Kendra's Travels – OE

Kendra traveled to Europe and Japan on a business trip. In Europe, she exchanged 300 U.S. dollars for euros and spent 100 euros. She then went to Japan and exchanged her remaining euros for yen. She spent 10,000 yen while in Japan.

The exchange rate during the time she traveled is shown below.

1.00 U.S. Dollar = 0.821774 Euro
1.00 U.S. Dollar = 110.565 Japanese Yen

Kendra will exchange her remaining yen for U.S. dollars. How much money, in U.S. dollars, will she receive? Show your work or explain how you found your answer.

2007 Released Item

Numerical and Proportional Reasoning

Expected Performance 2.2b(2)

Great Pyramid – GI

It is estimated that it took 30 years to construct the Great Pyramid at Giza. The pyramid contains 2,300,000 limestone blocks. If the pyramid was constructed continuously, 24 hours a day for 30 years, how many blocks were placed on the pyramid per hour? Round your answer to the nearest whole block.

2005 Released Item

Measurement & Geometry

Expected Performance 3.1a(1)

Geometric Figure – OE

Delia's drafting teacher gave her these instructions for drawing a geometric figure to be used in a design for a birdhouse.

- draw isosceles $\triangle ABC$ so that $\angle A$ is a right angle
- draw line l through point A that is parallel to BC
- draw line m through point B that is perpendicular to BC
- label a point E at the intersection of lines l and m

a. Draw the geometric figure in the space provided in your answer booklet.

b. Delia was asked the measure of $\angle EBA$. What is the degree measure of $\angle EBA$? Show your work or explain how you found your answer.

2004 Released Item

Numerical and Proportional Reasoning

Expected Performance 2.2b(1)

World Population – GI

In recent years the world's population has increased at a rate of approximately 10,900 people per hour. This number is equal to how many people per second? Round your answer to the nearest whole number.

2006 Released Item

Maple Syrup – GI

To make maple syrup, Ken must boil 40 gallons of maple tree sap to produce one gallon of syrup. Ken sells his maple syrup in containers that hold 1 quart. At that rate, how many **gallons** of maple tree sap must be boiled to make 1 quart of syrup?

2003 Released Item

Boston Marathon – GI

The 104th running of the 26.2 miles Boston Marathon occurred on April 17, 2000.

To qualify for the Boston Marathon, a runner must have a certified time in another marathon of 3 hours and 20 minutes. To the nearest tenth of a minute, what must be the runner's pace (minutes per mile) in order to complete the 26.2 miles in 3 hours and 20 minutes?

2002 Released Item

Fastest Runner – OE

The table shows the average speed of 3 runners.

Runner	Average Speed
Kayla	14.0 miles per hour
Brian	20.0 feet per second
Ricardo	440 yards per minute

Which of these runners is the fastest? Show your work or explain how you found your answer.

2005 Released Item

Numerical and Proportional Reasoning

Expected Performance 2.2a(2)

Bloodhound - GI

The bloodhound, a type of dog, has 4.0×10^9 scent receptors in its nose. A typical human has 1.2×10^7 scent receptors. How many times more scent receptors does a bloodhound have than a human? Round your answer to the nearest whole number.

2007 Released Item

Numerical and Proportional Reasoning

Expected Performance 2.2a(3)

Picnic Food - GI

Each summer, a high school sponsors a picnic for new students, their parents and teachers. Last year, 65 pounds of hamburger patties were cooked to serve between 250 and 300 people. This year, the school expects between 325 and 375 people.

Estimate the number of pounds of hamburger patties that should be ordered.

2007 Released Items

Lunch in Mystic - OE

Martin needs to estimate the cost of a lunch for himself and 12 of his friends at a Mystic restaurant. He knows that:

- the highest priced menu item is $8.85;
- the lowest priced item is $4.35;
- drinks are $0.90 each with free refills;
- everyone will have a $1.75 dessert;
- a 6% sales tax will be added to his bill;
- he will leave the server a 15% tip based on the bill after tax is added; and
- he will pay the bill in cash.

What is a reasonable estimate for the price of the lunch? Show or explain how you arrived at your estimate.

2002 Released Item

Presidential Election – GI

The chart shows the winning candidate in each presidential election from 1960 to 2000. It also shows the candidate who received the most votes in Connecticut.

Presidential Election Year	Winning Candidate	Candidate Receiving Most Votes in Connecticut
1960	Kennedy	Kennedy
1964	Johnson	Johnson
1968	Nixon	Humphrey
1972	Nixon	Nixon
1976	Carter	Ford
1980	Reagan	Reagan
1984	Reagan	Reagan
1988	Bush	Bush
1992	Clinton	Clinton
1996	Clinton	Clinton
2000	Bush	Gore

In what percent of the elections did the candidate receiving the most votes in Connecticut win the election? Round your answer to the nearest whole percent.

2006 Released Item

City Construction – GI

The penalty clause in a road construction contract reads, "The construction contractor must pay a fine of $1500 plus $375 per day for each day that work continues *after* the promised finish date of June 1." If the contractor paid a fine of $10,875, how many days late was the construction job?

2001 Released Item

Katharine Hepburn – GI

For the 2 decades from 1950 to 1969, what was the percent of Hepburn's films for which she was nominated for best actress? Round your answer to the nearest whole percent.

2001 Released Item

Health Club – GI

Two local health and fitness centers, Fitness First and Healthy Life are in your neighborhood. Copi
of their ads are shown below. Use the ads to answer questions 9 and 10.

Fitness First
$49.00/month for the first family member•
plus•
$29.00/month each additional family member•

Healthy Life
$65.00/month for the first family member•
plus•
$21.00/month each additional family member•

. A family pays $128/month at Healthy Life. How many people are in this family?

2001 Released Item

Health Club – GI

Healthy Life plans to increase all of its monthly charges by 20%. What will a family of four expect to pay per month after the increases?

2001 Released Item

Numerical and Proportional Reasoning

Expected Performance 2.2a(1)

Eric's T-shirt Shop – GI

Eric owns a T-shirt shop. Eric has been selling 50 T-shirts each day at a price of $20. He finds that for each $1 reduction in price, he can sell 5 more each day. At what price (in dollars) should he sell the T-shirts in order to maximize his daily income from their sales?

2002 Released Item

Final Exam – OE

Ms. Jackson let her students know that their final exam contained three groups of questions:

- 16 multiple-choice questions, worth $1\frac{1}{2}$ points each;
- 16 short-answer questions, worth $2\frac{1}{2}$ points each;
- 3 essay questions, worth 12 points each.

a. What **percent** of the final exam is each group worth? Show your work or explain how you found your answer.

b. Beatrice has a semester average of 89 before she takes the final. She knows that the final is worth 25% of her total semester average. What is the greatest number of questions Beatrice can miss and still raise her final semester average to at least 90? Show your work or explain how you found your answer.

2006 Released Item

Organism Lengths - OE

Students in a biology class measured and recorded the lengths of different microscopic organisms. The results are recorded in the table below.

Organism Lengths

Organism	Length (millimeters)
A	0.00065
B	4.72×10^{-4}
C	$\frac{8}{10,000}$
D	?

a. A fourth organism (D) was measured and found to be $\frac{1}{40}$ the length of organism B. What was the length of organism D? Show your work or explain how you found your answer.

b. Which of the four organisms in the table was **longest**? Show your work or explain how you found your answer.

2007 Released Item

Numerical and Proportional Reasoning

Expected Performance 2.1a(2)

Eric's T-shirt Shop – GI

On Fridays Eric has a T-shirt special in his shop.

Eric's T-Shirts
Friday Special

Buy 2 shirts at the regular price of $20 each
Get the third shirt at $\frac{1}{2}$ price

Eric's Friday special is equivalent to what single discount on 3 shirts? Give your answer to the nearest whole percent.

2002 Released Item

Machine Part - OE

Daniel and Sheri both work at a Connecticut company that manufactures machine parts. During quality control testing they must check the thickness of a machine part. The thickness of the part should be 0.06 mm, and be within an acceptable range of plus or minus 10% of 0.06 mm. The chart shows a quality control sample of ten parts and their thicknesses.

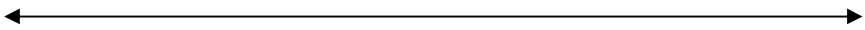
Part	Thickness (mm)
A	0.056
B	0.069
C	0.057
D	0.061
E	0.047
F	0.070
G	0.059
H	0.053
I	0.061
J	0.062

a) What are the minimum and maximum acceptable thicknesses for the machine part? Show your work or explain how you found your answer.

b) How many of the parts in the sample above are within the acceptable range for the thickness of a part? Show your work or explain how you found your answer.

c) Graph the range of acceptable thicknesses for the part on the number line in your answer book.

c.)



2003 Released Item

Numerical and Proportional Reasoning

Expected Performance 2.1a(1)

Water Quality Data - OE

The South Central Connecticut Regional Water Authority monitors the water quality throughout south central Connecticut. The table shows recent data on the amounts of certain pollutants found in Lake Gaillard.

Lake Gaillard Water Quality Data

Pollutant	Maximum Allowed (in mg/L)	Amount of Pollutants Found in a Sample of Lake Water (in mg/L)
Barium	2.0	0.01
Cadmium	0.005	0.0
Chloride	250.0	9.0
Fluoride	4.0	0.99
Iron	0.3	0.012
Manganese	0.05	0.027
Mercury	0.002	0.0

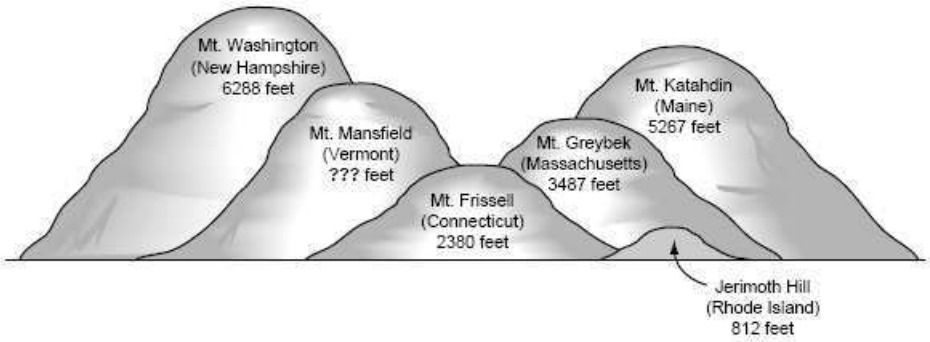
One environmental scientist recommends that the maximum allowable levels of all the pollutants found in the lake be reduced to **10% of their present levels**. If this reduction is made, which pollutants found in the lake would be *greater* than the reduced maximum allowable level recommended by this scientist? Show or explain how you determined your answer.

2002 Released Item

Highest Points in New England – GI

The drawing shows the highest point of land in each New England state.

The Highest Point in Each New England State



0. Based on the information in the drawing, what is the approximate height in feet of the highest point of land in Vermont?

2002 Released Item

Industrial Electricity Use – OE

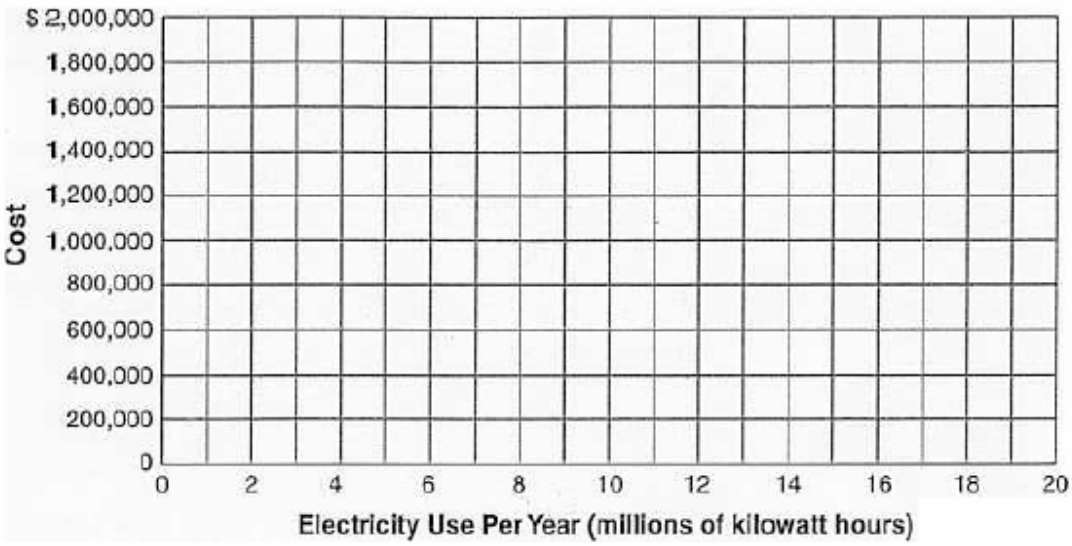
A utility company offers electricity to industrial users at a rate of 8 cents per kilowatt-hour. The company also offers a fixed annual rate of $1,200,000 for unlimited use of electricity.

a. Graph each of these two rates as a line on the grid in your answer booklet.

b. Explain why a large industrial user of electricity would choose to pay the fixed annual rate. Use the information in your graph to support your answer.

Industrial Electricity Use

a.



2002 Released Item

Algebraic Reasoning: Patterns and Functions

Expected Performance 1.3a(3)

Health Club – OE

Two local health and fitness centers, Fitness First and Healthy Life are in your neighborhood. The copies of their ads are shown below:

Fitness First
$49.00/month for the first family member•
plus•
$29.00/month each additional family member•

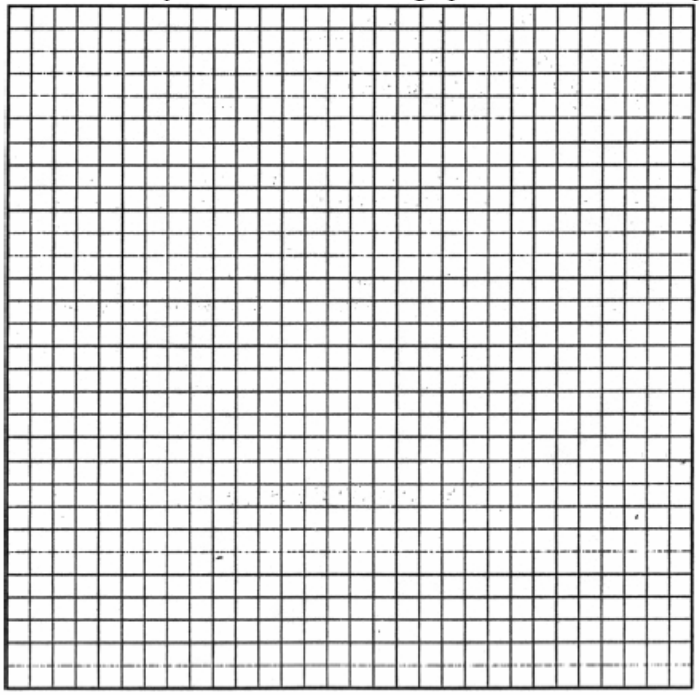
Healthy Life
$65.00/month for the first family member•
plus•
$21.00/month each additional family member•

a.- Write an equation in your answer booklet that shows C, the total monthly charges for a family with N members at Fitness First.

b. Write an equation in your answer booklet that shows C, the total monthly charges for a family with N members at Healthy Life.

c.- Find the number of family members for which the charges for the two health and fitness centers are equal.

The grid is provided in case you would like to use a graphical solution for this problem.



2001 Released Item

Pressure – GI

Underwater pressure can be found using the formula

$$p = 1 + \frac{d}{33}$$

where p is the pressure (in atmospheres), and d is the depth of the water in feet.

If a scuba diver is experiencing 3.4 atmospheres of pressure, what is the depth of the diver? Round your answer to the nearest whole foot.

2006 Released Item

Canadian Dollars – GI

On Monday, the following equation gave the exchange rate between the value of the Canadian dollar (C) and the U.S. dollar (U):

$$C = 1.5U$$

On Tuesday, the exchange rate had changed to the following equation:

$$C = 1.6U$$

On Monday, Bradley changed $40 U.S. to Canadian dollars at Monday's exchange rate. He did not spend any of the money, and on Tuesday he changed it back to U.S. dollars at Tuesday's exchange rate. How much money (in U.S. dollars) did Bradley LOSE in this process?

2006 Released Item

History Tests – GI

In the course of a semester, a history teacher gave his class two tests (with scores represented by T_1 and T_2) and two quizzes (with scores represented by Q_1 and Q_2). When he prepared the final grades for each student's report card, he used the formula

$$\text{Report Card Grade} = \frac{2T_1 + 2T_2 + Q_1 + Q_2}{6}$$

A student received the grades 84 and 91 on his two tests and 78 and 82 on his two quizzes. What was his final report card grade?

2004 Released Item

Algebraic Reasoning: Patterns and Functions

Expected Performance 1.2a(4)

Used Car Values – OE

The value of a $12,800 car decreases according to the formula

$$V = 12{,}800(0.8)^n$$

where n is the number of years since it was purchased.

a. Use the formula to complete the table in your answer booklet.

b. If you bought a $12,800 car, how many years would it take for its value to first fall below $2000? Show or explain how you got your answer.

Years Since Purchase	Value of Car (to the nearest dollar)
1	
2	
5	
10	
15	
20	

2002 Released Item

Algebraic Reasoning: Patterns and Functions

Expected Performance 1.3a(2)

Stopping Distance – GI

The relationship between the distance d, in feet, required to stop a vehicle and s, the speed in miles per hour that the vehicle was traveling, is given by the equation

$$d = \frac{0.0155s^2}{f}$$

where f represents the coefficient of friction between the tires and the road.

It took a car 205 feet to stop. What speed was the car traveling? Use $f = 0.3$ and round your answer to the nearest mile per hour.

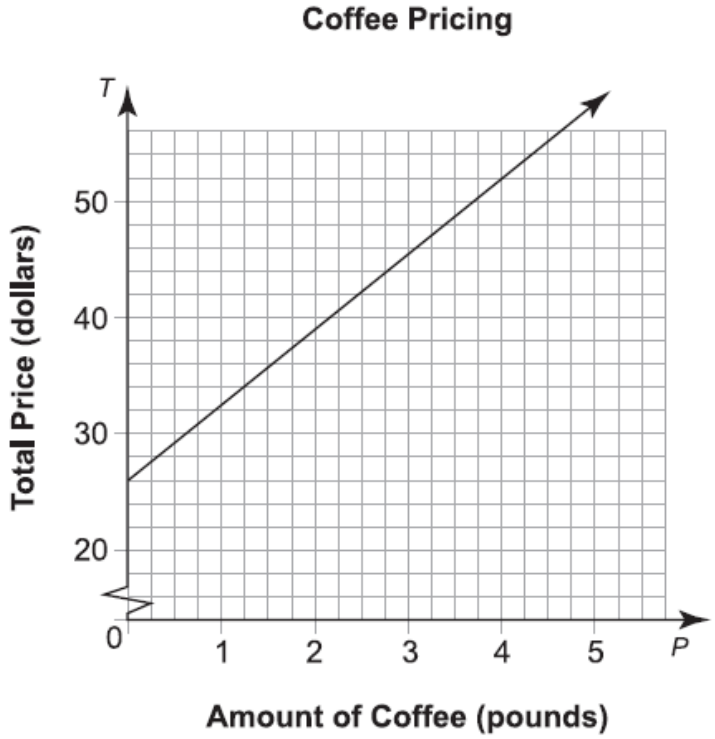
2007 Released Item

Algebraic Reasoning: Patterns and Functions

Expected Performance 1.2a(2)

Coffee Special – GI

A store sells gourmet coffee at a discount with the purchase of a coffee maker that costs $26.00. The graph below shows the total price in dollars, T, for a coffee maker plus the amount of coffee in pounds, P.



Carl plans to buy a coffee maker and four pounds of coffee. How much does the store charge per pound for the gourmet coffee?

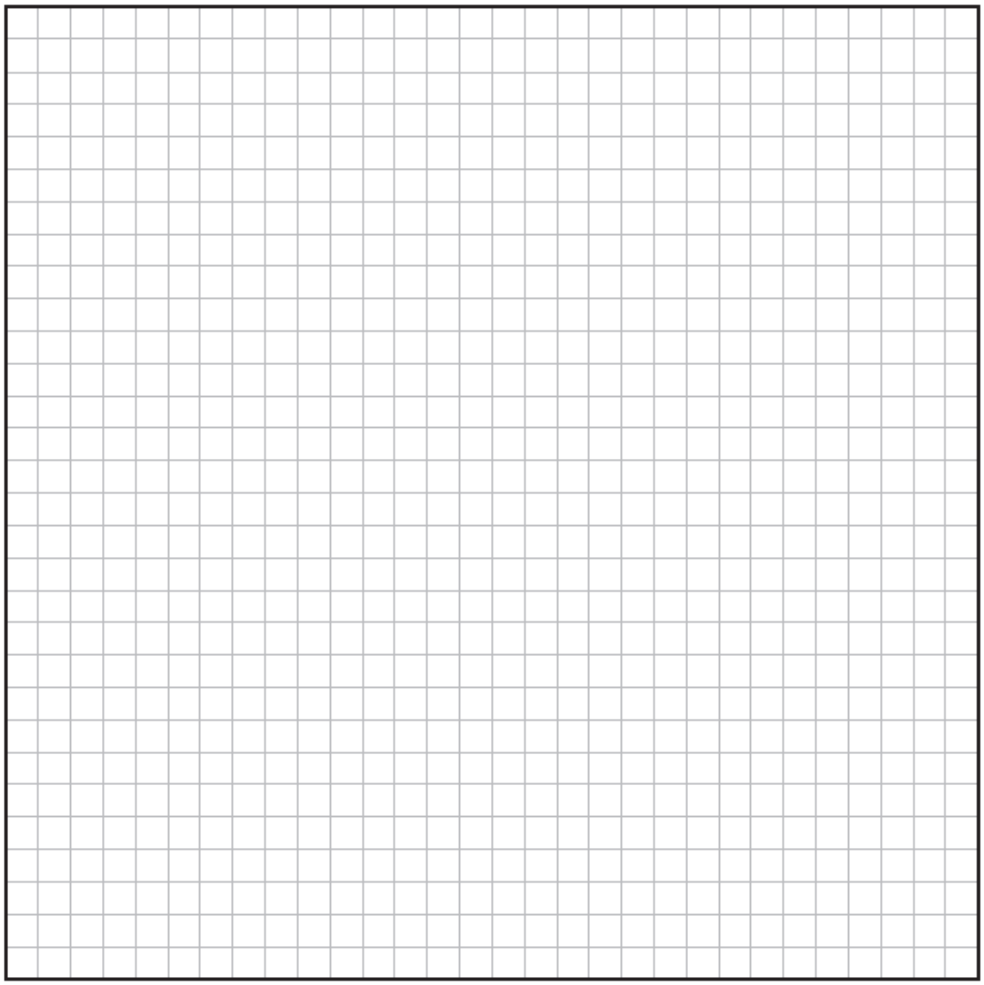
2007 Released Item

Hang Gliding –OE

Josephine likes to go hang gliding. She took off from a hillside at an elevation of 700 feet. During the first 5 minutes, she went down to 500 feet. Then she rode for another 5 minutes up to a height of 600 feet. She then descended at a rate of 200 feet every 15 minutes until she landed.

a. Using the grid provided, construct a graph to represent Josephine's flight. Use height as a function of time and remember to label the axes.

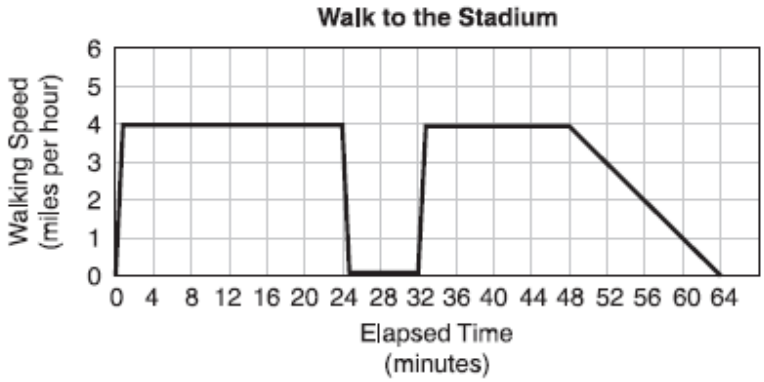
b. How many minutes did her flight take? Show your work or explain how you found your answer.



2007 Released Item

Walk to the Stadium – OE

Ernest walked to the stadium to watch a football game. The graph below illustrates his walking speed on the trip.



a. About how many miles did Ernest walk to the stadium?

b. Based on the information in the graph, describe what may be happening during his walk to the stadium. Be sure to include a description of each change shown in the graph.

2005 Released Item

Algebraic Reasoning: Patterns and Functions

Expected Performance 1.2a(1)

Hot Air Ballooning – OE

A hot air balloon pilot took her new balloon on a test flight. She made the balloon ascend to an altitude of 1,500 feet at 300 feet per minute. Then, for 30 minutes, she flew it at an altitude that varied between 1,600 and 1,400 feet. Finally, she made it descend for landing at a rate of 150 feet per minute.

a. Construct a graph on the grid provided in your answer booklet to represent the flight of the balloon. Use altitude as a function of time. Remember to title the graph and label the axes.

b. About how long was the total flight time of the balloon? Show your work or explain how you found your answer.

2004 Released Item

Increasing Population – OE

The population of Pleasanton has been increasing by approximately the same percentage each decade. The table below shows the town's population in selected years since 1950.

Pleasanton Population

Year	Population
1950	6451
1960	7423
1970	8548
1980	9814
1990	11,280

By what percent has the population of Pleasanton been increasing? Show your work or explain how you found your answer.

If the pattern continues, what will be the town's approximate population in the year 2010? Show your work or explain how you found your answer.

2003 Released Item

Algebraic Reasoning: Patterns and Functions

Expected Performance 1.1a(4)

Graphic Design Charges – OE

For an original graphic design, Lee charges a fixed fee of $50 plus $25 for each hour that he works. His main competitor charges a fixed fee of $40 plus $30 for each hour that he works on a design. Lee's competitor advertises that his rates are cheaper. Is Lee's competitor correct? Explain your reasoning. The grid in your answer book is provided in case you decide to use a graph as part of your explanation.

2003 Released Item

Martha's Sales – OE

Martha works as a salesperson for Momentum Sales. She earns $1,000 per month plus 15% commission on her sales.

a. Write an equation that expresses T, her income for one month as a function of x, her total sales for the month.

b. River City Sales, another company in the same town, has offered Martha a job that will pay her $500 per month plus 20% commission on her sales. The benefits and working conditions are equally good at both companies. Explain why Martha should or should not accept the job at River City Sales. Support your answer by finding x, the average total sales for the month she would need to at least equal her present income at Momentum Sales.

2007 Released Item

Algebraic Reasoning: Patterns and Functions

Expected Performance 1.1a(2)

Population of Hartford – OE

In the 1990 Census, the population of Hartford was recorded as 139,739. In the 2000 Census, the recorded population of Hartford had declined to 127,275.

Government planners are trying to project the city's population in 2030.

One planner makes the assumption that the population will continue to decrease by the SAME AMOUNT of people in each of the next three ten-year periods. Another planner makes the assumption that the population will continue to decrease by the SAME PERCENT in each of the next three ten-year periods.

a. Calculate the projected population of Hartford in 2030 using each of the two planners' approaches and the difference between the two projections. Show or explain how you got your answer.

b. Which assumption—decreasing by the SAME AMOUNT or by the SAME PERCENT—do you think most accurately projects the population? Explain your reasoning.

2006 Released Item

Baseball Card – GI

An ad for a special baseball card that was posted on the Internet claims that the value of the card "doubles every year." Jerome buys the card for $40 at the end of the year 2001. If the value of the card does indeed double every year, in what year will the value of the card first reach $5000?

2003 Released Item

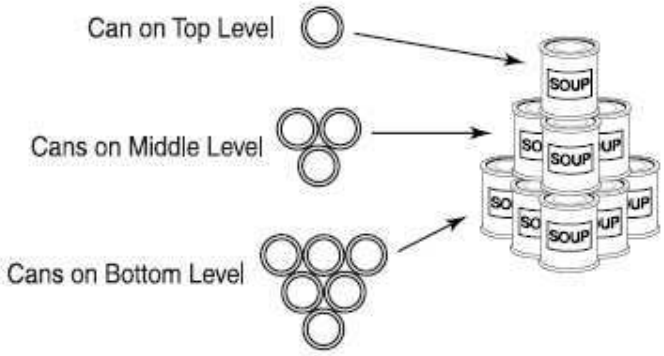
Algebraic Reasoning: Patterns and Functions

Expected Performance 1.1a(1)

3-Level Pyramid – GI

17. Ellis works at a grocery store in Stamford. He is building pyramids of cans for a display. To build a 3-level pyramid, Ellis used 10 cans, as shown in the diagram below.

3-Level Pyramid



If he follows the same pattern, how many cans will Ellis use to build a 7-level pyramid?

2001 Released Item

Bacterial Growth – GI

Judy works for a doctor. She placed a sample of bacteria in a culture dish and recorded the number of bacteria present each 30 minutes beginning at 12:00 P.M. The table shows Judy's data.

Bacterial Growth

Time	Number of Bacteria Present
12:00 P.M.	150
12:30 P.M.	600
1:00 P.M.	2400

If the pattern of bacterial growth remains constant, how many bacteria should be present in the culture dish at 2:00 P.M.?

2002 Released Item