

## **GEOL3300: Earth Resources Fundamental and Technical Literacy Survey (Final)**

Answer the following questions on the green (10-option) bubble sheet provided. Give only one answer for each question. Fill in your answer on the bubble sheet using a #2 pencil.

### **Personal Background**

1. What is your sex?
  - a. female
  - b. male
2. What is your age?
  - a. <18 years
  - b. 18-19 years
  - c. 20-21 years
  - d. 22-25 years
  - e. 26-30 years
  - f. over 30 years
3. How many years of science classes (chemistry, physics, biology, earth science, etc.) did you take in high school?
  - a. 0
  - b. 1
  - c. 2
  - d. 3
  - e. 4
  - f. more than 4 (by taking more than one at a time)
4. How many hours of college credit have you completed
  - a. < 29
  - b. 30-59
  - c. 60-89
  - d. 90
5. How many science classes (chemistry, physics, biology, earth science, etc.) have you taken in college?
  - a. 0
  - b. 1
  - c. 2
  - d. 3
  - e. more than 3
6. How many math classes (excluding statistics) have you taken in college?
  - a. 0
  - b. 1
  - c. 2
  - d. 3
  - e. more than 3

7. How many social science courses (sociology, political science, geography, anthropology, economics, etc.) have you taken in college?
- 0
  - 1
  - 2
  - 3
  - more than 3
8. In what setting was your last Earth Science (or geology) class?
- never taken one
  - in junior high school
  - in high school
  - in college
  - other, please explain\_\_\_\_\_
- 
9. In which UW College are you enrolled?
- Agriculture
  - Arts & Sciences
  - Business
  - Education
  - Engineering
  - Health Science
  - Law
  - undecided
  - do not know
10. What is your major area of interest (pick only one)?
- Fine Arts (art, dance, music, theatre)
  - Technology (engineering, computer science, architecture)
  - Business (accounting, finance, marketing, management, etc.)
  - Humanities (English, philosophy, language, liberal studies)
  - Social Science (anthropology, communications, history, psychology, sociology, etc.)
  - Biological Sciences (biology, zoology, botany, nursing, premed)
  - Physical Sciences (chemistry, geology, physics, astronomy)
  - Mathematics
  - Education
  - None of these
11. Which best describes your access to the Internet?
- very convenient (e.g. access from "home")
  - somewhat convenient (e.g. easy access to computer lab)
  - somewhat inconvenient
  - very inconvenient

### Attitude

12. How confident are you in your ability to understand science?
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)

13. How confident are you in your ability to understand math?
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)
14. How would you rank your ability to understand the complexities of social issues?
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)
15. Which best describes your state of mind about taking this college science class?
- I can't sleep because I worry about it.
  - I'm a little nervous, but I'll probably pass.
  - I don't think about it.
  - I've been looking forward to taking it.
  - I can't sleep because I'm so excited about it.
16. How important do you think geology is to daily life?
- don't know
  - totally useless
  - mostly useless
  - somewhat important
  - very important

## Fundamental Literacies

### Qualitative Assessments

17. In the last two years, how frequently have you done qualitative assessment?
- very frequently
  - frequently
  - sometimes
  - rarely
  - very rarely

On the Earth's surface, the acceleration due to gravity is described by the following equation:

$$g = \frac{G \cdot M_e}{r^2}$$

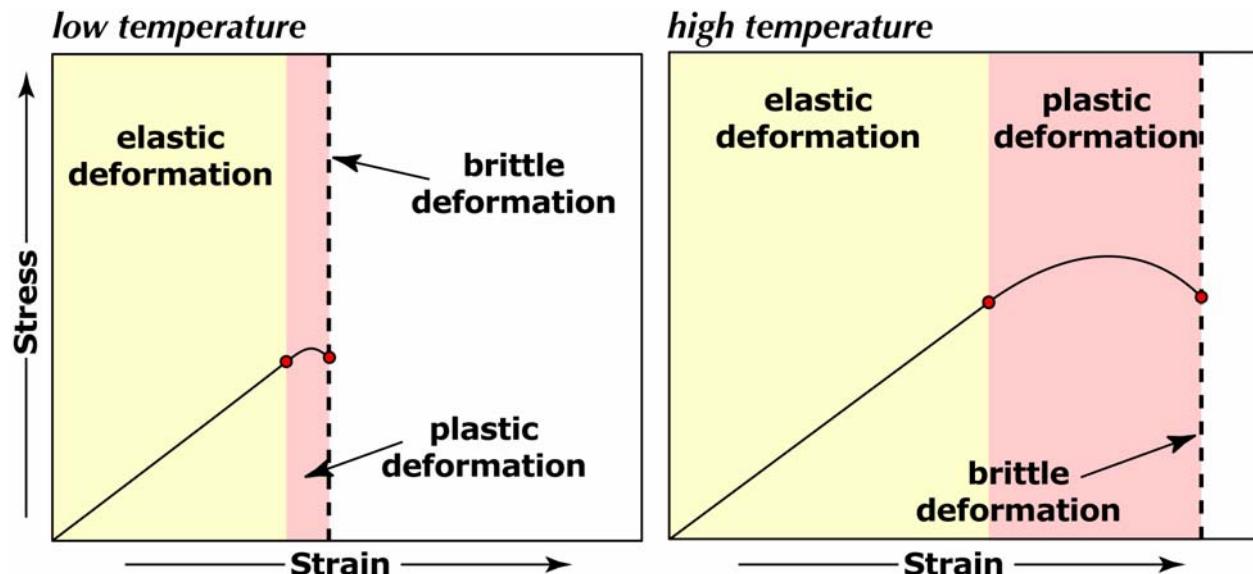
where  $M_e$  is the mass of the Earth,  $r$  is the Earth's radius and  $G$  is the universal gravitational constant.

18. Without worrying about specific numerical values, if the radius of the Earth,  $r$ , increases, what happens to  $g$ ?
- increases
  - decreases
  - remains unchanged
  - indeterminate
  - don't know

19. Please indicate how confident you are of your answer.

- a. 1 (low)
- b. 2
- c. 3
- d. 4
- e. 5 (high)

These charts plot stress versus strain. Do not worry what these are; we will cover them during the semester. Use these charts to answer the following qualitative questions.



20. What type of deformation occurs at the lowest strain?

- a. elastic
- b. brittle
- c. plastic
- d. stress
- e. don't know

21. Please indicate how confident you are of your answer.

- a. 1 (low)
- b. 2
- c. 3
- d. 4
- e. 5 (high)

#### **Quantitative Calculations (you may use a calculator)**

22. In the last two years, how frequently have you done quantitative calculations?

- a. very frequently
- b. frequently
- c. sometimes
- d. rarely
- e. very rarely

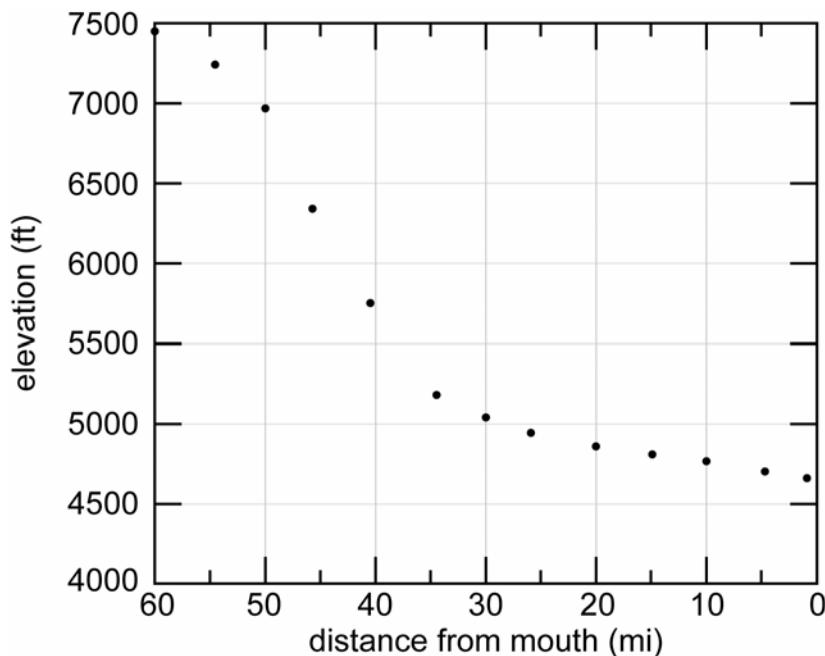
23. Convert 53.8 km<sup>2</sup> to meters squared (m<sup>2</sup>). (1 km = 1000 m)
- 53,800,000 m<sup>2</sup>
  - 53,800 m<sup>2</sup>
  - 0.0538 m<sup>2</sup>
  - 5.38 m<sup>2</sup>
  - don't know
24. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)
25. Calculate the surface runoff from a storm that has dropped 8 inches of rain on a paved area of 530 ft<sup>2</sup>. (Answer in cubic inches.)
- 610560 in<sup>3</sup>
  - 50880 in<sup>3</sup>
  - 4240 in<sup>3</sup>
  - 4240 ft<sup>3</sup>
  - don't know
26. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)
27. Express 1,230,000,000 in scientific notation.
- 123 x 10<sup>9</sup>
  - 123 x 10<sup>7</sup>
  - 0.123 x 10<sup>10</sup>
  - 1.23 x 10<sup>9</sup>
  - don't know
28. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)
29. If you need 12 pounds of coal per day to heat your home and your coal contains 0.6 % sulfur, how much sulfur will you release into the air in a year? (Show your work.)
- 0.072 lbs
  - 26 lbs
  - 7.2 lbs
  - 2,628 lbs
  - don't know
30. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)

### Reading Graphs/Charts/Tables

31. In the last two years how frequently have you read graphs, charts, or tables?

- a. very frequently
- b. frequently
- c. sometimes
- d. rarely
- e. very rarely

This graph plots elevation at various points along a river versus distance from the river's mouth (i.e. where it empties into another river or standing body of water). Use the graph to answer the next two questions.



32. At 10 miles from the mouth (i.e., where it empties into another river or body of water), what is the elevation of the river?

- a. 10 ft
- b. 4000 ft
- c. 4800 ft
- d. 7000 ft
- e. don't know

33. Please indicate how confident you are of your answer.

- a. 1 (low)
- b. 2
- c. 3
- d. 4
- e. 5 (high)

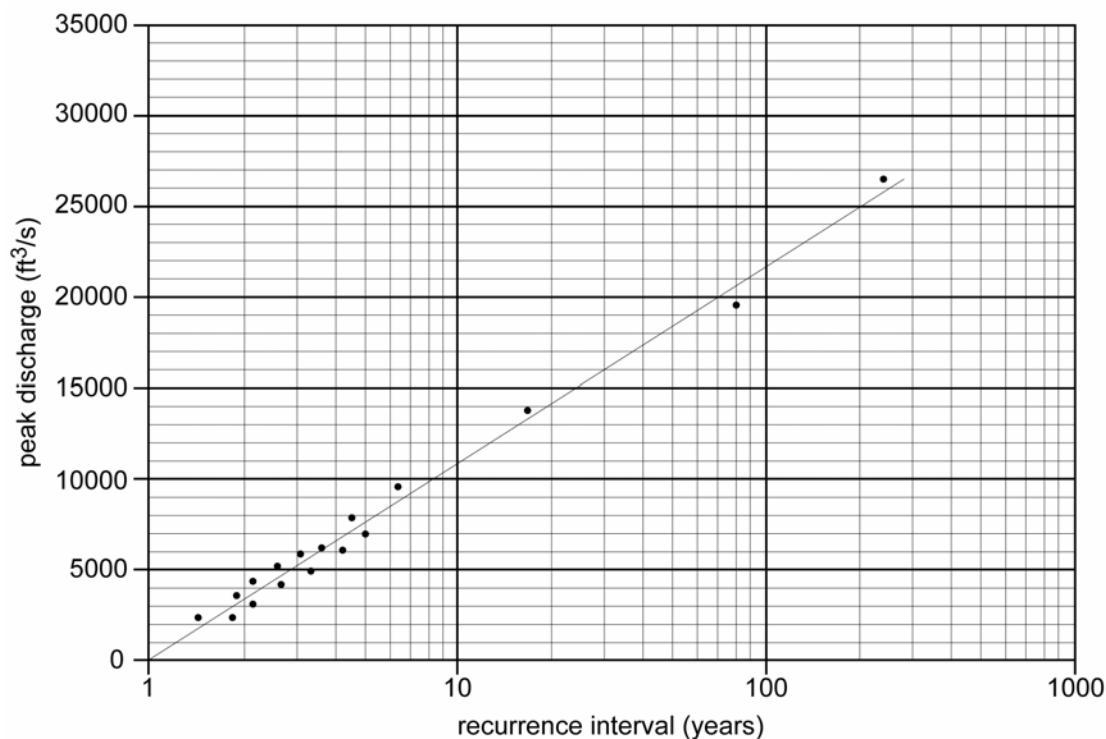
34. What is the average slope (gradient) of the river?

- a.  $(7500-4000)\text{ft} / 60\text{mi} = 58 \text{ ft/mi}$
- b.  $(7500-4600)\text{ft}/60\text{mi} = 48 \text{ ft/mi}$
- c.  $7500\text{ft}/60\text{mi} = 125 \text{ ft/mi}$
- d. don't know

35. Please indicate how confident you are of your answer.

- a. 1 (low)
- b. 2
- c. 3
- d. 4
- e. 5 (high)

This graph plots time between floods (recurrence interval) against flood size (discharge). Use it to answer the next few questions.



36. What is the discharge of a flood with a recurrence interval of 30 years?

- a. 5000 ft³/s
- b. 11000 ft³/s
- c. 16000 ft³/s
- d. 22000 ft³/s
- e. don't know

37. Please indicate how confident you are of your answer.

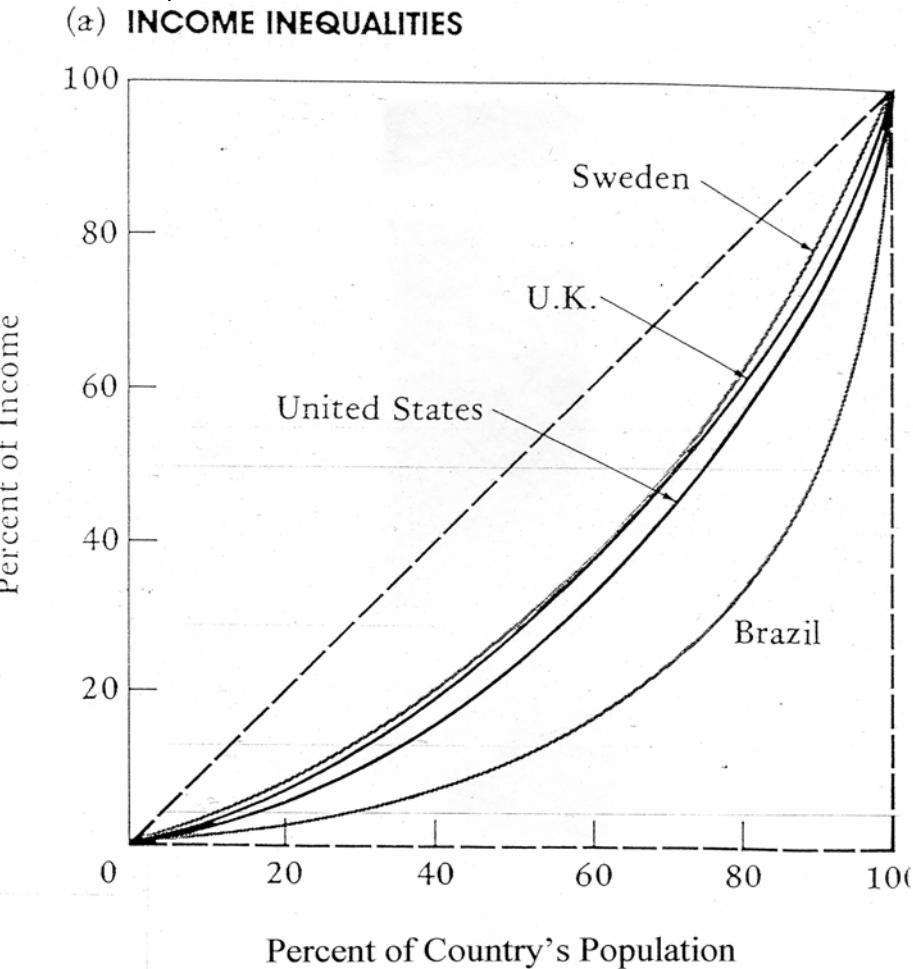
- a. 1 (low)
- b. 2
- c. 3
- d. 4
- e. 5 (high)

38. What is the recurrence interval of a flood with a discharge of 25,000 ft³/s?

- a. 100 yrs
- b. 110 yrs
- c. 200 yrs
- d. 1000 yrs

- e. don't know
39. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)

The graph below plots the percent of income versus percent of a country's population. Use it to answer the next few questions.

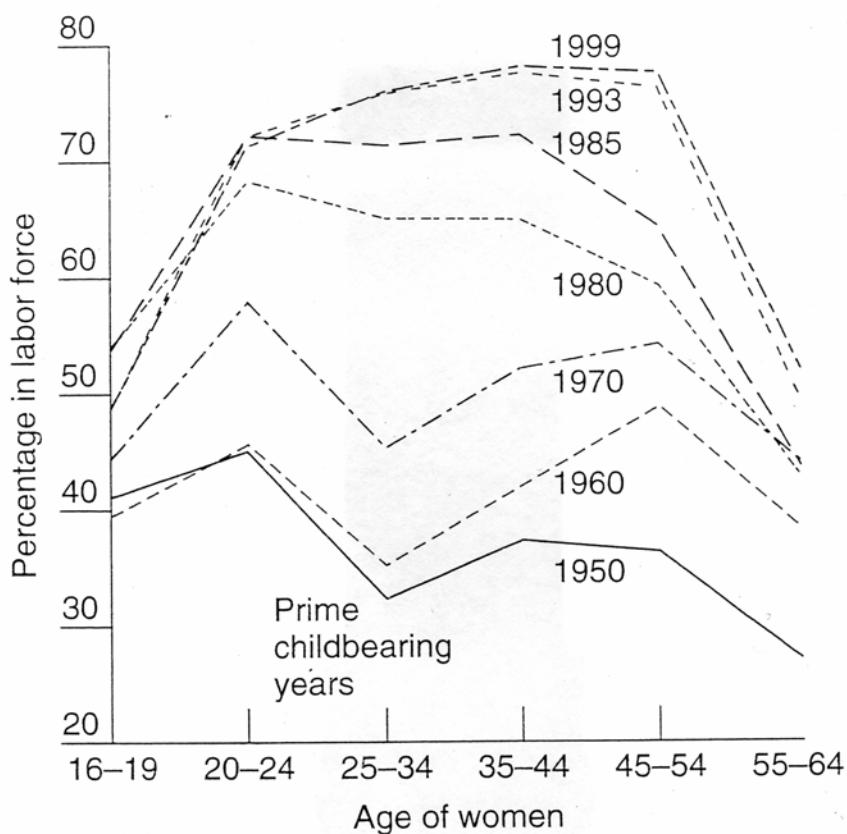


40. This graph displays:
- how much income inequality there is in the world
  - differences in income inequalities in among 4 countries
  - that there is more inequality in the United states than in Brazil
  - That Sweden, the US and the UK are larger countries than Brazil
41. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)

42. The broken line running from corner to corner in this graph represents:
- complete income equality
  - the average income inequality for all countries in the world
  - the line dividing capitalist countries and socialist countries
  - nothing, since it is not labeled
43. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)

The graph below illustrates the labor force participation of women by age for the period from 1950-1999. Use it to answer the next few questions.

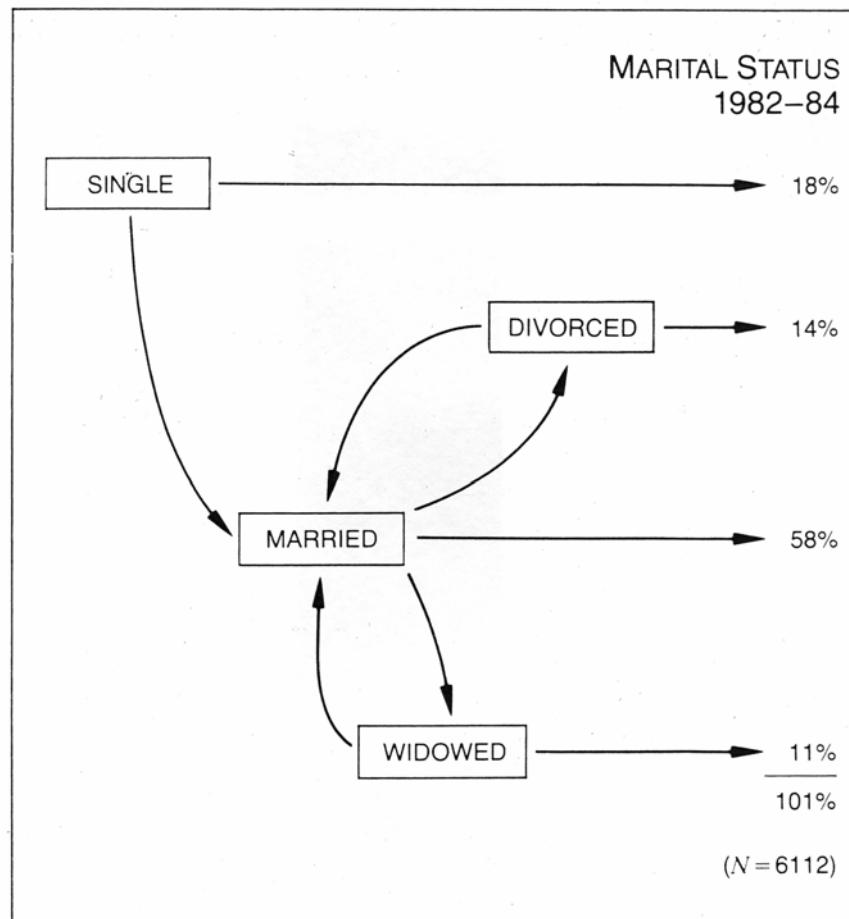
**Labor Force Participation for Women, by Age, 1950–1999**



44. The graph is based on information about women in which country(ies)?
- the United States
  - all the countries of the World
  - only countries where women work, thus excluding Muslim countries where women are not allowed to work

- d. you cannot tell from this graph
45. Please indicate how confident you are of your answer.
- a. 1 (low)
  - b. 2
  - c. 3
  - d. 4
  - e. 5 (high)
46. Through 1985, but not from 1993 onward, women's labor force participation:
- a. continued until they were about 55 years of age, then declined sharply
  - b. declined when they reached childbearing years
  - c. was highest for those women in their mid-40s to mid-50s
  - d. was highest for the youngest women (16-19) in the middle of the decade than later
47. Please indicate how confident you are of your answer.
- a. 1 (low)
  - b. 2
  - c. 3
  - d. 4
  - e. 5 (high)
48. Overall, this from this graph you can draw three conclusions. Which conclusion is unfounded?
- a. Women were increasingly more likely to be in the labor force as the century went on.
  - b. World War II caused many more women to enter the labor force than ever before.
  - c. Women increasingly remained in the labor force during childbearing years, especially at the end of the century.
  - d. By ages 55-64 women's labor force participation is about the same rate or below what it was at ages 16-19, for each age cohort shown in the table.
49. Please indicate how confident you are of your answer.
- a. 1 (low)
  - b. 2
  - c. 3
  - d. 4
  - e. 5 (high)

The following chart shows marital outcome of adults in the U.S. from 1982 to 1984.



50. The figure Marital Status of Adult Americans between 1982-84 shows that:
- divorced women are less likely to remarry than divorced men
  - most people who get divorced will someday remarry
  - widowed persons have never been divorced
  - a person cannot be widowed or divorced unless they have been married
51. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)
52. This figure shows that:
- less than one in five adults have never married
  - 58% of all married adults have never been divorced or widowed
  - a quarter of all adults will never again be married
  - half of all marriages with someday end in divorce

53. Please indicate how confident you are of your answer.
- a. 1 (low)
  - b. 2
  - c. 3
  - d. 4
  - e. 5 (high)
54. This chart shows that:
- a. 58% of married people never divorce
  - b. it is very rare that a widowed person will have been divorced (true for only 3% of adults)
  - c. if you classified all adults in the U.S. as being single, married, widowed or divorced in the years 1982-84, 14% would be divorced and not have remarried
  - d. more people get divorced (14%) than become widows or widowers (11%)
55. Please indicate how confident you are of your answer.
- a. 1 (low)
  - b. 2
  - c. 3
  - d. 4
  - e. 5 (high)
56. The figure 101% indicates that:
- a. people do not give interviewers the correct information about their lives
  - b. the numbers 18%, 14%, 58% and 11% are whole number that have been rounded off, creating a total that appears to exceed 100%
  - c. some people are both widowed and divorced
  - d. some single people (approximately 1%) will later marry
57. Please indicate how confident you are of your answer.
- a. 1 (low)
  - b. 2
  - c. 3
  - d. 4
  - e. 5 (high)

## Gender and Religiousness in Selected Nations

Nation	Women	Men
<i>Percent who attend church at least monthly</i>		
United States	61	54
Canada	44	32
Mexico	70	57
Great Britain	30	17
Germany	36	23
Italy	62	42
Russia	9	3
Japan	16	11
<i>Percent who pray</i>		
United States	94	87
Canada	88	75
Mexico	95	89
Great Britain	78	54
Germany	74	59
Italy	90	74
Russia	50	21
Japan	90	85

Source: Prepared by Rodney Stark from the *World Values Survey, 1995-1996*.

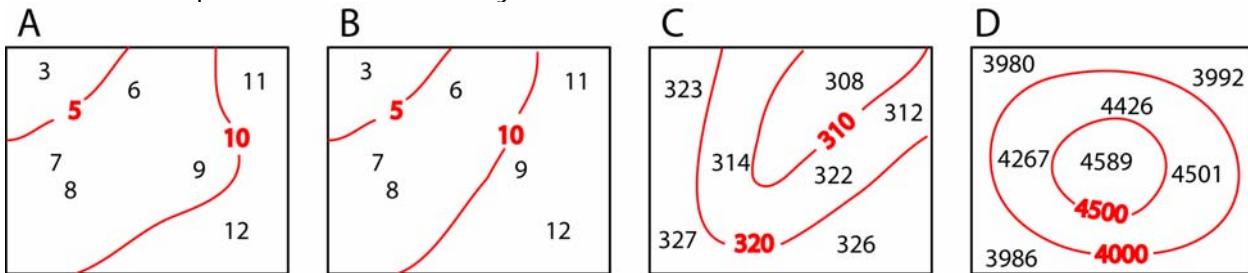
58. The Gender and Religiousness table above shows that:
- in every country men are more likely to attend church and say they pray than are women
  - in every country men are more likely to attend church but women are more likely to say they pray
  - in every country women are more likely to attend church but men are more likely to say they pray
  - in every country women are more likely to attend church and say they pray than are men
59. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)
60. One can conclude from this table that:
- there is no relationship between prayer and church attendance
  - people who say they go to church are consistently less likely to pray
  - no one who prays fails to go to church
  - there is a strong relationship – country by country – between prayer and church attendance for both men and women, though prayer is more frequent than church attendance
61. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)

62. Japan is exceptional because:
- the Japanese are very likely to pray but very unlikely to go to church
  - the Japanese people pray at home rather than in church
  - it is the only Asian country where people go to church and where they pray
  - the Japanese man is more likely than the Japanese woman to pray and go to church
63. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)

## Technical Literacies

### Map Interpretation

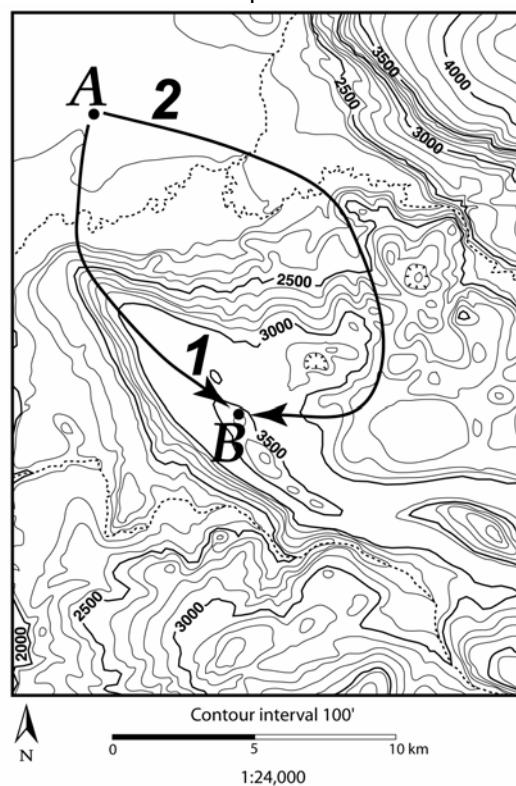
64. In the last two years how frequently have you used or interpreted maps?
- very frequently
  - frequently
  - sometimes
  - rarely
  - very rarely
65. Which map is contoured correctly?



- e. don't know
66. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)

67. Which hike (path 1 or 2) from A to B would be least steep?

- a. 1
- b. 2
- c. don't know



68. Please indicate how confident you are of your answer.

- a. 1 (low)
- b. 2
- c. 3
- d. 4
- e. 5 (high)

69. If you walk from the house to the mountain on the map below, what direction will you be heading?

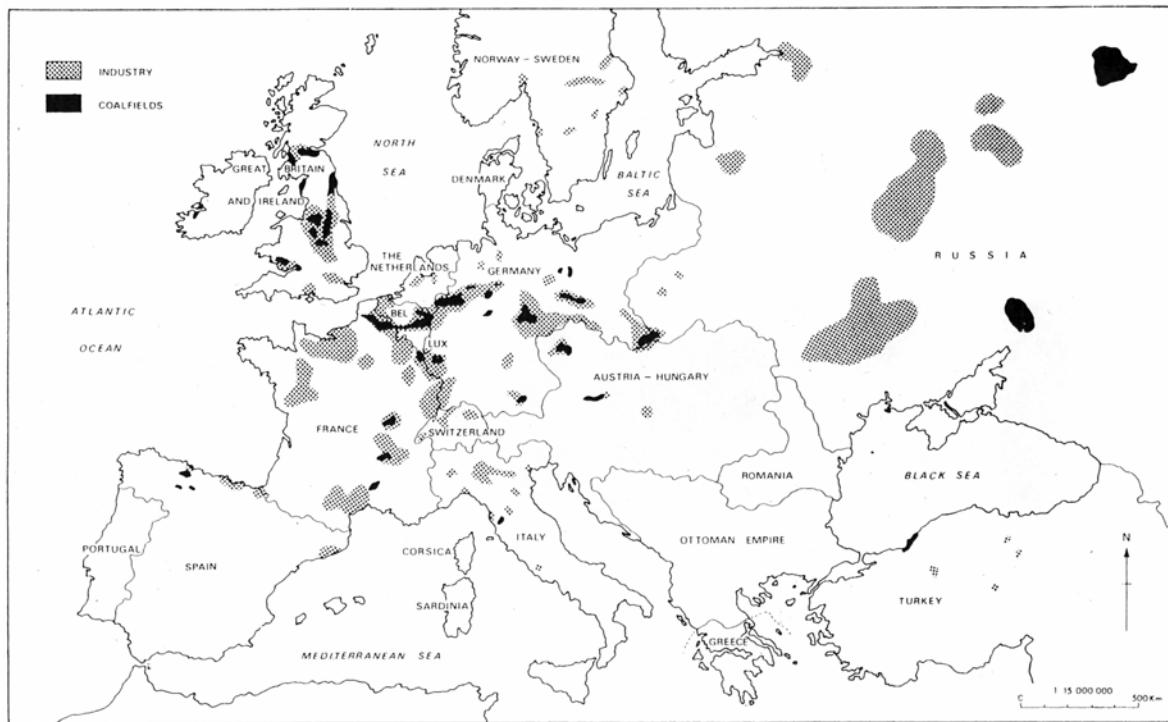
- a.  $45^\circ$  from north
- b.  $170^\circ$  from north
- c.  $270^\circ$  from north
- d. don't know



70. Please indicate how confident you are of your answer.

- a. 1 (low)
- b. 2
- c. 3
- d. 4
- e. 5 (high)

The map below shows European coal fields in 1875 and the development of industry.



71. From this map, you can see that in Europe:

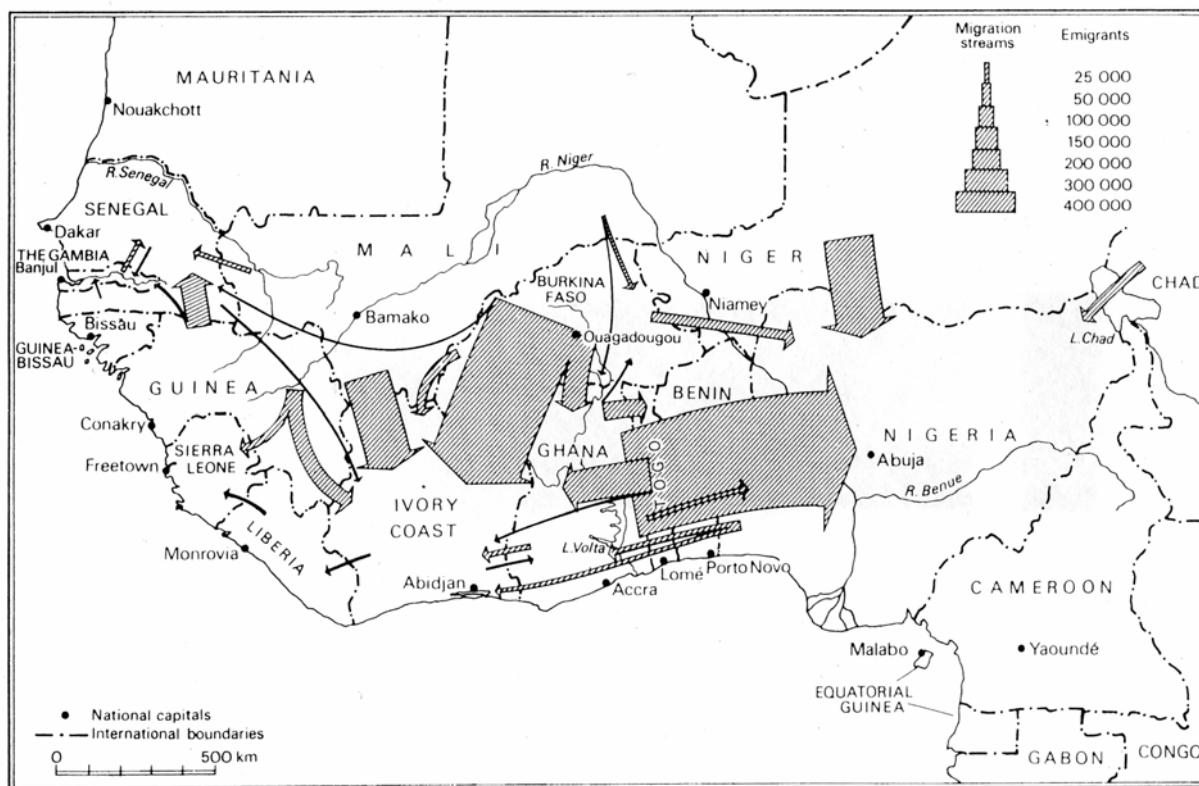
- a. coal tended to be mined in those areas where industry had the need for it as an energy source
- b. most disputes in Europe occurred where earth resources (e.g. coal) were plentiful
- c. hydroelectric power was more important to industry than coal, oil or natural gas in the early years of industrialization
- d. industry was more likely to develop in those areas where coal was available to be mined and used as an energy source

72. Please indicate how confident you are of your answer.

- a. 1 (low)
- b. 2
- c. 3
- d. 4
- e. 5 (high)

73. In what two countries are there extensive coalfields but relatively little development of industry in close proximity to them?
- Ireland and Spain
  - Italy and Turkey
  - Russia and France
  - Norway and Sweden
74. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)

Extraction of large Earth resource deposits often produce large shifts in population, both locally, nationally and internationally. The map below depicts population shifts in the shoulder of Africa.



75. The map shows that:
- Most migration occurs from north to south and west to east
  - Nigeria and the Ivory Coast are the principle sites of immigration
  - Guinea is the main source of emigrants in West Africa
  - Most migration occurs across several countries rather than from one country to its neighbor

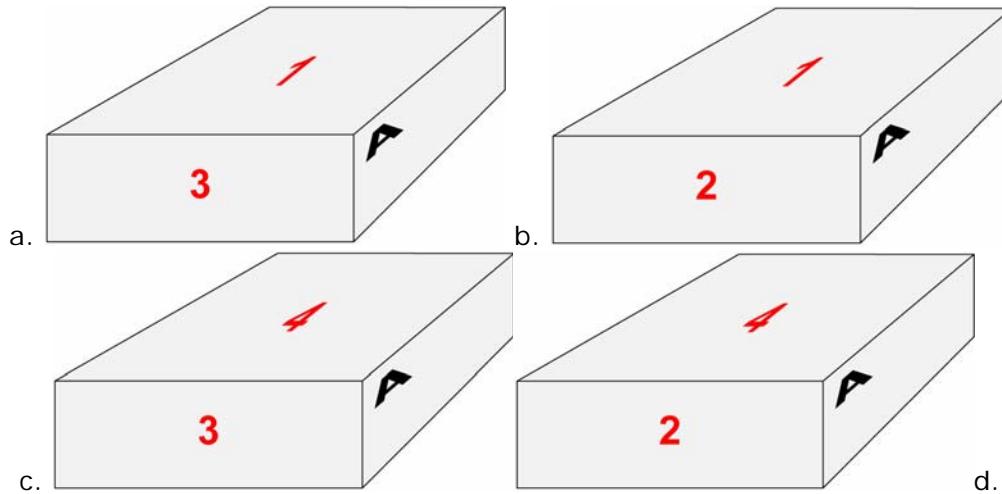
76. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)
77. In general terms, what is being shown on this map?
- the flow of refugees fleeing natural and man-made disasters
  - the movement of people seeking jobs
  - members of tribes joining with similar kinsmen to form larger tribal entities
  - it is not possible to tell from this map why these migration patterns exist
78. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)
79. More specifically, this map shows all of the following, EXCEPT:
- Most migration occurs from north to south and west to east
  - Nigeria and the Ivory Coast are the principle sites of immigration
  - Guinea is the main source of emigrants in West Africa
  - Most migration occurs across several countries rather than from one country to its neighbor
80. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)
81. Which migration stream is the largest?
- from Niger to Nigeria
  - from Ghana to Nigeria
  - from Ivory Coast to Mali
  - from Gambia to Senegal
  - from Guinea to Sierra Leone
82. Please indicate how confident you are of your answer.
- 1 (low)
  - 2
  - 3
  - 4
  - 5 (high)

### Spatial Visualization

83. In the last two years how frequently have you had to use spatial visualization skills?
- very frequently
  - frequently
  - sometimes
  - rarely
  - very rarely

The red wooden block on your table has an A printed on one of its faces. The remaining faces are labeled 1-5 with stick-on dots. Use this block to answer the following questions.

84. Which diagram matches the real block?

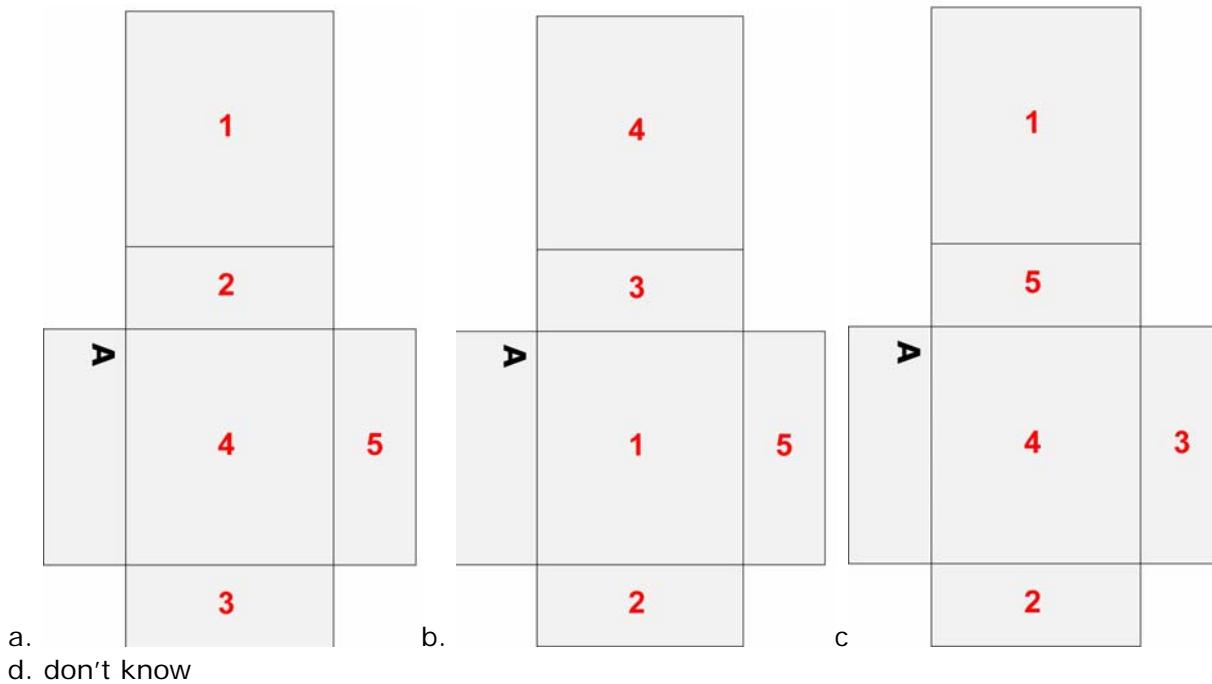


e. don't know

85. Please indicate how confident you are of your answer.

- a. 1 (low)
- b. 2
- c. 3
- d. 4
- e. 5 (high)

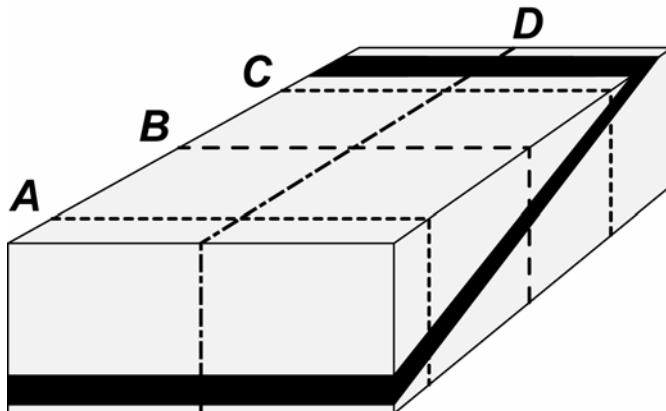
86. If the block was a small cardboard box, we could cut along its edges and flatten it. Which diagram matches the real block?



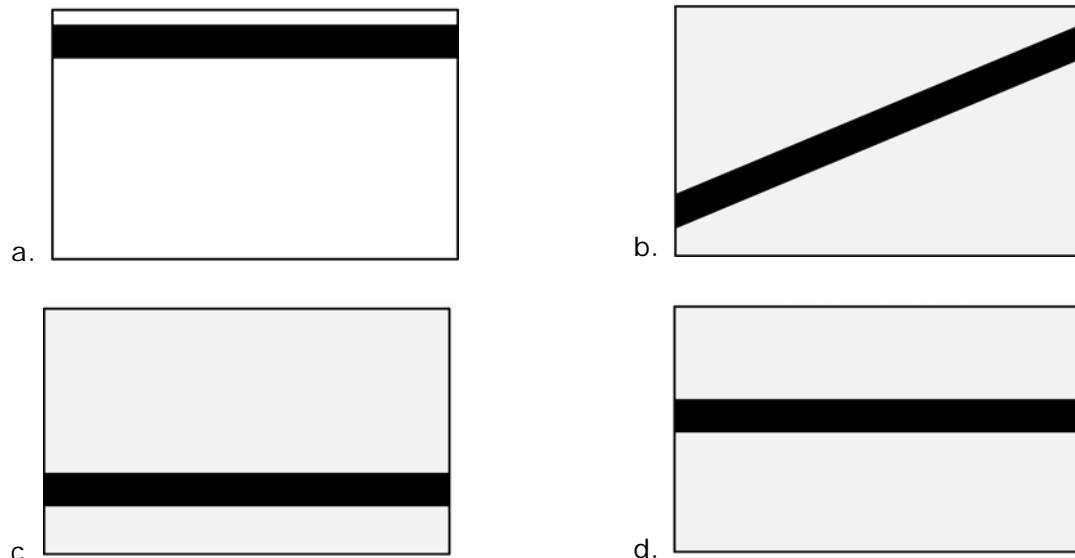
87. Please indicate how confident you are of your answer.

- a. 1 (low)
- b. 2
- c. 3
- d. 4
- e. 5 (high)

88. The diagram below is a perspective drawing of a solid block with a dipping plane running through it. Below the diagram are four cross-sections, i.e. vertical cuts through the block, along the dashed lines A-D. (Note the cross-sections are not scaled to the block size rather they are all drawn to the same size.)



1. Which diagram matches cross-section A?



e. don't know

89. Please indicate how confident you are of your answers.

- a. 1 (low)
- b. 2
- c. 3
- d. 4
- e. 5 (high)