

Answer one of the following questions, either A or B. You should write at least 250 words – several paragraphs. Be VERY SPECIFIC!! You may bring your answer already written out, if you wish. Again, BE SPECIFIC and site examples to back up your argument!

(A) From the preface to Martin Gardner's *The New Ambidextrous Universe*:

In Carl Sandburg's *The People, Yes* there is an episode about a white man who draws a small circle in the sand and says, "This is what the Indian knows." He draws a larger circle around the small one and adds, "This is what the white man knows." The Indian takes the stick and draws an immense ring around both circles. "This is where the white man and the red man know nothing."

Change the symbolism in this story so that the small circle represents the mathematics as it is traditionally taught in the schools, that is the mathematics known up till about 1900. The next larger circle represents mathematics as it is known and studied today. And the largest circle represents the mathematics of the future, and its place in society. On the basis of what you have studied in this course, comment on what will be found in the largest circle. How will it be different? Who will do it? What will attitudes towards it be? What roles will it play in society? But you must be specific, give examples to back up your argument, cite what you have learned or studied this quarter, and relate your vision to what is found in the "medium size" circle and the smallest circle.

(B) Answer the following question. Be specific. Give examples. Write in complete sentences. Arrange your thoughts carefully. Support your statements with facts.

Mathematics is a world created by the mind of man, and mathematicians are people who devote their lives to what seems to me a wonderful kind of play! -Constance Reid (1980)

A mathematician, like a poet or painter is a maker of patterns...

The mathematician's patterns, like the painter's or the poet's must be *beautiful*; the ideas, like the colours or the words, must fit together in a harmonious way. Beauty is the first test; there is no permanent place in the world for ugly mathematics.

- G. H. Hardy in *A Mathematician's Apology* (1940)

There is not much difference between the delight a novice experiences in cracking a clever brain teaser and the delight a mathematician experiences in mastering a more advanced problem. Both look on beauty bare - that clean, sharply defined, mysterious, entrancing order that underlies all structure.

- Martin Gardner in *Mathematical Puzzles and Diversions* (1959)

How have the quotes above been shown to be true in this course. How false? What do you think about these ideas?