

Mathematics

SESSION 1

You may use your reference sheet during this session.

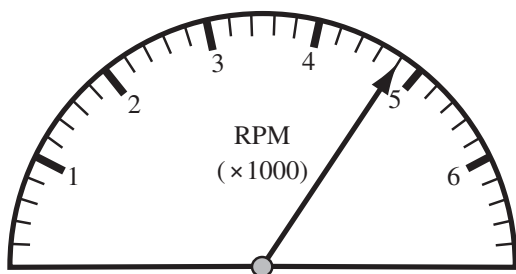
You may **not** use a calculator during this session.



DIRECTIONS

This session contains fifteen multiple-choice questions, five short-answer questions, and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

- 1 The figure below shows an RPM gauge.



How many RPMs is the gauge registering?

- A. 44
- B. 48
- C. 4080
- D. 4800

- 2 Which of the following statements is **false**?

- A. $(-12)(-12)(-12) = 3(-12)$
- B. $12(4 - 1) = 12(4) - 12(1)$
- C. $12 + (4 - 1) = (12 + 4) - 1$
- D. $-12 + 12 = 12 + (-12)$

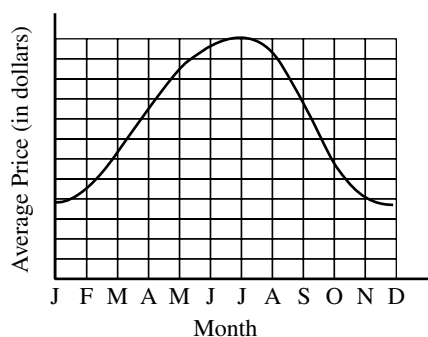
- 3 The chart below shows the average monthly price per share of HiTek stock for each month in 2001.

2001 HiTek Stock Prices

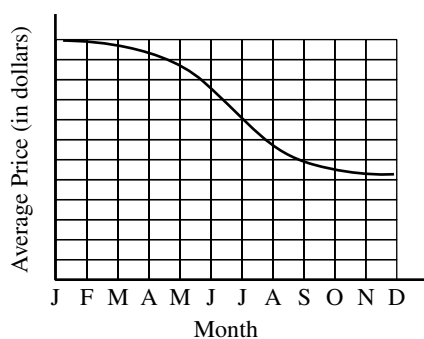
Month	January	February	March	April	May	June	July	August	September	October	November	December
Average Price (in \$)	22.61	24.25	31.02	27.31	29.92	33.10	36.14	35.50	34.01	31.05	36.20	40.12

Which of the following curves **best** models the general behavior of the stock's price for last year?

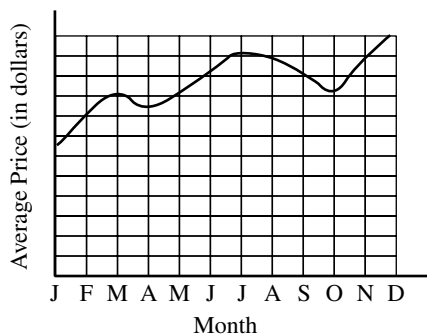
A.



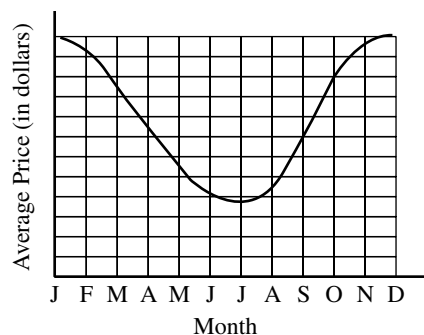
C.



B.



D.



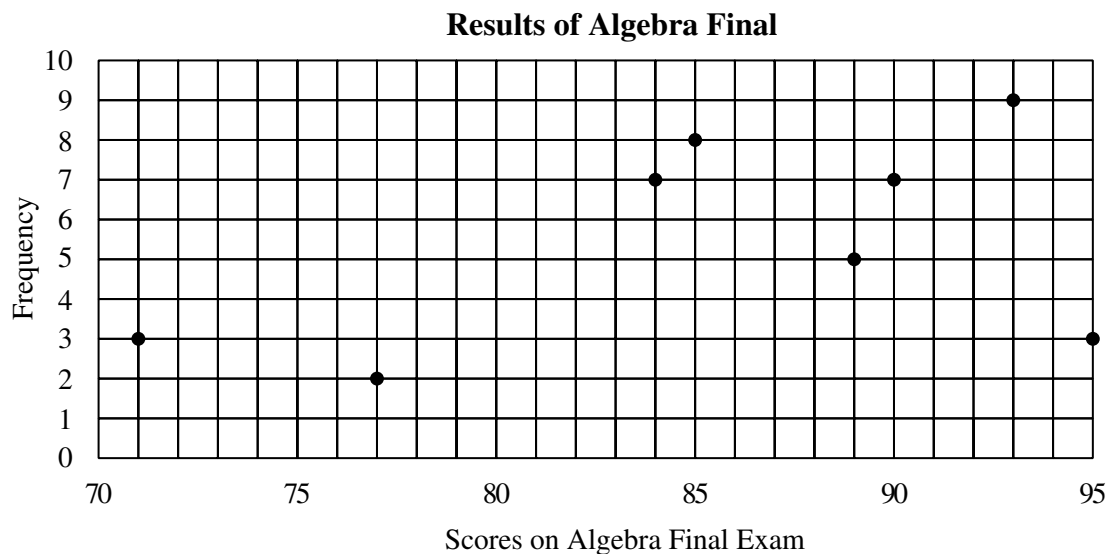
- 4 If $3x + y = 6$, what is the value of $6x + 2y$?

A. 6
B. 8
C. 12
D. 16

- 5 A survey is conducted to find the most popular food among eighth-grade students at a school. Which of the following sampling methods would give the **most** accurate results?

A. choose every fourth student in an alphabetical list of all eighth-grade students
B. choose every eighth-grade teacher and every eighth-grade parent
C. choose every fourth student in an alphabetical list of all eighth-grade girls
D. choose every eighth-grade student athlete

- 6 The graph below shows the frequency of test scores on the algebra final exam.



What is the **mode** of the algebra final exam scores?

A. 88
B. 89
C. 93
D. 95

Questions 7 and 8 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

- 7 What is the y-intercept of the graph represented by the equation below?

$$y = \frac{4}{5}x - 2$$

- 8 The stem-and-leaf plot below shows the ages of the people who bought skateboards at a store during a sale.

Ages of People

Stem	Leaf
1	1 3 4 5 5 6 6 6 8
2	0 1 7 8
3	9
4	3 6
6	5 5
7	1

Key
6 2 = 62

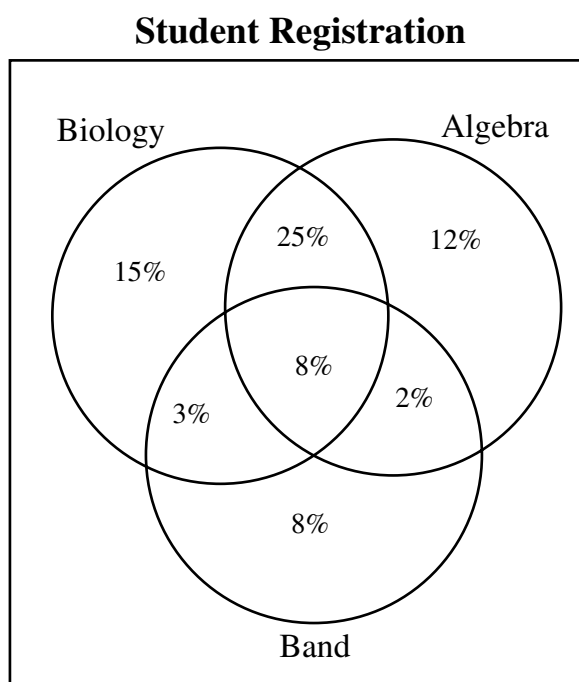
What is the median age of the people who bought skateboards during the sale?

Question 9 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 9 in the space provided in your Student Answer Booklet.

- 9 At student registration, eighth-grade students selected the courses they would be taking next year as ninth graders. The counselor made the diagram below that shows a relationship among the percentages of students who chose to take Biology, Algebra, and/or Band.



- According to the diagram, what percent of the eighth-grade students will be taking **all three** courses, Biology, Algebra, and Band, next year?
- What percent of the eighth-grade students will be taking Algebra and Biology, but **not** Band, next year?
- If 900 students signed up to take courses, how many will **not** be taking Biology, Algebra or Band? Show or explain your work.

Mark your answers to multiple-choice questions 10 through 18 in the spaces provided in your Student Answer Booklet.

- 10 If $y + 5$ is an even integer, which of the following could be the value of y ?

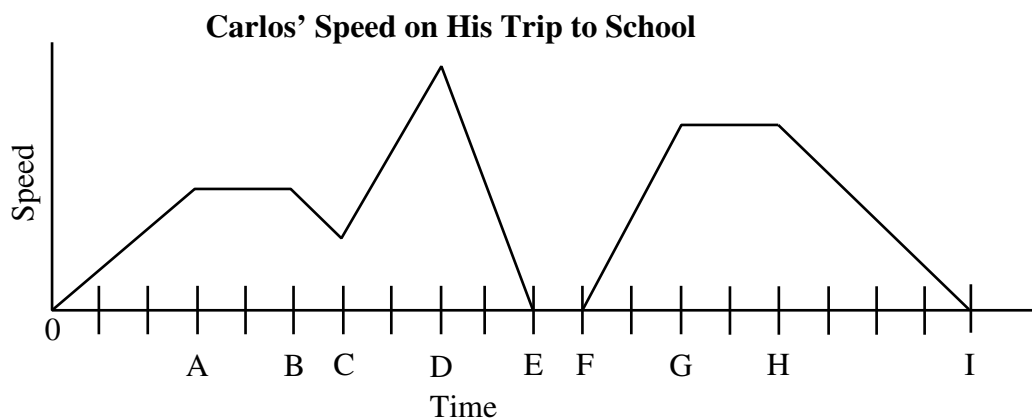
A. -2
B. -1
C. 0
D. 2

- 11 Which steps could be used to solve this equation?

$$\frac{2}{3}x + 9 = 15$$

- A. Subtract 9 from both sides, then multiply both sides by the reciprocal of $\frac{2}{3}$.
B. Subtract 9 from both sides, then divide both sides by the reciprocal of $\frac{2}{3}$.
C. Multiply both sides by the reciprocal of $\frac{2}{3}$, then subtract 9 from both sides.
D. Divide both sides by the reciprocal of $\frac{2}{3}$, then subtract 9 from both sides.

- 12 The graph below shows Carlos' speed on his trip to school.

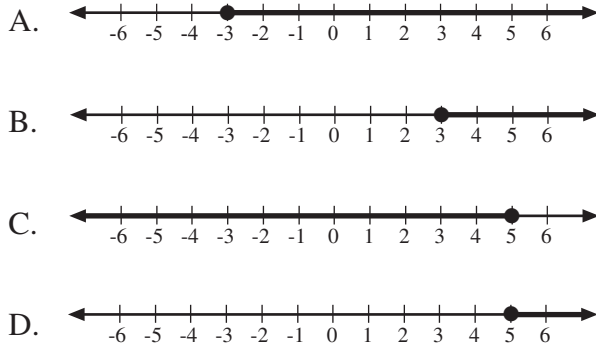


Based on the graph, when is Carlos' speed decreasing most rapidly?

- A. for times between B and C
B. for times between D and E
C. for times between E and F
D. for times between H and I

- 13 Which graph below represents the solution to the inequality below?

$$2(2x - 6) \geq x + 3$$

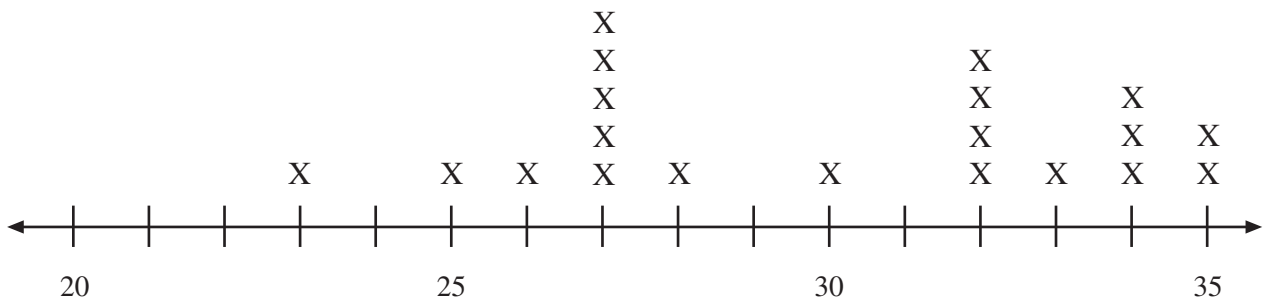


- 14 For what value of n is the equation below true?

$$363,600,000 = 3.636 \times 10^n$$

- A. $n = 3$
 B. $n = 5$
 C. $n = 8$
 D. $n = 10$

- 15 The line plot below represents the number of raisins that Janika's class counted in each of 20 boxes of cereal.



What was the median number of raisins in a box?

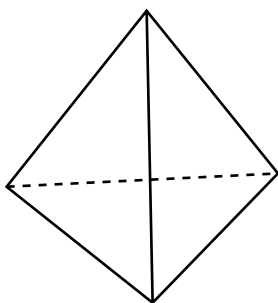
- A. 27
 B. 29
 C. 30
 D. 31

- 16 Mei Ling gave the following description of a three-dimensional figure.

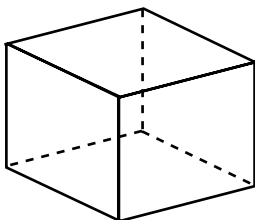
- The solid has 6 faces.
- The solid has 8 vertices.
- The solid has 12 edges.

Which of the following figures matches Mei Ling's description?

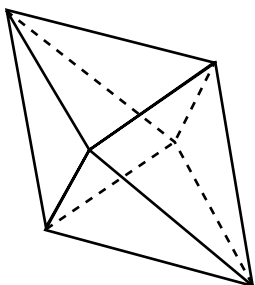
A.



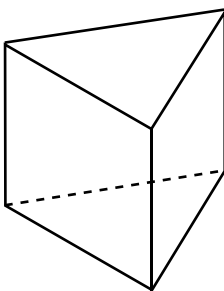
B.



C.



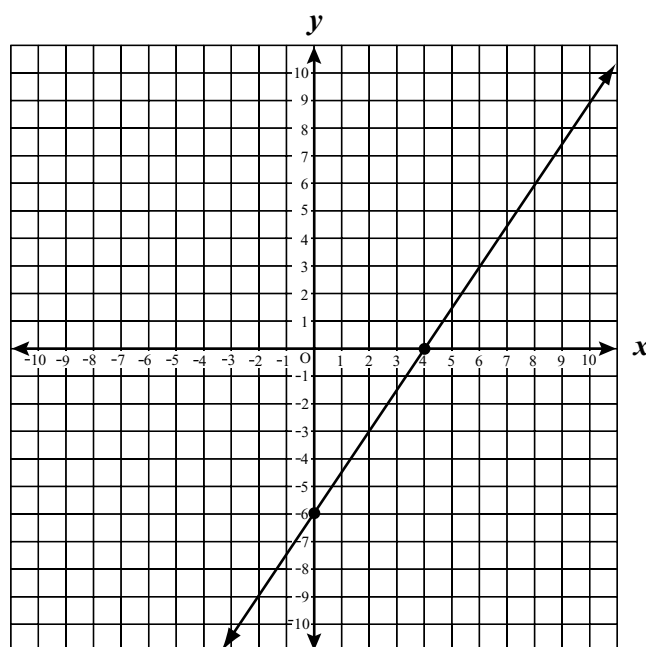
D.



- 17 If $5x - 8 = 7$, what is the value of $5x + 8$?

- A. -7
B. 0
C. 15
D. 23

Use the graph below to answer question 18.

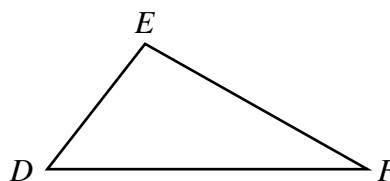
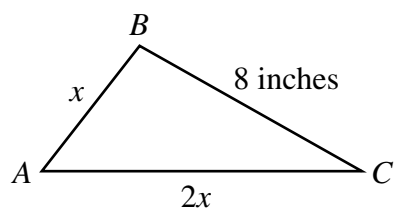


- 18 Which statement **best** describes the slope of the line graphed above?

- A. The slope is -6 .
B. The slope is $-\frac{2}{3}$.
C. The slope is $\frac{3}{2}$.
D. The slope is 4 .

Questions 19, 20, and 21 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

- 19 Triangles ABC and DEF shown below are congruent.



The perimeter of $\triangle ABC$ is 23 inches. What is the length of side \overline{DF} in $\triangle DEF$?

- 20 What is $\frac{3}{4}$ of $1\frac{1}{2}$?

- 21 Write a rule that could be used to show the relationship between x and y in the table below.

x	y
-4	16
-1	1
0	0
3	9
7	49

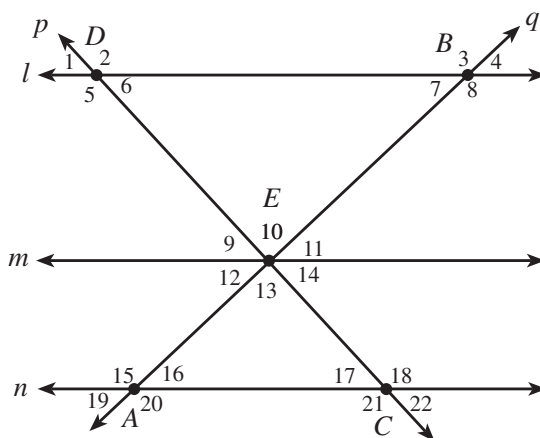
Question 22 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 22 in the space provided in your Student Answer Booklet.

22 In the figure below, the following statements are true.

- Lines l , m , and n are parallel.
- The perpendicular distance from line m to line n is less than the perpendicular distance from line m to line l .
- Lines m , p , and q intersect at point E .
- Lines p and q are perpendicular.
- Angles 6 and 7 are congruent.



- Are triangles DEB and AEC similar? Explain your answer.
- Are triangles DEB and AEC congruent? Explain your answer.
- List the 8 angles whose measures are equal to that of $\angle 2$.
- List all the angles whose measures are equal to that of $\angle 1$.

Mathematics

SESSION 2

You may use your reference sheet during this session.

You may use a calculator during this session.



DIRECTIONS

This session contains fourteen multiple-choice questions and three open-response questions.

Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

- 23 Which of the following numbers has the same value as the expression below?

$$3(0.25)$$

A. $\frac{4}{3}$

B. $\frac{3}{4}$

C. $\frac{12}{1}$

D. $\frac{1}{12}$

- 24 The difference between two temperature readings was 7 degrees. Which of the following could be the two temperature readings?

A. -7° and 1°

B. -4° and 3°

C. -1° and 7°

D. -5° and 12°

- 25 To sell their house, the Fords placed an advertisement in the local newspaper. For one week, they recorded the number of calls they received each day in response to the advertisement in the following chart.

Responses to Advertisement

S	M	T	W	Th	F	Sa
2	5	2	8	10	4	11

What is the **mean** number of calls for the days shown in the chart?

A. 2

B. 5

C. 6

D. 8

- 26 The ratio of boys to girls in Meg's chorus is 3 to 4. If there are 20 girls in her chorus, how many boys are there?

A. 12

B. 15

C. 16

D. 24

- 27 Juan's parents put \$10,000 into a college education savings account at the rate of 6% compounded annually. The chart below shows the value of the original investment at the end of years 1 and 2.

Investment Value			
End of Year 1	End of Year 2	End of Year 3	End of Year 4
\$10,600.00	\$11,236.00		?

If no further deposits or withdrawals are made, what will the value of the original investment be at the end of year 4? Round your answer to the nearest dollar.

- A. \$11,836.00
- B. \$12,436.00
- C. \$12,584.00
- D. \$12,625.00

Questions 28 and 29 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 28 in the space provided in your Student Answer Booklet.

- 28** The table below shows how C , the circumference of a circle, depends on d , its diameter.

d units	C units
1	3.14
2	6.28
3	9.42
4	12.56
\vdots	\vdots
10	31.4

An equation that shows the relationship between the diameter of a circle and its circumference is $C = \pi d$, where 3.14 is used for π .

- What is the circumference of a circle with a diameter of 6 units?
- What is the diameter of a circle with a circumference of 26.69 units?
- On the grid in your Student Answer Booklet, draw a line graph on a coordinate plane showing the relationship between the diameter of a circle and its circumference. Be sure to label the axes.
- Explain how you could use your graph to approximate the circumference of a circle with a diameter of 9 units.

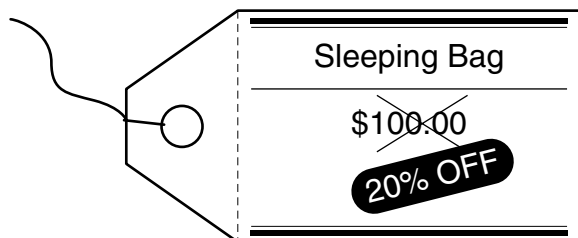
Write your answer to question 29 in the space provided in your Student Answer Booklet.

- 29 Jeremy has been saving money to buy some camping equipment from a store. The chart below shows the prices for some of the equipment he needs.

Camping Equipment Prices

Item	Price
Tent	\$250
Sleeping bag	\$100
Boots	\$55
Cooking kit	\$35

- The camping equipment store is offering a 20% discount this weekend on **each** of the camping items listed in the chart. After the 20% discount, and before tax is added, what is the price of the tent?
- Jeremy must also pay a 7% sales tax for his total purchase. Including the discount and after the tax is added, what will it cost Jeremy to buy one each of the four pieces of equipment in the chart?
- Jeremy has a coupon that will allow him to take an additional 10% off the discounted price of the sleeping bag.



If Jeremy uses the coupon above to buy the sleeping bag, what is the final price of the sleeping bag, before tax is added?

Mark your answers to multiple-choice questions 30 through 38 in the spaces provided in your Student Answer Booklet.

- 30 Which of the following is an irrational number?
- A. $\frac{4}{3}$
- B. $\sqrt{24}$
- C. $\sqrt{81}$
- D. -4.07
- 31 Harry measured all but one angle of a hexagon. The total degree measure for all of the angles he measured was 550° . What is the measure, in degrees, of the remaining angle?
- A. 92°
- B. 120°
- C. 170°
- D. 720°

- 32 The chart below shows the number of restaurant advertisements in a city directory.

Restaurant Advertisements

Type of Restaurant	Number
Chinese	10
Mexican	17
Italian	8
French	5

The telephone numbers of these restaurants are written on separate slips of paper and one is selected at random. What is the probability that the telephone number of an Italian restaurant is selected?

- A. 0.025
- B. 0.125
- C. 0.2
- D. 0.8
- 33 Mari divided 8 by $\frac{2}{3}$. Which operation shown below should produce the same result?
- A. $\frac{8}{1} \cdot \frac{3}{2}$
- B. $\frac{8}{1} \cdot \frac{2}{3}$
- C. $\frac{1}{8} \cdot \frac{2}{3}$
- D. $\frac{1}{8} \cdot \frac{3}{2}$

- 34 A kilometer is about $\frac{6}{10}$ of a mile. If the speed limit along a stretch of highway is 80 kilometers per hour, what is the **approximate** speed limit in miles per hour?
- A. 70
B. 65
C. 50
D. 35
- 35 A recipe for punch uses $3\frac{1}{5}$ ounces of fruit mix to make 4 glasses of punch. Based on this recipe, how many glasses of this punch can be made from a 32-ounce bottle of fruit mix?
- A. 25
B. 28
C. 37
D. 40

- 36 The input-output table below shows values for x and y .

INPUT (x)	OUTPUT (y)
-2	6
2	2
3	6
4	12

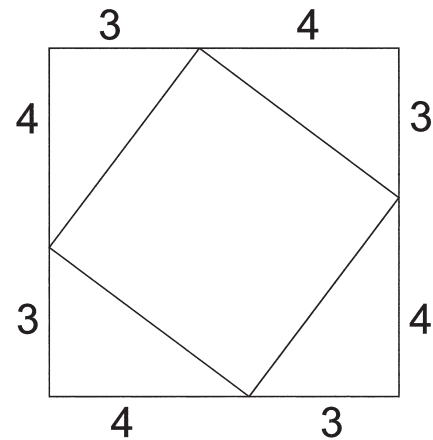
Which equation could represent a rule for the relationship between x and y ?

- A. $y = x^2 - x$
B. $y = x^2 + 2$
C. $y = 2x - 2$
D. $y = -2x + x$

- 37 Guenther drove 260 miles in 5 hours. He has 494 more miles to drive on his trip. If he continues at this same average rate of speed, what will his driving time be for the remainder of his trip?

A. 7.6 hours
B. 9.5 hours
C. 13 hours
D. 14.5 hours

- 38 The figure below shows a square inscribed in a larger square.



What is the area of the smaller square?

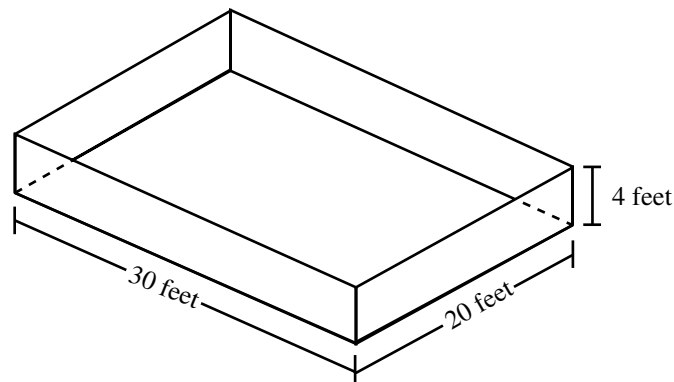
- A. 9 square units
B. 16 square units
C. 25 square units
D. 36 square units

Question 39 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 39 in the space provided in your Student Answer Booklet.

- 39** Alain works for a company that built a goldfish pond for a local university. He has to plaster the interior sides of the pond, which is shaped like a rectangular prism with the dimensions shown in the picture below.



- What is the volume, in cubic feet, of the goldfish pond? Show or explain your work.
- What is the total surface area of the interior sides and bottom of the pond? Show or explain your work.
- If the company charges \$1.50 per square foot to plaster the pond, what will it cost to plaster the 4 interior sides and the bottom of the pond?

Grade 8 Mathematics
Spring 2003 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	170	Measurement	8.M.1	D
2	170	Number Sense and Operations	8.N.8	A
3	171	Data Analysis, Statistics, and Probability	8.D.2	B
4	172	Patterns, Relations, and Algebra	8.P.7	C
5	172	Data Analysis, Statistics, and Probability	8.D.1	A
6	172	Data Analysis, Statistics, and Probability	8.D.3	C
7	173	Patterns, Relations, and Algebra	8.P.6	-2
8	173	Data Analysis, Statistics, and Probability	8.D.2	20 years old
9	174	Data Analysis, Statistics, and Probability	8.D.2	
10	175	Patterns, Relations, and Algebra	8.P.2	B
11	175	Patterns, Relations, and Algebra	8.P.7	A
12	175	Patterns, Relations, and Algebra	8.P.5	B
13	176	Patterns, Relations, and Algebra	8.P.7	D
14	176	Number Sense and Operations	8.N.4	C
15	176	Data Analysis, Statistics, and Probability	8.D.3	D
16	177	Geometry	8.G.7	B
17	177	Patterns, Relations, and Algebra	8.P.7	D
18	177	Patterns, Relations, and Algebra	8.P.5	C
19	178	Geometry	8.G.2	10 inches
20	178	Number Sense and Operations	8.N.12	$\frac{9}{8}$ or equivalent
21	178	Patterns, Relations, and Algebra	8.P.1	$y = x^2$ or $x^2 = y$
22	179	Geometry	8.G.3	
23	180	Number Sense and Operations	8.N.9	B
24	180	Number Sense and Operations	8.N.10	B
25	180	Data Analysis, Statistics, and Probability	8.D.3	C
26	180	Number Sense and Operations	8.N.3	B
27	181	Patterns, Relations, and Algebra	8.P.1	D
28	182	Patterns, Relations, and Algebra	8.P.1	
29	183	Number Sense and Operations	8.N.10	
30	184	Number Sense and Operations	8.N.2	B
31	184	Geometry	8.G.1	C
32	184	Data Analysis, Statistics, and Probability	8.D.4	C
33	184	Number Sense and Operations	8.N.9	A
34	185	Measurement	8.M.2	C
35	185	Number Sense and Operations	8.N.3	D
36	185	Patterns, Relations, and Algebra	8.P.1	A
37	186	Patterns, Relations, and Algebra	8.P.9	B
38	186	Measurement	8.M.3	C
39	187	Measurement	8.M.3	

* Answers are provided here for multiple-choice and short-answer items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's website later this year.