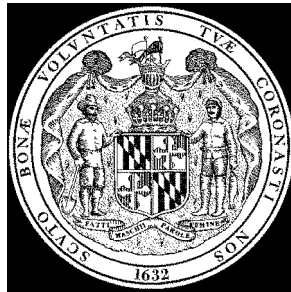


Maryland

High School Assessment Program



Algebra

Prototype Items
1998-1999

Directions

The questions in this booklet are samples of the kinds of questions that might appear on future Algebra tests for the Maryland High School Assessment. There are three types of test questions: multiple-choice, student-produced response, and open-ended. You will be provided with separate directions for the student-produced response questions. Some of the open-ended questions require short written answers. Other questions require longer written answers.

You should do your best to answer each question completely and correctly. You may need to use more or less time than is expected to answer each question. You should write your answer within the available space. You may not need to use all of the lines that are provided for writing your answer.

The answer choices for the multiple-choice questions are labeled ABCD or FGHI. If your teacher has directed you to write your answers in the test booklet, then completely fill in the bubble to indicate your answer choice. If you are using a separate piece of paper to write your answers, be sure to write the letter that is next to the answer choice you choose.

Algebra

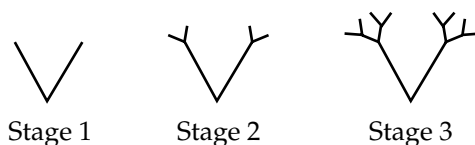
1 Look at the table below.

x	y
-1	7
0	3
1	-1
2	-5

Which equation describes the relationship between x and y ?

- Ⓐ $y = x + 3$
- Ⓑ $y = x - 4$
- Ⓒ $y = 4x - 3$
- Ⓓ $y = -4x + 3$

- 2** Fractals are patterns that are used in science to understand various forms in nature, including the branching structures of trees. The pattern starts with two branching line segments (Stage 1). Two new branches are then added to the end of each previous branch.



- In the space below, draw the branch structure for Stage 4.

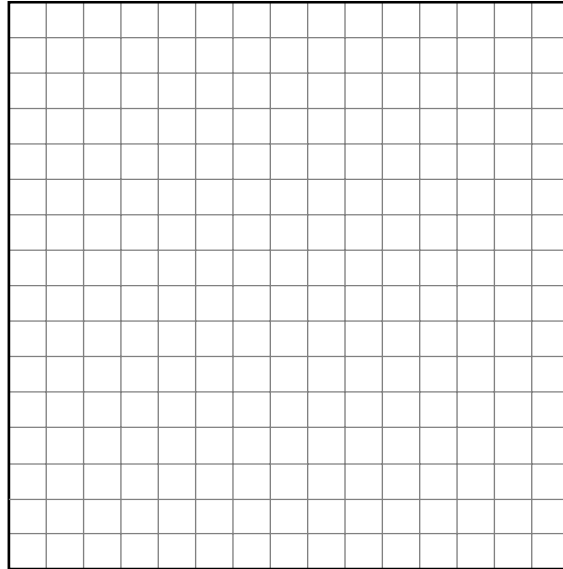
Stage 4

- Complete the table below to show the number of new branches added at each of the first 6 stages.

FRACTAL PATTERN

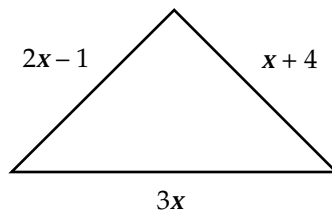
Stage Number	Number of New Branches
1	2
2	4
3	8
4	
5	
6	

- Graph the number of new branches as a function of the stage number on the grid.



- Should the points on your graph be connected? Justify your answer.

- 3** The relationship between the three sides of a triangle is shown in the diagram below.



If the perimeter of the triangle is 24 inches, what is the value of x ?

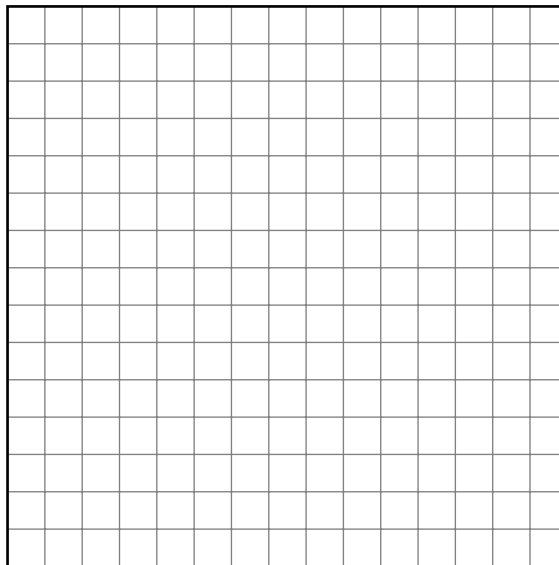
- A $3\frac{1}{6}$
- B $3\frac{1}{2}$
- C $4\frac{1}{2}$
- D $4\frac{5}{6}$

4

The Ride Right Cab Company charges \$2.15, plus \$0.50 per mile for a cab ride. The Flyer Cab Company charges \$1.25, plus \$0.65 per mile.

- For each company, write an equation that represents the total cost of a cab ride. Let t be the total cost of the cab ride and m be the number of miles driven.

- On the grid below, graph the equations you wrote.



-
- **For what distance would the cost of a cab ride be the same for both companies? Explain how you determined the answer. Use words, symbols, or both in your explanation.**

- **What is the cost for a ride of this distance?**

5

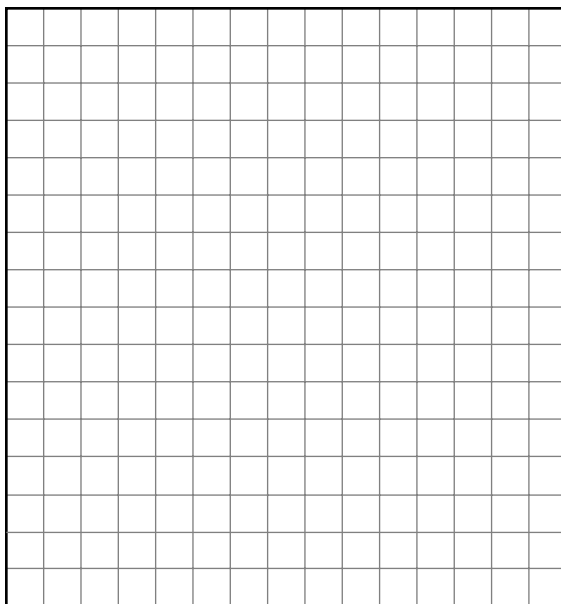
Hanz and Mario went to a sale at a music store where all CDs were one price and all cassettes were another price. Hanz bought 2 CDs and 2 cassettes for \$40, while Mario bought 1 CD and 4 cassettes for \$44.

The equations below represent these purchases, where x is the cost of a CD and y is the cost of a cassette.

$$2x + 2y = 40$$

$$x + 4y = 44$$

- What are the costs of a single CD and a single cassette? Solve the system of equations by either constructing a graph on the grid or by using an algebraic process. Explain how you determined the costs. Use words, symbols, or both in your explanation.



- 6** Sarah has \$135 in her savings account. Tracy has \$150 in her savings account. Each week Sarah saves \$8 and Tracy saves \$5. After how many weeks will they each have the same amount of money?

	0	0	0	
.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

- 7** All 15 students in Joe's English class must give an oral report. The teacher randomly selects 1 student each day to present his or her report. If by the end of the third day Joe has not been selected, what is the probability that the teacher will select Joe on the fourth day?

	0	0	0	
.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

8

A small town experienced a population boom. The table below shows the population in the town from 1990 to 1997.

POPULATION GROWTH

Year	Population
1990	113
1991	197
1992	264
1993	331
1994	415
1995	481
1996	560
1997	641

- Find the equation for the line of best fit. Explain how you determined the line of best fit. Use words, symbols, or both in your explanation.

- Use the equation you found to estimate the town's population in 2005. Explain how you determined this estimate. Use words, symbols, or both in your explanation.



9

Look at the sign below.



Which equation below represents the total cost for renting and returning a rowboat undamaged? Let c be the total cost in dollars and t be the time in hours.

- Ⓐ $c = 5t + 100$
- Ⓑ $c = 500t$
- Ⓒ $c = 100t + 5$
- Ⓓ $c = 5t$

- 10** The table below shows statistical measures for the number of hours per week several students watched television over a 9-week period.

HOURS OF TELEVISION VIEWING

	Mean	Median	Mode	Maximum Number of Hours	Minimum Number of Hours
Student A	16	16	15	18	14
Student B	9	10	6	14	5
Student C	18	18	9	28	6
Student D	14	12	12	16	8

Which student was most consistent in the number of hours of television watched from week to week?

- F Student A
- G Student B
- H Student C
- J Student D

11

A random sample of 100 students at Heritage High School voted on a school mascot. The table below shows the results of the vote.

MASCOT VOTES

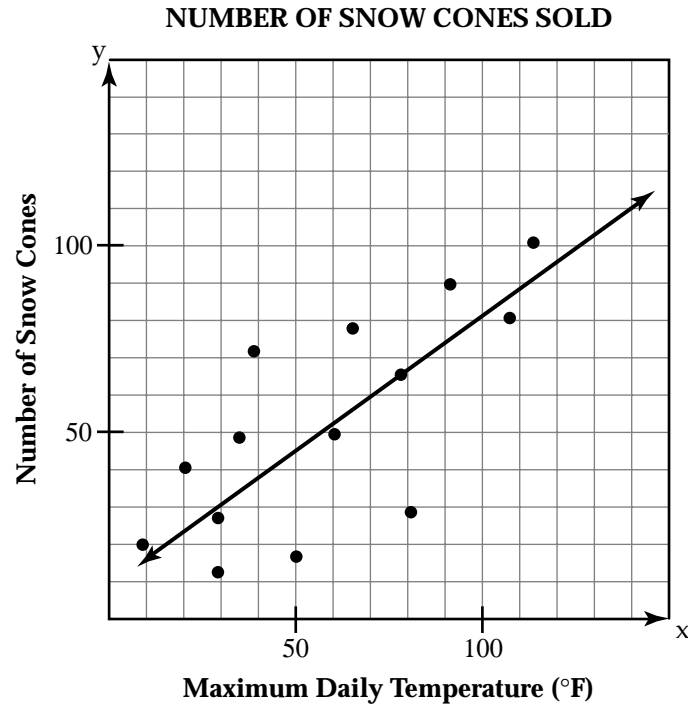
Mascot	Tiger	Lion	Dolphin	Hawk
Number of Votes	19	22	17	42

The total population of the school is 1,550. Predict how many students at Heritage High School want the mascot to be the lion.

- A 22
- B 42
- C 341
- D 651

12

The graph below shows a line of best fit for data collected on the number of snow cones sold as a function of the maximum daily temperatures.



Use the line of best fit to predict the number of snow cones that would be sold on a day with a maximum temperature of 90° .

60

Ⓕ

72

Ⓒ

82

Ⓗ

90

Ⓙ