# QUIZ BANK

## *Using the Quiz Bank*

The Quiz Bank contains questions keyed to each lesson in the text, which are designed to help you assess the student's understanding of the work they have done in class and on their homework. Copy a page of the Quiz Bank and "cut and paste" appropriate questions to make a customized quiz for your students. You might want to provide access to the Lab Gear or grid paper for certain questions.

## OPEN-NOTE QUIZZES

The nature of the lessons in the text lends itself to open-note quizzes in which the students may refer to their homework and classwork, but not to the textbook. Reading students' explanations and answers to homework problems is a valuable form of assessment, but it may not be possible to do so daily. Giving open-note quizzes provides you with a quick way to assess student understanding. Such quizzes also reduce student anxiety and provide an incentive for students to write up classwork neatly and prepare homework carefully. The student who thoroughly answers the textbook questions, understands the reasoning, and writes the solutions clearly will have the resources to answer the quiz questions. The student whose work is incomplete, or who has written answers without understanding the concept will likely be stymied on a quiz.

When you prepare an open-note quiz, leave the lesson number next to the quiz question. This will help students find the relevant sections of work in their notebooks.

## CLOSED-NOTE QUIZZES

Most of the questions in the Quiz Bank can be used to create more traditional quizzes in which the students are not allowed to refer to their notebook or textbook. Some questions are appropriate **only** for open-note quizzes, because they refer directly to particular problems in the lesson; these are labeled **O.N.** in the margin.

A quiz question may sometimes be posed for a concept or skill that is being introduced for the first time in that lesson. Until you expect your students to have mastered a skill or concept, questions on it are best used in the open-note quiz setting.

# Chapter 1

[1.1] What is the area of a 6-omino?

[1.1] Draw a 6-omino with a perimeter of 14.

[1.2] What are all the possible perimeters for a 7-omino?

[1.2] What is the longest possible perimeter for a polyomino of area 49?

[1.2] What is the shortest possible perimeter for a polyomino of area 49?

[1.3] Sketch what $x^2 + 5x + 2$ would look like with the Lab Gear.

[1.4] Evaluate, for $x = 2$ and $y = 6$:

[1.4] Give three examples of values for ◊ and △ that make each equation true. If you can give no values, explain why.
  a) $◊ + ◊ = 3 \cdot △$   b) $△ + 2 = 2 + △$   c) $◊ + 5 = ◊$

[1.5] Sketch the following:
  a) Eight 1-blocks arranged to model a one-dimensional line segment.
  b) Eight 1-blocks arranged to model a two-dimensional rectangle.
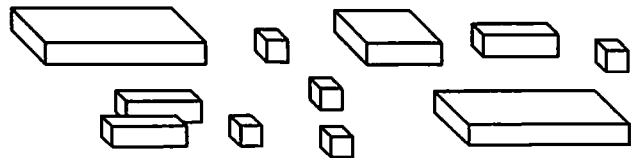  c) Eight 1-blocks arranged to model a three-dimensional box.

[1.5] Arrange these blocks into a rectangle. Make a top-view sketch. Write the length, width, and area of the rectangle.
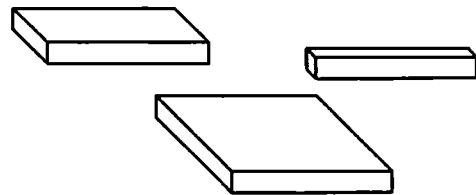
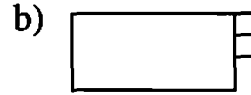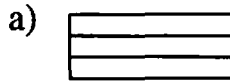[1.6] What is the degree of each term:   a) 5   b) $3x$   c) $x^2y$

[1.6] What is the degree of $x^3 + 2x^2 + 4$?
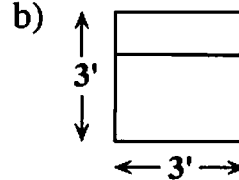
[1.6] Write the short way:

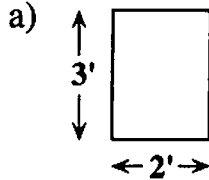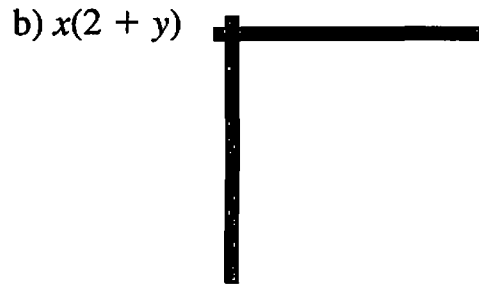[1.6] What terms are missing in the equation: $4x^2 + 2x + \underline{\phantom{xxx}} = 8x^2 + 6x + 4$?

[1.7] Find the area and perimeter:

a)

b)

O.N. [1.8] What is the price for each window?

a)

3'

←2'→

b)

3'

←3'→

[1.9] Multiply with the corner piece. Sketch and state the product.

a) $x \cdot 2y$

b) $x(2 + y)$
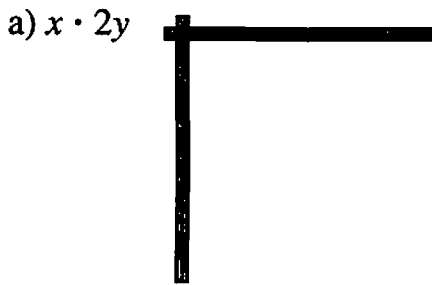
[1.10] Find the surface area of the $xy$ block.

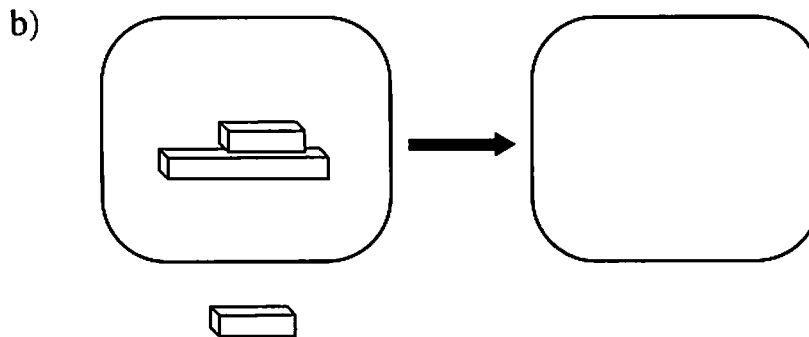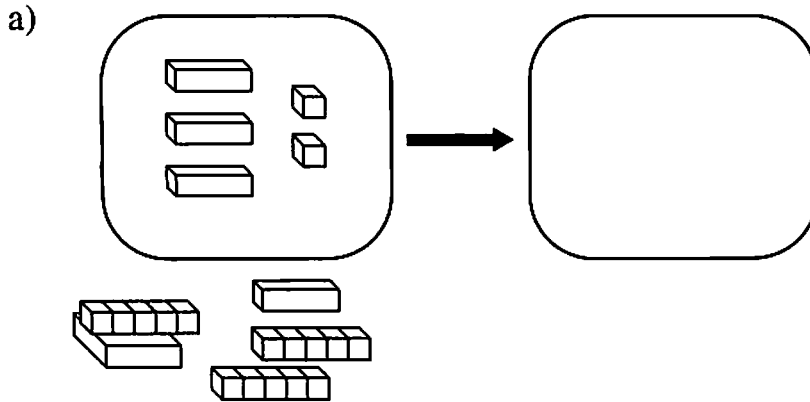[1.11] Show how to use rectangular numbers to find the 50th triangular number.

[1.12] Draw the triangle with vertices at (0, 3), (0, 8), and (4, 4). Find the area of the triangle and explain your work.

(0, 0)
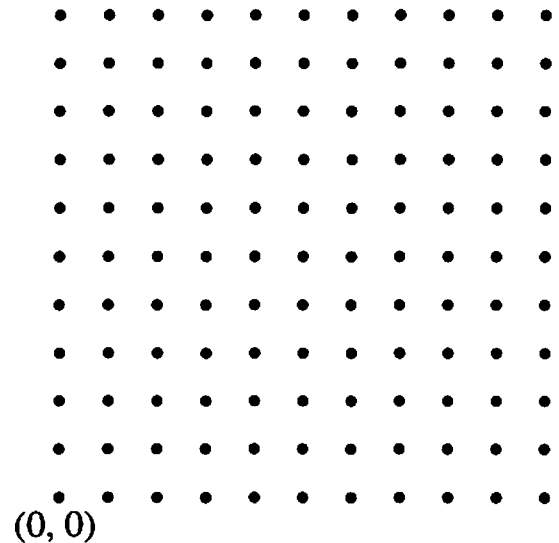
# Chapter 2

[2.1] Tell whether each minus sign means negative, opposite, or subtract in the expression $-2 - (-x)$.

[2.2] Simplify each Lab Gear expression, and sketch the result:
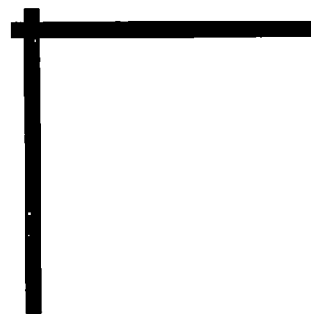
a)

b)

[2.2] Simplify with or without Lab Gear:

a) $5 - (3x + 2)$         b) $(x + 5) - (3x - 2)$

[2.3] a) Use the corner piece to model the multiplication $(x + 2)(2x + 1)$, and sketch the result.

b) On the sketch write the area of each of the smaller rectangles that make up the larger rectangle.

c) Write the result of the multiplication. Combine like terms.

[2.3] Write the addition $x^2 + 3xy + x$ as a multiplication. Include a Lab Gear sketch to explain.
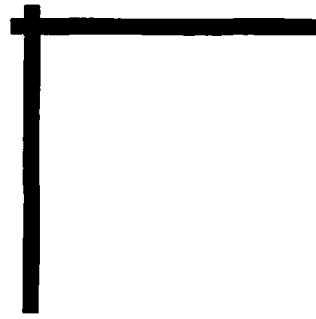
[2.4] Find the product $x(y - 3)$ using the Lab Gear. Sketch.
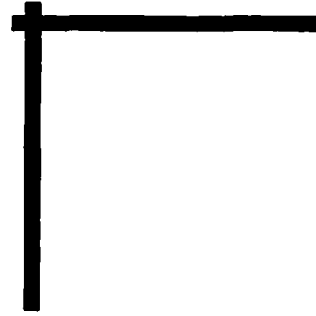
[2.4] Use the distributive law to multiply $3y(4 + 2x - y)$.

[2.4] a) Show the quantity $x^2 - x$ with the Lab Gear, arranged so that the uncovered part is a rectangle. Sketch.

b) Write a multiplication of the type *length · width = area* for the uncovered rectangle.
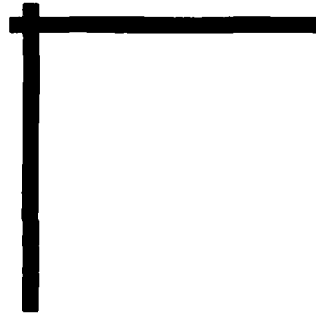
[2.5] Suppose Abe gets $1 on January 1, $3 on February 1, $9 on March 1, and so on, tripling the amount each month.

a) How much does Abe get on the first day of the sixth month?

b) How much does Abe get on the first day of the $n$th month?

O.N. [2.6] What will someone pay to park for four and one-half hours in Zalman's garage?

[2.6] Here is a portion of the Fibonacci sequence: ..., 89, 144, 233, .... Find the next two numbers in the sequence.

**[2.7]** Make a function diagram for the function $y = 2x - 1$, showing five in-out pairs.



**[2.7]** Assume that in-out lines can be added to the function diagram, following the same pattern. Complete the chart below.
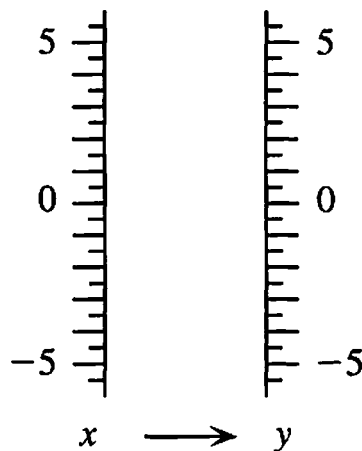
| Input | Output |
|-------|--------|
| 2     |        |
| −4    |        |
| 0.5   |        |
|       | 16     |
|       | 6      |
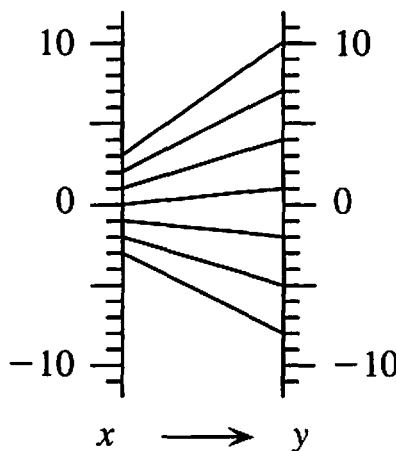


**[2.8]** The function diagram shows Grabel's distance from home, and time since leaving on a day-long car trip she took to Oakville.

a) How far from Grabel's home is Oakville?

b) Assuming her rate is constant, how fast does she travel on the way to Oakville? Explain how you know.

c) Grabel spends two hours in Oakville. Assuming her rate is constant, how fast does she travel on the way home?



*time* ⟶ *distance*
*(hours)*      *(miles)*
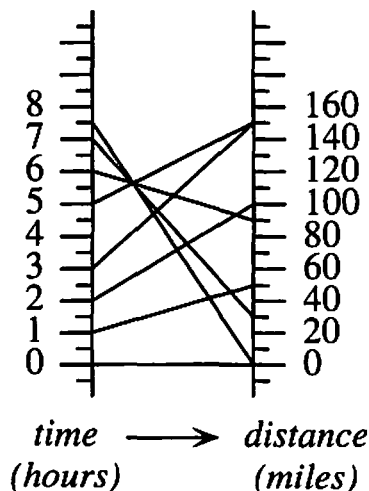
[2.9] a) Which of the function diagrams below represent functions of the form
$y = x + b$?

b) Which of the function diagrams below represent functions of the form
$y = mx$?

i.


ii.


iii.


iv.


v.
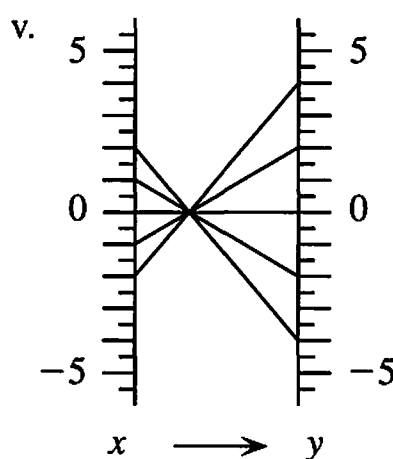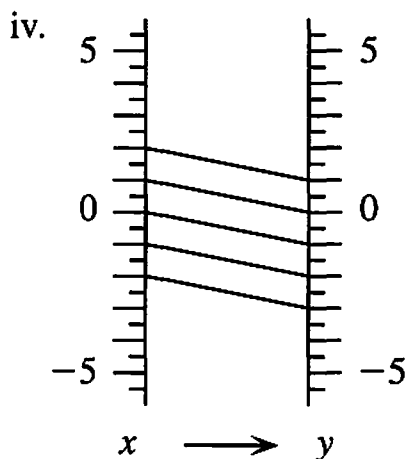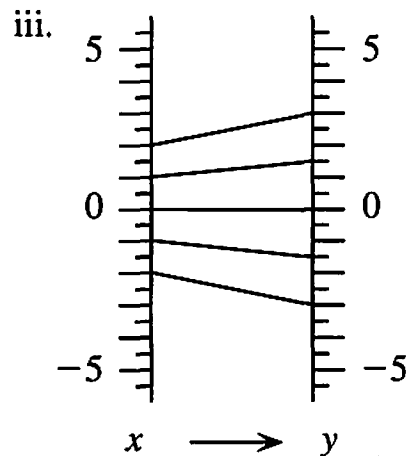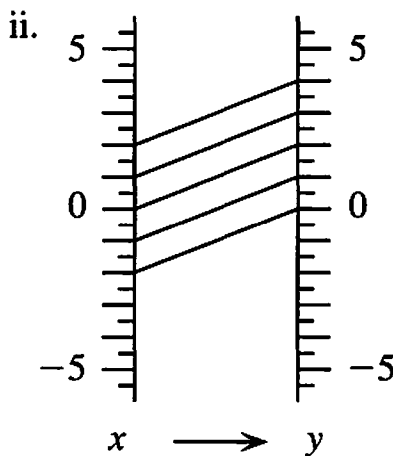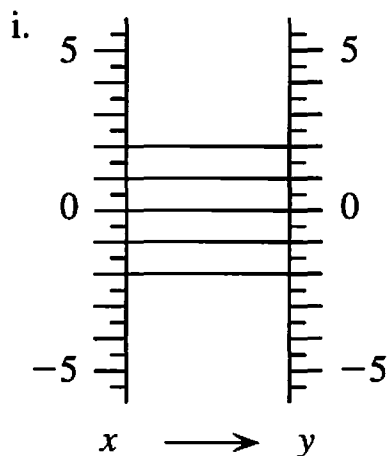

[2.10] Complete the table for the sequence of block figures shown.



| Figure # | 1 | 2 | 3 | 4 | 10 | n |
|---|---|---|---|---|---|---|
| Perimeter | 8 | 10 | 12 | | | |

[2.11] A polyomino has area 20, with 5 eyes. What is its perimeter?

[2.12] Draw the geoboard triangle with vertices at (0, 4), (6, 5), and (4, 2). Find the area of the triangle and explain your work.

(0, 0)
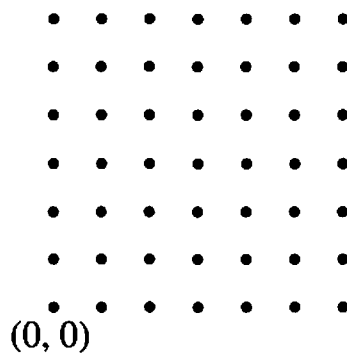
[2.12] A geoboard triangle has vertices at (2, 0), (8, 0), and (2, 5).

a) What is the area of the triangle?

b) Suppose the vertex at (2, 5) is changed to $(x, 5)$. How does the value of $x$ affect the area of the triangle?

c) Suppose (2, 5) is changed to $(2, n)$. Express the area of the triangle as a function of $n$.

(0, 0)
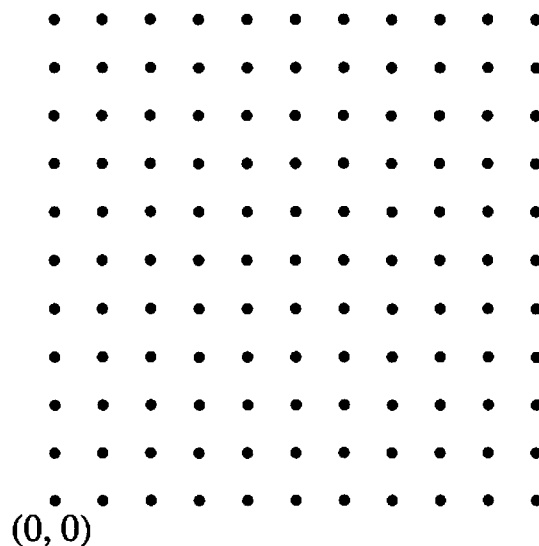
# Chapter 3

[3.1] Algebank II has a new plan to attract wealthy investors. Each month they multiply your balance by 1.5, and then subtract a service charge of $500.

a) If Ms. Alar has $550 after 2 months of this plan, how much did she start with?

b) What is the smallest amount an investor should begin with in order to make money under this plan? Explain.

[3.2] For what values of $x$ will the function $y = 3 - x$ have $y$-values that are greater than three? Explain.

[3.2] Find the product: $(-5x)(-2)(-7y)$

[3.3] Write an equivalent expression without parentheses: $2x - (-4 + 3y)$

[3.3] Fill in the blank: $3x^2 - 5x + 7 = x^2 - 2x - ($   $)$.

**[3.4]** Find what the last step or steps of this magic trick should be so that the final result always equals the original number:

1) Think of a number.
2) Add three.
3) Multiply by two.
4) Add the original number.
5) Subtract six.

???????

**[3.5]** Simplify both sides on the workmat. Write the simplified expressions in the blanks. Write the correct symbol (>, <, =) in the circle.

_____ ◯ _____
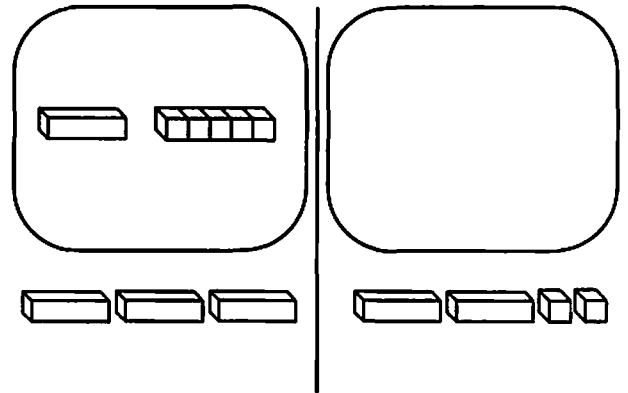


**[3.5]** Decide which side is greater. If you would have to know the value of $x$, then give one value of $x$ that makes the left side greater and one that makes the right side greater.

a) $(x^2 - 5 - x)$ ? $(x^2 - 10 - x)$  b) $(5 - x)$ ? $(5 - 3x)$

**[3.6]** Divide: $\dfrac{4x^2 + 6x}{2x}$

**[3.6]** Show how to use a table to multiply: $(x + 3)(y + 2 - x)$

**[3.7]** Find two numbers $a$ and $b$ that satisfy the equation: $\dfrac{3}{5} \cdot a \cdot b = 7$

**[3.7]**  a) If $4 \cdot x = 12$, what does $x$ equal?

  b) If $\dfrac{4}{x} = 12$, what does $x$ equal?

  c) How are these answers related?

*O.N.* **[3.8]** Convert 50° Celsius to Fahrenheit.

[3.8] Bobbie lives in the country, and she notices that the warmer it is, the faster the crickets chirp. She decides to learn more about this, and over several months she collects the data shown in the table.

| Temp (F) | 47 | 62 | 77 | 87 |
|---|---|---|---|---|
| Chirps/min | 40 | 100 | 160 | 200 |
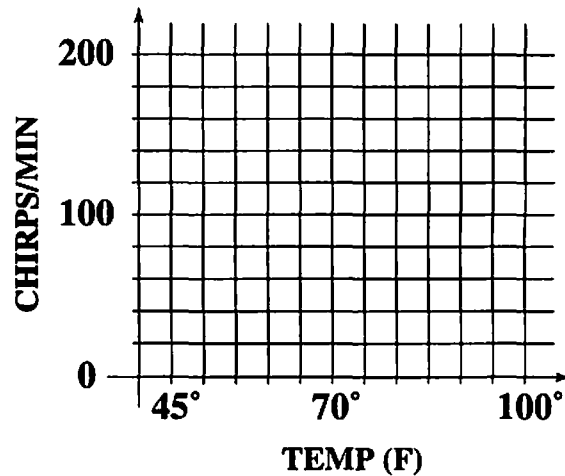
a) Graph the points in the table.

b) Use your graph to estimate the number of chirps per minute when the temperature is 70°.

c) If the temperature increases by one degree, by about how much does the number of chirps per minute increase? What does the graph show? Can you use the chart to check this?

[3.9] Solve the equation $7 - 5(x - 3) = 6$ using the cover-up method. Show your work with a sequence of equations leading to the solution.

[3.10] a) Make a two-step function diagram which combines the functions $y_1 = x - 2$ and $y_2 = 3x$ by performing $y_1$ first and then $y_2$. Show at least three in-out lines.

b) If you summarize the diagram in (a) with a one-step diagram, what function corresponds to that diagram?
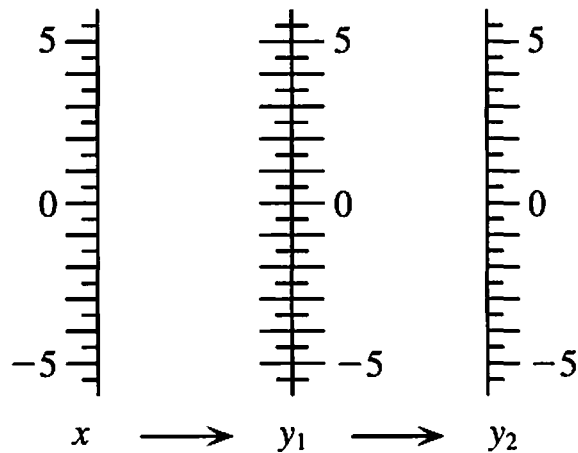
[3.10] What is the inverse function for the function which has the rule: Multiply by four, then add three?

O.N. [3.11] Use your addition table to convert 3 ducats, 2 ecus, and 1 florin to the smallest possible number of coins.

[3.11] The Queen of Zipnorg decrees a single infinite month, called Ondne, but with 3-day weeks as shown in the calendar below. She calls the days Ro, Sham, and Bo.

**Calendar**

| Ro | Sham | Bo |
|----|------|-----|
|    | 1    | 2   |
| 3  | 4    | 5   |
| 6  | 7    | 8   |
| 9  | 10   | ... |

**Addition Table**

| sum  | Ro | Sham | Bo |
|------|----|------|-----|
| Ro   |    |      |     |
| Sham |    |      |     |
| Bo   |    |      |     |

a) Complete the addition table showing how to add the days of the weeks.

b) What is Calendar Zero? Explain.

c) What days are Calendar Opposites? Explain.

[3.12] Name the vertices of a geoboard rectangle that is similar to the one with vertices at (0, 0), (6, 0), (6, 8), and (0, 8).

[3.12] Consider three rectangles with dimensions 9 by 12, 12 by 16, and 7 by 9. Which, if any, of these rectangles are similar to each other? Explain how you can tell by using ratios and by using dot paper.

# Chapter 4

[4.1] Lea travels at a speed of 25 mph on a bike and Gabe goes 30 mph on a scooter. They start out on the same route at the same time.

a) How far apart will they be after $H$ hours? Explain.

b) If you graph each person's travel, with time elapsed on the $x$-axis and distance covered on the $y$-axis, what will the graphs look like? How will Gabe's greater speed be apparent from the appearances of the graphs?

c) Biff also starts out on the same route at the same time. If he is 10 miles ahead of Gabe after 3 hours, how long will it take Biff to travel 100 miles?

[4.2] Is the point (3.4, 0) on the graph of the function $y = 7 - 2x$? Explain how you can be sure.

[4.2] If the point $(x, -3)$ is on the graph of the function $y = 7 - 2x$, what must $x$ equal?
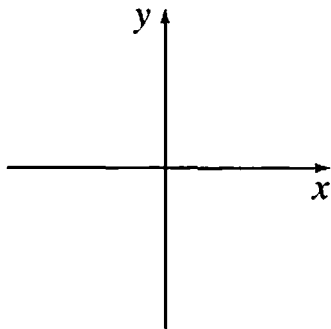
[4.3] Complete the table:

| $x$ | $x^2$ | $-x^2$ | $(-x)^2$ | $x^3$ | $-x^3$ | $(-x)^3$ |
|---|---|---|---|---|---|---|
| 3 | 9 | | | 27 | | |
| −2 | | | | −8 | | |

[4.3] Which of these functions have the same graph: $y_1 = x$, $y_2 = x^2$, $y_3 = -x^2$, $y_4 = (-x)^2$, $y_5 = x^3$, $y_6 = -x^3$, $y_7 = (-x)^3$.

[4.3] What is the degree of the polynomial function $y = 2x + 5 - x^3$?

[4.3] Sketch a graph that could be a function of:

   a) degree 0

   

   b) degree 1
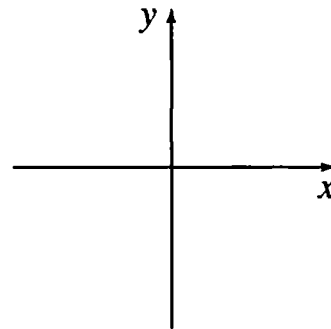
   

   c) degree 2
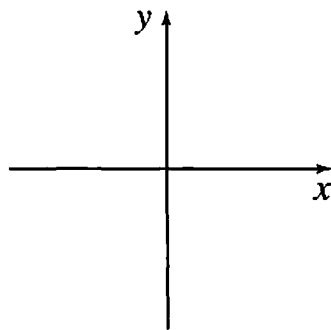
   

   d) degree 3
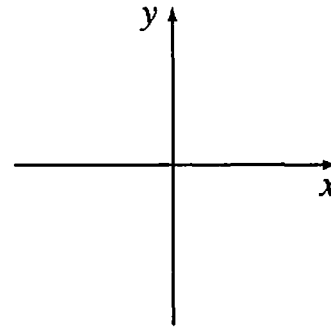
   

[4.4] Find the equation of a second-degree function whose graph passes through the point (0, 4).

[4.4] Find the equation of a third-degree function whose graph passes through the origin.

[4.4] Find the coordinates of the $y$-intercept of the graph of $y = 2x - 6$.

[4.4] Find the coordinates of the $x$-intercept of the graph of $y = 2x - 6$.

[4.5] Explain how to find the exact coordinates of two more points on the line through the origin and the point (6, 9), without graphing.

[4.5] Find the equation of the line through the origin and the point (6, 9).

**[4.6]** Bea and Gabe did another experiment weighing amounts of unknown liquids, and Gabe (sigh...) forgot to subtract the weight of the cylinder again. Here is their data. Describe the pattern in the numbers which shows that their liquids have the same density.

| Bea | | Gabe | |
|---|---|---|---|
| volume | weight | volume | weight |
| 10 ml | 13 g | 40 ml | 82 g |
| 20 ml | 26 g | 50 ml | 95 g |
| 30 ml | 39 g | 60 ml | 108 g |

**[4.6]** What does the graph of a direct variation look like? Be as specific as possible.

**[4.6]** What number pattern is always true of the (x, y) pairs of a direct variation?

**[4.7]** A student trying to find the density of a mystery substance came up with volume and weight data from three samples.

Sample 1: (12 ml, 7 g)
Sample 2: (4 ml, 2 g)
Sample 3: (19 ml, 10 g)

a) Estimate the density by drawing a line through the origin on the graph. Show your work.

b) Estimate the density by another method. Show your work.
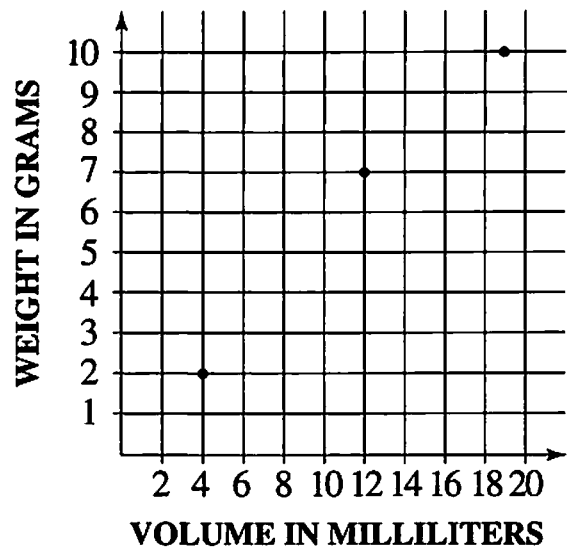


**[4.8]** Complete the chart and graph for the flat jar shown below.
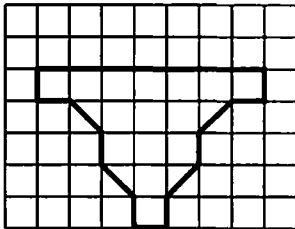


| Height | Area |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
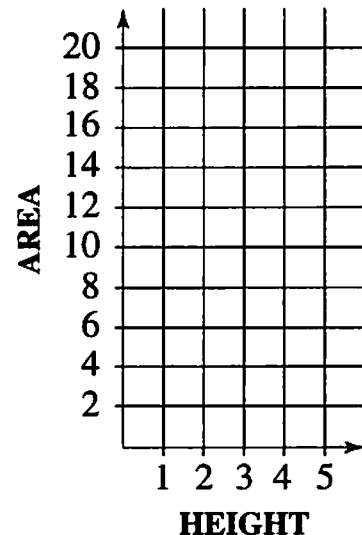
*O.N.* [4.9] Barney is driving his car at 50 mph.

  a) How long is the safe distance according to the 3-Second Rule?

  b) If Barney's car is 16 feet long, what is the safe distance according to the 1-for-10 Rule?

[4.10] A commuter train leaves on its midday run at 12:00, beginning at station A and ending at station E. The graph shows its speed at each time during the run.



  a) How long does the train wait at each station?

  b) Describe what happens at 12:24.

  c) Between two of the stations there is a 45-mph speed limit. Which two stations are they?

[4.11] a) What is the equation of the vertical line through the point (2, 5)?
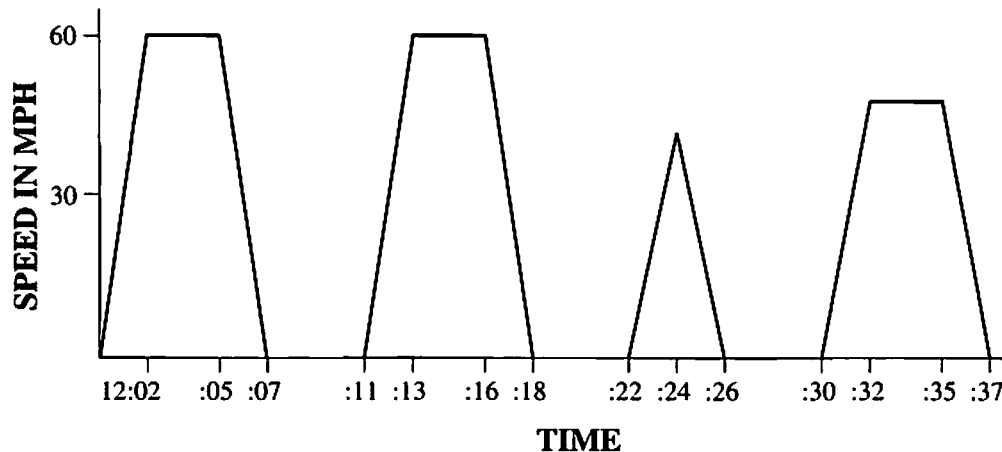
  b) What must be true of the coordinates of any point chosen to the right of this line?

  c) What inequality describes all points to the left of this line?

[4.12] a) What would be the area of a geoboard figure with 50 boundary dots and 0 inside dots?

  b) What would be the area of a geoboard figure with 50 boundary dots and 40 inside dots?

# Chapter 5

[5.1] Find a constant sum function with each property. If impossible, explain why.

  a) All the in-out lines on the function diagram slant upward.

  b) The function diagram includes the in-out line $(-4, 12)$.

  c) The graph has $x$-intercept $(-4, 0)$.

  d) The graph is in quadrants II and III only.

  e) The graph has $x$-intercept $(5, 0)$ and $y$-intercept $(0, 10)$.

[5.2] a) Sketch a constant product graph that includes the point (6, 1).

b) Find the coordinates of a point on the graph which has a positive $x$-coordinate less than 1/4.
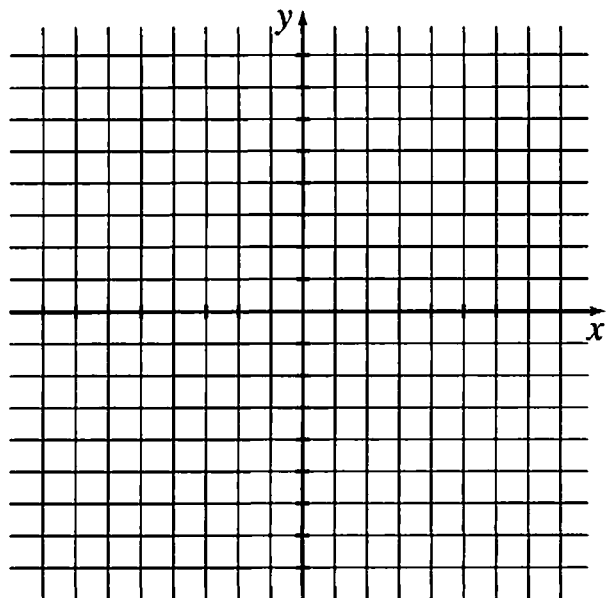
[5.2] Explain why a constant product graph has no $x$- and $y$-intercepts.

[5.3] Divide: $\dfrac{12x^2 + 4xy - 8x}{4x}$. Use Lab Gear if you wish.

[5.4] Find all trinomials of the form $x^2 + 6x + $ ____ which can be factored, and write them in factored form. (Assume the missing number is not negative.)

[5.4] Factor: $x^2 - 12x + 35$

[5.5] Consider the graph of the function $y = x^2 - 9x + 20$, which can be written in factored form as $y = (x - 4)(x - 5)$. Find the $x$-intercepts without graphing, and explain how you know they are correct.

[5.5] Write the equation of a frown parabola having $x$-intercepts at (6, 0) and $(-1, 0)$.

[5.6] Factor completely: $15x^2 - 10x$

[5.6] Factor completely: $x^3 + 3x^2 + 2x$

[5.7] Use the Lab Gear to multiply $(x - 2)(2x - 3)$, and sketch the resulting Lab Gear figure.
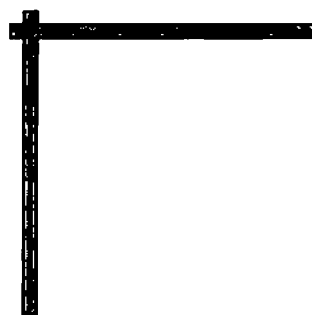
[5.8] Suppose you have an unlimited supply of 7-cent and 10-cent stamps. What is the largest postage amount that you cannot make exactly?

[5.9] Show how to find the sum of the staircase $10 + 11 + 12 + ... + 17$ by making a rectangle or using Gauss' method.

[5.10] What is the sum of the first 200 odd numbers?

[5.10] Find the 500th term of the arithmetic sequence 11, 18, 25, 32, 39, ....

[5.11] Find the mean and the sum of the arithmetic sequence: 18, 23, 28, 33, 38, 43, ..., 1018 (201 terms). Show your work.

O.N. [5.12] Simplify: $f_1 a f_2 cs$

[5.12] Consider the sequence of carpet moves:
NE,NE,S,NE,N,E,NW,N,SE

$$\nearrow \quad \nearrow \quad \downarrow \quad \nearrow \quad \uparrow \quad \rightarrow \quad \nwarrow \quad \uparrow \quad \searrow$$

a) Starting at (0, 0), where will these moves take you?

b) Simplify the sequence of carpet moves using N, E, W, S notation.

# Chapter 6

[6.1] Rental company B has a spring sale, lowering the daily rate to $24, with 100 "free" miles and $0.30 for each additional mile.

a) Graph the cost as a function of the number of miles driven.

b) Approximately how many miles must you drive in order for this rental to be more expensive than company D's sale rate of $35 with unlimited mileage?



c) Show how to find the answer to (b) on the graph.
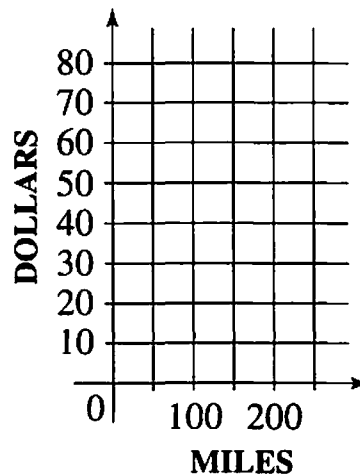
[6.1] Company A has a sale, and the cost as a function of the miles driven is given by
$$\begin{cases} y = 29.95 & \text{if } x \le 100 \\ y = 29.95 + 0.25(x - 100) & \text{if } x > 100 \end{cases}$$

Explain in words the cost of rental during this sale. Include the daily rate, number of free miles, and cost per additional mile.

**[6.2]** The table at the right compares the expressions $3x - 1$ and $x + 9$ for some values of $x$.

a) Extend the table to include at least one value of $x$ for which $3x - 1$ is greater than $x + 9$.

b) Find a value of $x$ for which the two expressions are equal.

| $x$ | $3x - 1$ | $x + 9$ |
|-----|----------|---------|
| $-10$ | $-31$ | $0$ |
| $-5$ | $-16$ | $-5$ |
| | | |
| | | |
| | | |

**[6.2]** Simplify $4 - 2[4 - (x + 3)]$.

**[6.3]** a) Write the equation shown at the right.

b) Use the Lab Gear to find the solution. Write equations to show some of the steps as you move your blocks.

c) Write the solution.
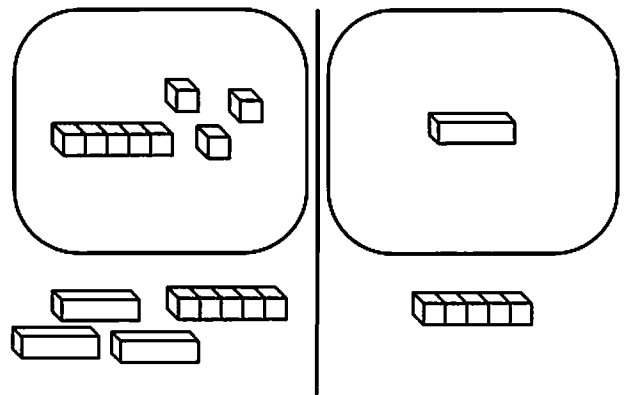


**[6.4]** Solve with or without Lab Gear:

a) $3(2x - 1) = 6(x + 1) - 9$

b) $3(2x - 1) = 6(x + 1) - x$

c) $3(2x - 1) = 6(x + 1)$

**[6.5]** a) Graph $y = x - 6$ and $y = 4x - 3$ on the same pair of axes.

b) Show how to use the graphs to solve the inequality $x - 6 < 4x - 3$.

c) Write the solution.

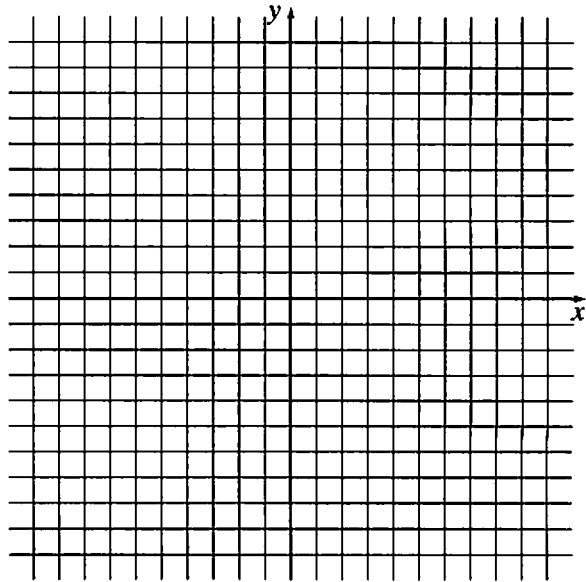**[6.6]** Abel has $675 in his bank account at the start of the year. He earns $50 per week, spends $28 of his earnings during the week, and saves the rest.

a) Write an expression that gives the amount of money he has $n$ weeks after the start of the year.

b) Use a table, graph, or equation to find out how long it will take Abel to have $1199 to buy a motor scooter. Explain.

**[6.7]** a) $12y$ is how much more than 4?

b) $12y$ is how many times as much as 4?

**[6.7]** A scale model of an airliner is 1.05 meters long. The actual jet is 90 meters long. If the tail fin on the model is 0.12 meters tall, how tall is the tail fin on the jet?

**[6.7]** When Carlos was 8, his mother was 32. How old will Carlos be when his mother is only twice his age?

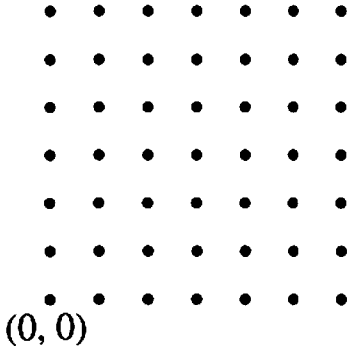**[6.8]** Solve: a) $\dfrac{3}{5}x = 27$      b) $\dfrac{3}{5}(2x - 7) = 27$

**[6.8]** Solve: $2 + 9x = 6 - 5x$

**[6.8]** Transform $2y + 5x = 8$ so that $y$ is in terms of $x$.

**[6.9]** Solve: $\dfrac{2x + 5}{x - 1} = 4$

**[6.10]** Suppose Abra has made 13 out of 20 free throws so far this season. Write an expression for her season average if she attempts $x$ more free throws this season and makes half of them.

[6.11] In the movie "Honey, I Shrunk the Kids" a 32-inch-tall boy is shrunk to 1.5 inches.

    a) The height of the shrunken boy is how many times the original height of the boy?

    b) If his shoes were originally 5 inches long, how long should his shrunken shoes be?

[6.12] A geoboard square has vertices at $(0, 5)$ and $(2, 0)$.

    a) What are the other vertices of the square?

    b) Show how to find the area of the square using subtraction.

*O.N.*  c) Show how to find the area using the formula from problem 10d.

# Chapter 7

[7.1] Make a Lab Gear sketch representing each expression with as few squares as possible:

    a) $(x + 3)^2$                   b) $x^2 + 9$

[7.1] How much larger is $(x + y)^2$ than $x^2 + y^2$? Make a Lab Gear sketch to help explain your answer.

[7.2] Find the numbers of corner, edge, and inside panes needed for a 60-foot by 60-foot window.

[7.3] Build a Lab Gear square using 6 $x$-blocks and any other blocks except more $x$-blocks. What are the dimensions and area of the square?

[7.3] Look at each of the expressions below. If it is a perfect square trinomial write it as the square of a binomial. If it is not, change one term to make it a perfect square, and then write your new expression as the square of a binomial.

    a) $x^2 + 18x + 36$

    b) $9x^2 + 12x + 4$

[7.4] Factor: $16x^2 - 9$

[7.4] If a square having area $y^2$ is cut out of a square having area 100, and the remaining area is rearranged into a rectangle, what are the length and width of that rectangle?
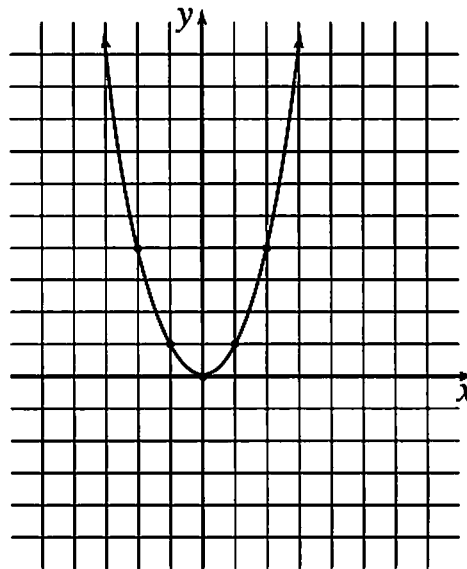
[7.5] Use the identities of Lesson 7.5 to factor:

a) $4y^2 - 4y + 1$

b) $x^2 - 64$

c) $9x^2 + 12x + 4$

[7.6] The graph of $y = x^2$ is shown at the right. Draw the graph of $y = 2 - x$ on the same grid. Explain how to use the graph to decide how many solutions there are to the equation $x^2 = 2 - x$.

[7.6] The solutions to $x^2 - 8 = 0$ are the $x$-values where the graph of $y = x^2$ intersects with the graph of what line?

[7.7] The graph of $y = (x - 3)^2$ is shown at the right. Use the graph to estimate the solutions to the equation $(x - 3)^2 = 7$. Explain.
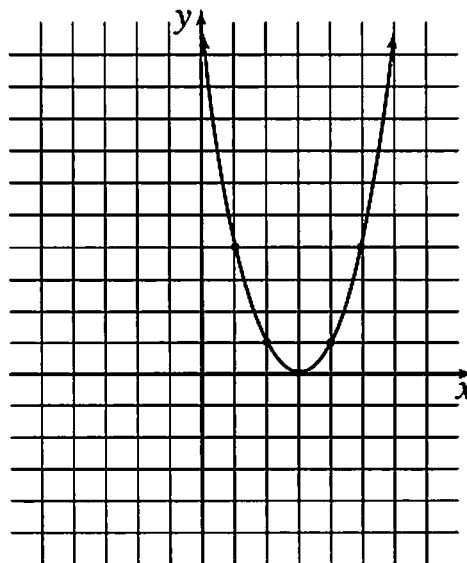
[7.7] Use the equal squares method to solve the equation $(x + 2)^2 = 49$. Use the Lab Gear if you wish.

[7.8] On day zero, Zea learns a secret. On day one she tells three people. On day two each of them tells three people. Each person who is told then tells three people the next day.

a) How many people are told on the 5th day?

b) How many people are told on the $n$th day?

c) What does this formula give for $n = 0$? Is this correct? Explain.

[7.9] Write 5.1 trillion in scientific notation.

[7.9] Write an approximation to 3,000 using a power of 2 multiplied by a number between 1 and 2.
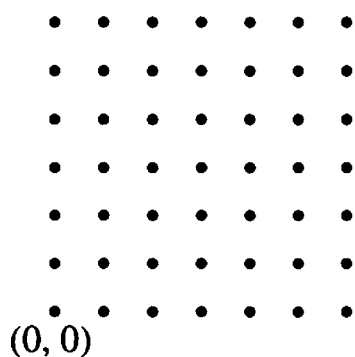
[7.10] a) $8(10^{15})$ is how many times as large as $4(10^9)$? Express your answer in scientific notation.

b) Explain how to find the answer without using a calculator.

[7.11] Write 42,895,000,000,000 in scientific notation.

[7.12] What is the side of a square having area 20?

[7.12] Find the distance between (5, 2) and (1, 4).

(0, 0)

# Chapter 8

[8.1] Open your book to page 286 and refer to the table to answer these questions.

a) What was the average rate of growth in centimeters per month of Joshua's height between ages 12 months and 2 years?

b) Between what ages did Joshua's weight grow at the fastest rate? Explain your answer.

[8.2] a) What is the magnification of the function pictured?

b) What is the b-parameter? Explain how to find it on the function diagram.

c) What is the equation of the function?

$x \longrightarrow y$
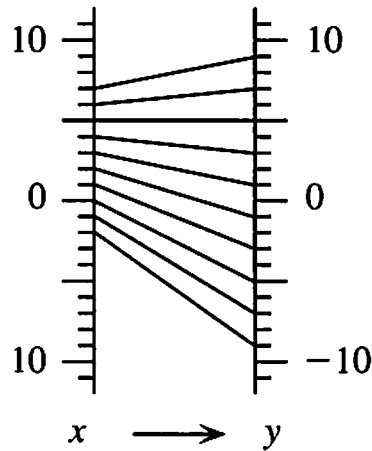
[8.3] What is the slope of the line joining (2, 1) and (5, 6)?

(0, 0)
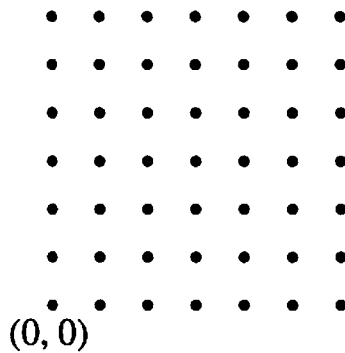
[8.3] If the slope of a ramp is 0.2, how many inches of height do you gain for every 50 inches you move horizontally?

[8.4] Find the slope and $y$-intercept of each function. Put the function into slope-intercept form if necessary.

a) $y = -\dfrac{1}{3}x + 8$

b) $y = 2(-3 + x)$

[8.5] $5^{12}$ is how many times as large as $5^4$? Write your answer as a power.

[8.5] Write as a single power:

a) $4^3 \cdot 4^5$

b) $\dfrac{6^8}{6^2}$

[8.6] A population starts at 500 and is multiplied by 6 each day. Write an expression for the population after $x$ days of growth.

[8.6] Simplify: $\dfrac{200(3^{x+5})}{50(3^5)}$

[8.7] Bar starts her job at a salary of $40,000 per year and gets a raise of 5% each year. By what number can you multiply each year's salary to get the next year's salary?

[8.7] If a CD set costs $24.90 including 6% sales tax, what is the cost without the tax?

[8.8] An aging algebra teacher loses 1% of his strength each year. He can lift 150 pounds now. Write an equation that gives the amount he can lift ($A$) as a function of the number of years from now ($n$).

[8.9] Explain how to write any power of 25 as a power of 5. Include an example.

[8.9] Simplify: $(x^3)^5$

[8.10] Write $5x^9$ as a product of two monomials in four different ways.

[8.10] Simplify each expression:
a) $(4ab)^3$
b) $\left(\dfrac{3x}{y}\right)^4$

[8.11] At 12 noon a bacterial culture weighs 50 grams, and its weight $x$ hours later is given by $S = 50 \cdot 4^x$. Find the weight two hours *before* noon. Explain.

[8.11] What is the value of $4^{-3}$? Show how to find it without using a calculator.

[8.12] Write 0.00000583 in scientific notation.

[8.12] If popcorn has $6.2(10^2)$ kernels per liter, express in scientific notation the volume in liters of one kernel?

# Chapter 9

[9.1] What is the taxicab distance between $(1, 7)$ and $(4, -2)$?

[9.1] Find the absolute value of $-0.68$.

[9.1] Write an expression for the distance between 5 and $y$ on the number line.

[9.2] Find the Euclidean distance between $(1, 7)$ and $(4, -2)$.

[9.2] $A$, $B$, and $C$ are squares built on the sides of a right triangle as shown. If the area of $B$ is 8 and the area of $C$ is 20, what is the area of square $A$?
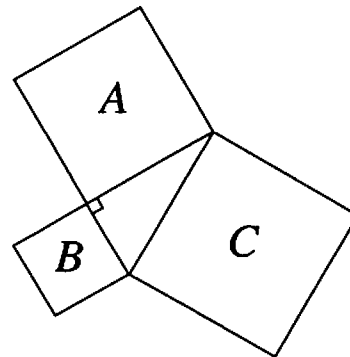
[9.3] Multiply without a calculator. Show your work.
   a) $5\sqrt{3} \cdot 2\sqrt{3}$          b) $\sqrt{5} \cdot \sqrt{20}$

[9.4] Write $\sqrt{54}$ in simple radical form.

[9.4] What number times $\sqrt{6}$ equals $3\sqrt{10}$?

[9.4] Simplify $\sqrt{50} + \sqrt{2}$.

[9.5] Give an example of a number $x$ such that:
   a) $x^2 < x$          b) $\sqrt{x} > x$

[9.6] Explain two different methods for finding the number that is halfway between $-18$ and $87$.

[9.6] Find the midpoint of the segment joining $(6, 1)$ and $(2, 8)$.

[9.7] Bobbi's salary grew from $6.50 per hour to $17 per hour in 4 years. How much was her salary after 2 years if you assume
   a) linear growth?          b) exponential growth?

[9.8] Write $\sqrt{5(10^{10})}$ in simple radical form.

[9.8] What is the meaning of $x^{1/2}$? Explain why this makes sense. (Assume $x$ is not negative.)

[9.9] Multiply: $(5 - \sqrt{2})(3\sqrt{2} + 4)$

[9.9] Rationalize the denominator: $\dfrac{2}{\sqrt{5} + 1}$

[9.10] A polyomino with area 10 and perimeter 20 is stretched by doubling horizontally, or vertically, or both horizontally and vertically. For each of the following, give the requested area or perimeter if possible. If you would need to see the figure, say "can't tell."
   a) dimensions doubled horizontally: area = ?
   b) dimensions doubled vertically: perimeter = ?
   c) dimensions doubled both ways: perimeter = ?
   d) dimensions doubled both ways: area = ?

[9.11] A 6-inch-diameter pizza costs $4. What will an 18-inch pizza cost with the same price per square inch?

[9.12] Two similar figures have a ratio of similarity equal to 4. If the area of the smaller figure is 10 square units, what is the area of the larger figure?

[9.12] Two similar figures have perimeters of 12 and 8. What is the ratio of the two areas?