND the problem thoroughly.
Read: Read and reread the poem.

Trial and Error: Check if a few arbitrary values give you a solution. For example, check if a rose-red city age of 3 billion years satisfies all the conditions of the poem. Pick your own additional values for the city's age , and try them out. Reflect on your answers. After three or more trials make a guess of what the solution will be. You may organize <u>each</u> trial in the following format:

	City's Age in billion years	Time's Age in billion years
Present: Today	3	
Past: One Billion Years Ago		
Future: One Billion Years From Now		
Is the city's age a solution?		

2. TRANSLATE the problem into an equation.
Chose a variable to represent the unknown: Let x =

Write an equation in x for your problem:

3. SOLVE the equation for x.

4. INTERPRET.
Check your solution:

State your answer:

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Group Work on Linear Equations: How Many Bees in Lilavati's Swarm?

In twelve century AD there lived in India a famous mathematician by the name Bhaskara. His contributions to mathematics were so remarkable that a medieval inscription in an Indian temple reads:

"Triumphant is the illustrious Bhaskara whose feats are revered by both the wise and the learned. A poet endowed with fame and religious merit, he is like the crest on a peacock."

And indeed, as it was the custom in India of his days, all of Bhaskara's mathematical works were written in verse. His most charming book, *Lilavati*, written for his daughter , whose nickname was Lilavati (The beautiful), contains many interesting algebraic poems. Apparently beautiful Lilavati, following in her father's footsteps, had a taste for higher mathematics.

Here is one poem from *Lilavati*:

A fifth part of a swarm of bees came to rest
on the flower of Kadamba,
a third on the flower of Silinda.
Three times the difference between these two numbers
flew over a flower of Krutaja,
and one bee alone remained in the air,
attracted by the perfume of a jasmine in bloom.
Tell me, beautiful girl, how many bees were in the swarm?

Follow the four steps followed by Lilavati to find the answer to the question posed in the poem:

1. UNDERSTAND the problem thoroughly.

Read: Read and reread the poem.

Trial and Error: Check if a few arbitrary values give you a solution. For example, check if a swarm of 6 bees satisfies all the conditions of the poem. Pick your own additional values for the number of bees in the swarm, and try them out. Reflect on your answers. After three or more trials make a guess of what the solution will be?

2. TRANSLATE the problem into an equation.

Chose a variable to represent the unknown: Let x =

Write an equation in x for your problem:

3. SOLVE the equation for x.

4. INTERPRET.

Check your solution:

State your answer: