

**Mathematics Attitudes, Skills, & Knowledge Survey  
(MASKS)  
Level 1 Form C**

Directions to Students:

Do not open this booklet until you are told to do so. Please respond to the following items by marking the best answer on your answer sheet using a #2 pencil. Please do not write on this survey. Scratch paper will be provided on request. If you do not understand what is being asked in an item, please ask the survey administrator for clarification.

Calculators are not permitted on this exam.

***Please Do Not Write On This Test Booklet***



Arizona Collaborative for Excellence in the Preparation of Teachers  
Supported by the National Science Foundation under Grant DUE-0084434  
January 2001

1. Which best describes your race or ethnic background?
  - A. American Indian
  - B. Asian/Pacific Islander
  - C. Hispanic
  - D. Black
  - E. Other
  
2. What is the highest level of education your mother obtained?
  - A. did not finish high school
  - B. high school graduate
  - C. some education after high school
  - D. college graduate
  - E. I don't know
  
3. What is the highest level of education your father obtained?
  - A. did not finish high school
  - B. high school graduate
  - C. some education after high school
  - D. college graduate
  - E. I don't know

Use the following key to indicate whether you agree/disagree with items 4 – 10.

A. strongly agree   B. agree   C. not sure   D. disagree   E. strongly disagree

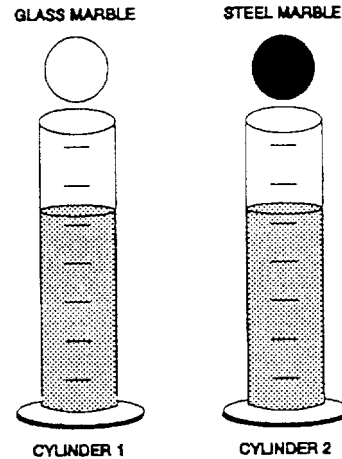
4. Math is one of my favorite subjects.
  
5. Math is mostly rules, procedures, and formulas.
  
6. The ability to identify a pattern increases with the amount of data collected.
  
7. I try hard to make sense out of math problems.
  
8. A variable is a quantity that never changes.
  
9. If I don't get the correct answer quickly to a math problem, I give up.
  
10. Identifying relationships between quantities is an important part of math.

11. To the right are drawings of two cylinders filled to the same level with water. The cylinders are identical in size and shape.

Also shown at the right are two marbles, one glass and one steel. The marbles are the same size but the steel one is much heavier than the glass one.

When the glass marble is put into Cylinder 1 it sinks to the bottom and the water level rises to the 6th mark. If we put the steel marble into Cylinder 2, the water will rise

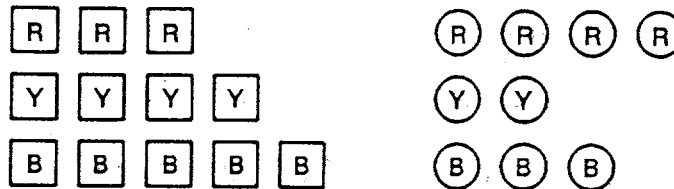
- A. to the same level as it did in Cylinder 1
- B. to a higher level than it did in Cylinder 1
- C. to a lower level than it did in Cylinder 1



12. because

- A. the steel marble will sink faster.
- B. the marbles are made of different materials.
- C. the steel marble is heavier than the glass marble.
- D. the glass marble creates less pressure.
- E. the marbles are the same size.

13. Three red square pieces of wood, four yellow square pieces, and five blue square pieces are put into a cloth bag. Four red round pieces, two yellow round pieces, and three blue round pieces are also put into the bag. All the pieces are then mixed about. Suppose someone reaches into the bag (without looking and without feeling for a particular shape piece) and pulls out one piece.



What are the chances that the piece is a red round or blue round piece?

- A. can not be determined
- B. 1 chance out of 3
- C. 1 chance out of 21
- D. 15 chances out of 21
- E. 1 chance out of 2

14. because
- A. 1 of the 2 shapes is round.
  - B. 15 of the 21 pieces are red or blue.
  - C. there is no way to tell which piece will be picked.
  - D. only 1 of the 21 pieces is picked out of the bag.
  - E. 1 of every 3 pieces is a red or blue round piece.

15. A student put a drop of blood on a microscope slide and then looked at the blood under a microscope. As you can see in the diagram below, the magnified red blood cells look like little round balls. After adding a few drops of salt water to the drop of blood, the student noticed that the cells appeared to become smaller.



Magnified Red Blood Cells

After Adding Salt Water

This observation raises an interesting question: Why do the red blood cells appear smaller?

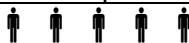
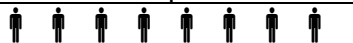


Here are two possible explanations: I. Salt ions ( $\text{Na}^+$  and  $\text{Cl}^-$ ) push on the cell membranes and make the cells appear smaller. II. Water molecules are attracted to the salt ions so the water molecules move out of the cells and leave the cells smaller.


To test these explanations, the student used some salt water, a very accurate weighing device, and some water-filled plastic bags, and assumed the plastic behaves just like red-blood-cell membranes. The experiment involved carefully weighing a water-filled bag in a salt solution for ten minutes and then reweighing the bag.

What result of the experiment would best show that explanation I is probably wrong?

- A. the bag loses weight
  - B. the bag weighs the same
  - C. the bag appears smaller
16. What result of the experiment would best show that explanation II is probably wrong?
- A. the bag loses weight
  - B. the bag weighs the same
  - C. the bag appears smaller

Use the table and given information to answer questions 17 and 18. (NAEP #5, C section 4, accession number HW000863)

	1980 Population	1990 Population
Town A		
Town B		

 = 1,000 people

In 1980, the populations of town A and town B were 5,000 and 6,000 respectively. The 1990 populations of town A and town B were 8,000 and 9,000 respectively.

17. Brian claims that from 1980 to 1990 the populations of the two towns grew by the same amount. Which of the following arguments could be how Brian could mathematically justify his claim.
- A. The two towns grew by the same amount because they both grew by 3,000 people.
  - B. The two towns grew by the same amount because Town A had fewer people to start with.
  - C. The two towns grew by the same amount because they both grew larger during the ten years from 1980 to 1990.
  - D. There is not enough information given to justify Brian's claim.
18. Darlene claims that from 1980 to 1990 the population of town A had grown more. Which of the following arguments could be how Darlene could mathematically justify her claim.
- A. Town A grew more because it started with a smaller amount in 1980.
  - B. Town A grew more because it is catching up in population to Town B.
  - C. Town A grew at a greater percentage rate than Town B when compared to their 1980 populations.
  - D. There is not enough information given to justify Darlene's claim.
19. The table represents a relation between  $x$  and  $y$ . What is the missing number in the table? (TIMMS pop. 2 J18)

- A. 2
- B. 3
- C. 4
- D. 5
- E. 6

$x$	$y$
1	1
2	?
4	7
7	13

For problems 20 and 21 refer to the following information.

Mary is interested in leasing or buying a particular car model. She has determined that the cost of leasing this car for 4 years is  $0.78p + 450$ , where  $p$  is the selling price. Mary has also determined that the cost of buying this car, including finance charges, is  $1.2p + 80$ . At the end of 4 years, when the car is paid off, it can be sold for  $0.4p$ .

20. Mary decided to buy the car at a selling price of \$20,000. She kept the car for 4 years and sold the car to recover some of the costs. If Mary had decided to lease the same car for 4 years, what amount of money would she have saved? (like NAEP C Section 4, accession number AP003210)

- A. \$8000
- B. \$8030
- C. \$50
- D. \$30

21. For the particular car model that Mary is interested in, determine the selling price for which the car costs the same to buy and resell at the end of 4 years as it costs to lease the car for 4 years.

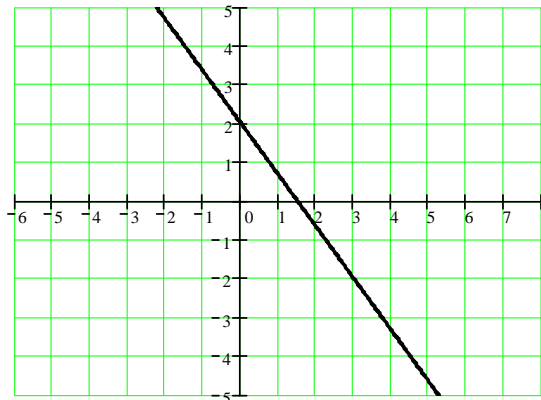
- A. \$16050
- B. \$18500
- C. \$16080
- D. \$24080

22. A rubber ball rebounds to half the height it drops. If the ball is dropped from a rooftop 18 m above the ground, what is the total distance traveled by the time it hits the ground the third time? (TIMMS pop. 2 L11)

- A. 31.5 m
- B. 40.5 m
- C. 45 m
- D. 63 m

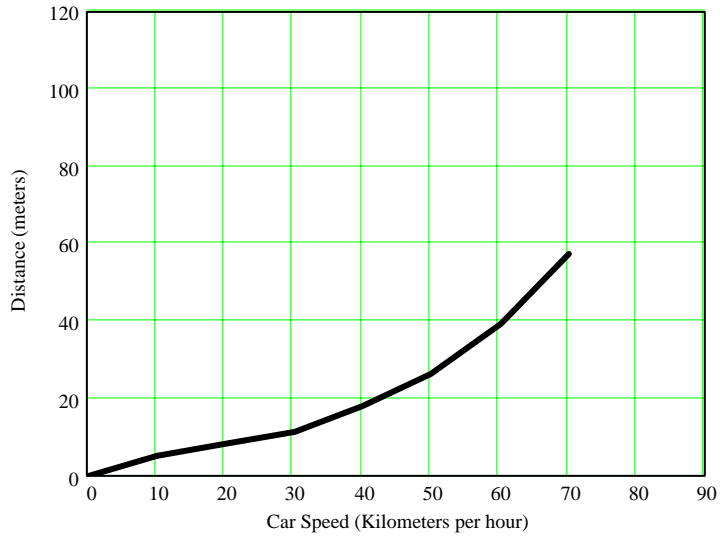
23. What is the approximate slope of the line graphed below?

- A.  $\frac{3}{4}$
- B.  $-\frac{3}{4}$
- C.  $\frac{4}{3}$
- D.  $-\frac{4}{3}$
- E. 1



For problems 24 and 25 refer to the following information.

The graph shows distance traveled before coming to a stop after the brakes are applied for a typical car traveling at different speeds.



24. A car traveling on a highway stopped 30 meters after the brakes were applied. About how fast was the car traveling? (TIMMS pop. 2 O1)
- A. 10 km per hour
  - B. 48 km per hour
  - C. 55 km per hour
  - D. 70 km per hour
25. According to the graph above, it would take a car traveling at 70 kilometers per hour about how far to stop?
- A. 42 meters
  - B. 52 meters
  - C. 60 meters
  - D. 80 meters