

Vision - Potential

Vision Within Every Instructor - Potential Within Every Student

Newsletter of the HBCU College Algebra Reform Consortium*

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[1] Reflection

Reflecting and acting on reflection are key components in becoming an exploratory learner. As teachers, we need to model reflection practices in helping our students learn how to reflect. Here are some suggestions:

- a. Share with students an experience of a reflection that led to an action. For example, how a reflection on a class led to changes in the lesson plan for the next day. The example needs to be specific and related to the students.
- b. Periodically hold a reflection time during class. Call on students to reflect on a particular topic. Ask them to discuss implications and ramifications based on their reflections.
- c. Call on students to discuss last night's homework. What was it about? What did you learn from it? This should be done frequently so that students learn to anticipate (and hopefully prepare) being asked about

their homework. This type of reflection provides a measure of a student's development over the course of a semester.

d. After a test, hold a class reflection on the preparation for the test.

e. Hold a *Peer Reflection* related to group work. Create a matrix with favorable characteristics (e.g., shows leadership, dependable, contributes, etc.) listed as row headings. Hand out a copy to each student with instructions to list the names of their group members as column headings and then fill in the matrix, rating each group member on a scale of one to five with five being the best rating. Encourage students to include additional comments. Create a scatter plot of the results (categories on the horizontal axis and ratings on the vertical axis) to display to the class. Results for an individual student could be discussed during individual counseling sessions. Holding three or four or more Peer Reflections provides the teacher with an insight to student development that is not necessarily shown in the normal assessment.

Readers, please send me your thoughts and suggestions on how reflection leads to student growth. I will include them in future issues of this Newsletter so that all may benefit from your experience and insight.

* Supported by the U.S. Military Academy.

"If there is no struggle,

there is no progress.”

[2] Growth Rates

The economic historian, Simon Kuznets, called the period 1,800 to 2,000 the time of *modern economic growth*. The world’s population had grown from roughly 230 million in 1 A.D. to 900 million 1800 years later. (Today, the world’s population is approximately 6.3 billion, a 7-fold increase in a little over 100 years.)

A comparison of the Gross Domestic Product (GDP) of the United States and Western Europe over the period 1820 to 1998 illustrates the power of compound interest. In 1820, the GDP of the United States and Western Europe was approximately the same at \$1,200 per person. The average annual growth rates in GDP over the period 1820 to 1998 was approximately 1.9 percent for the United States and 1.5 percent for Western Europe. Although the difference in these rates do not seem to be great, they lead to radically different results when applied over a 178 year span. The United States had approximately a 20 -fold increase in its GDP over that time compared to a 14-fold increase for Western Europe.

By contrast, the approximate GDP of Africa was \$400 per person in 1820 and its average annual growth rate has been approximately 0.7 percent over the time span from 1820 to 1998. Over this 178 year span, Africa’s GDP had increased from approximately \$400 to \$1,384 per person, slightly more than a 3-fold increase. Over this time span, a comparison of the GDP between the United States and Africa grew from 3-fold gap to almost six times that amount.

Compute the following:

a. The annual growth rate of the world’s population from 1 A.D. to 1800 A.D.

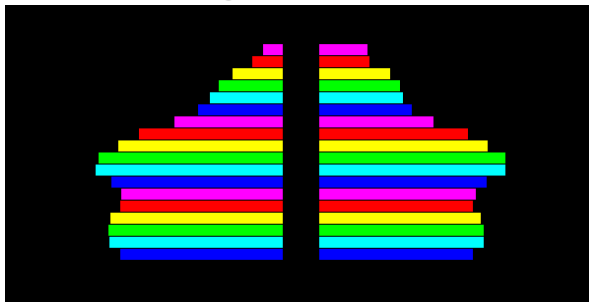
b. The annual growth rate of the GDP in the United States from 1998 to 2007.

[3] Interpreting Population Pyramids

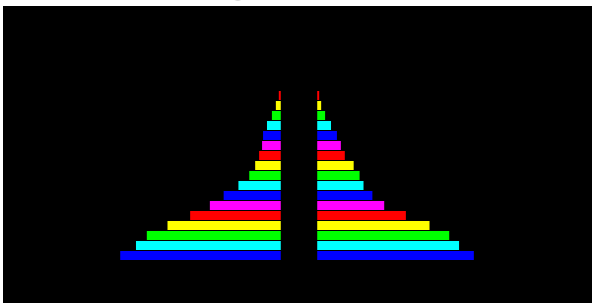
Learning how to interpret graphs and draw inferences from graphs is an important objective of a refocused college algebra course. Population pyramids offer nice opportunities for this type of analysis. A population pyramid represent a country’s population by age. Each level represents a five year age interval, with the bottom level being 0-to-4, the second level being 5-to-9, etc. The left-hand side represents the male population and the right-hand side the female population. The horizontal lengths of the bars denote the size of the population. Because the horizontal scales are different for different countries, comparisons and interpretations need to be based on the shapes of the pyramids.

Discuss the patterns of growth for each of the countries as suggested by their population pyramids. Consider such things as birth rates, death rates, immigration (emigration), government encouragement or discouragement of couples having children, etc. Predict the corresponding pyramids for 2025 and then check your prediction against those found at www.IDB Population Pyramids.

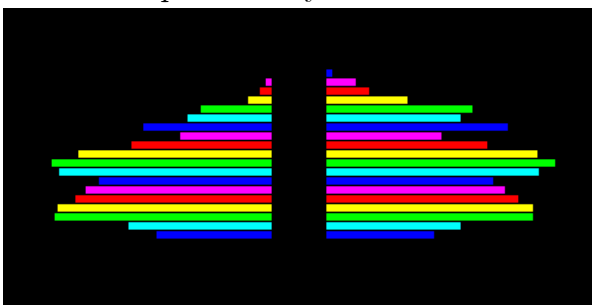
U.S. Population Pyramid for 2000



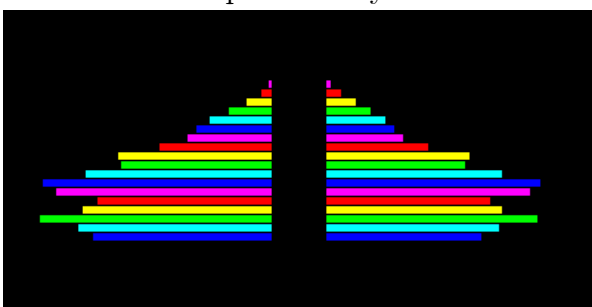
Haiti's Population Pyramid for 2000



Russia's Population Pyramid for 2000



China's Population Pyramid for 2000



[4] Skill Work

Although mastering skill work is not an objective of a refocused college algebra course, an occasional accountability session is appropriate. Such a session might include pairing students into groups of two and presenting them with the following list of statements. After five minutes begin calling on different groups to state whether a given statement is True or False. If a group says that the statement is True, ask them to give an example illustrating the statement. If they say the statement is False, ask them to give a counterexample (i.e., an example showing that the statement is false).

- $\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$
- $\frac{a}{x+b} = \frac{a}{x} + \frac{a}{b}$
- $\sqrt{x^2 + a^2} = x + a$
- $\frac{a}{b} + \frac{c}{d} = \frac{ad+bc}{bd}$
- $\frac{a+bx}{a} = 1 + bx$
- $a^x a^y = a^{x+y}$
- $\left(\frac{a}{\frac{b}{c}}\right) = \frac{ac}{b}$
- $(x^2)^3 = x^5$

[5] Queries

- Margaret and Don stopped at Cooks Crossing in Searsport, Maine to buy two crab rolls. On the menu, crab rolls were listed at \$9.00 each. The bill, including sales tax, was \$19.26. What is Maine's sales tax rate?
- The L.L. Bean outlet store in Ellsworth, Maine advertised a sale of 30% off on all items in the store. In addition, over Labor Day weekend the store had a sign at the check-out counter that read 50% off the sale price on selected items. If you purchased one of the selected items, what would be the sale percentage off?
- The price including an 8% sale tax for a cheeseburger and a cup of coffee at Alexis Diner in Newburgh, NY is \$6.92. What is the menu charge for a cheeseburger and cup of coffee?

[6] Notices

- The sixth edition of *Contemporary College Algebra: Data, Functions, Modeling* is now available. Contact Kathy Kilburg (563-584-6322, Kathhj_Kilburg@mcgraw-hill.com) for an examination copy.

2. A Reunion of College Algebra Workshop Participants will be held on Tuesday evening from six to eight o'clock on January 6, 2009 as part of the Joint Mathematics Meetings in Washington, DC. Bill Haver and Don Small will facilitate the session. A box supper will be provided. Please contact Don Small by December 1 if you plan to attend in order to have an accurate account for food.
3. A Contemporary College Algebra workshop will be held at Husson University in Bangor, Maine on October 13-14, 2008. The contact person is Ken Lane, LaneK@husson.edu.
4. BBA National Conference
We are feverishly continuing our plans to host our first, standalone national conference to be held in Little Rock, Arkansas. The conference is entitled the 2008 Benjamin Banneker Conference on the Mathematics Teaching, Learning and Research of African American Students: Unlocking Doors of Excellence in Mathematics for African American Students. There are open possibilities to attend, present, sponsor or host a booth. For those of you who have been members of Banneker over the years, you will agree that this represents a major opportunity to showcase the diligent work of the organization on a national level. The South Central Regional Representative, Vanessa Cleaver (southcentralrep@bannekermath.org) and her local team continue to work very hard in preparation. Slots for research and teaching presentations are open until filled, and early bird registration is available online at www.bannekermath.org/conferences/BBA2008.
5. A National Math Panel Forum organized by CBMS and the U.S. Department of Education will be held October 6 & 7 at the Marriott Wardman Park Hotel in Washington DC. The intent of the Forum is to launch action for changes in mathematics education based on the findings and recommendations of the National Math Panel report, Foundations for Success. Information about the Forum and how to participate may be accessed online via the CBMS website www.cbmsweb.org,
6. The NAM MathFest XVIII will be held at Texas Southern University, November 13-15, 2008.
7. Past issues of the *Vision - Potential* Newsletter are available on our website: www/ContemporaryCollegeAlgebra.org.
8. Deadline for contributions to the November Newsletter is November 1, 2008. Opinion articles, suggestions for writing assignments, small group in-class activities, small group out-of-class projects, Queries, announcements, etc. are welcomed.
9. To subscribe to this Newsletter, write to Don Small, Department of Mathematics, U.S. Military Academy, West Point, NY 10996 or contact him via e-mail at don-small@usma.edu.