Real-World Problem Solving

Graphic Novels

BOOK 3

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TABLE of CONTENTS

Number Sense

1 Proportions: The Fry Bread Fiasco 1
2 Order Rational Numbers: Best Deal in Town 4
3 Divide Fractions: How Many Lockers? 5

Practice On Your Own 6

Algebraic Thinking

1 Rates: Talk is Cheap 7
2 Arithmetic Sequences: Box Office Numbers 10
3 Ratios: The All-Star Triple Decker Skatezilla Rampapolooza! 11

Practice On Your Own 12

Geometry

1 Scale Drawings: A Tale of Scale 13
2 Pythagorean Theorem: The Long & the Short of It 16
3 Reflections: Tile Stylin' 17

Practice On Your Own 18

Measurement

1 Volume of Prisms: Surviving Summer 19
2 Similar Figures: Slippery Slide 22
3 Scale Drawings: Logo Booster 23

Practice On Your Own 24

Statistics and Probability

1 Sampling Methods: A Statistical Home Run 25
2 Probability: Nothing but Net 28
3 Scatter Plots: The Runners' Relationships 29

Practice On Your Own 30

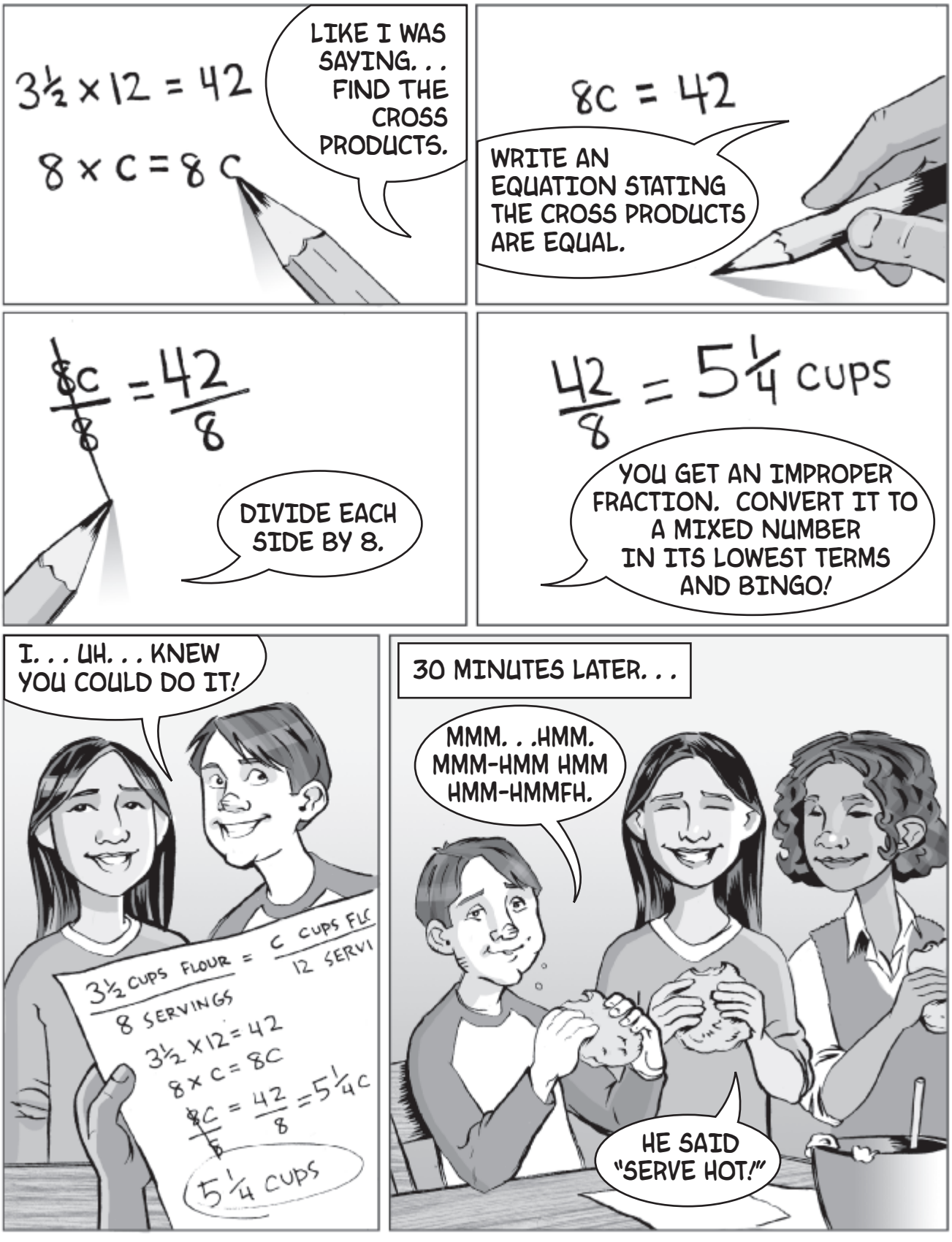
Mathematical Reasoning

1 Draw a Diagram: Getting Ready for Spaghetti 31
2 Scale Drawings: Here to There 34
3 Four-Step Plan: Time Out? 35

Practice On Your Own 36

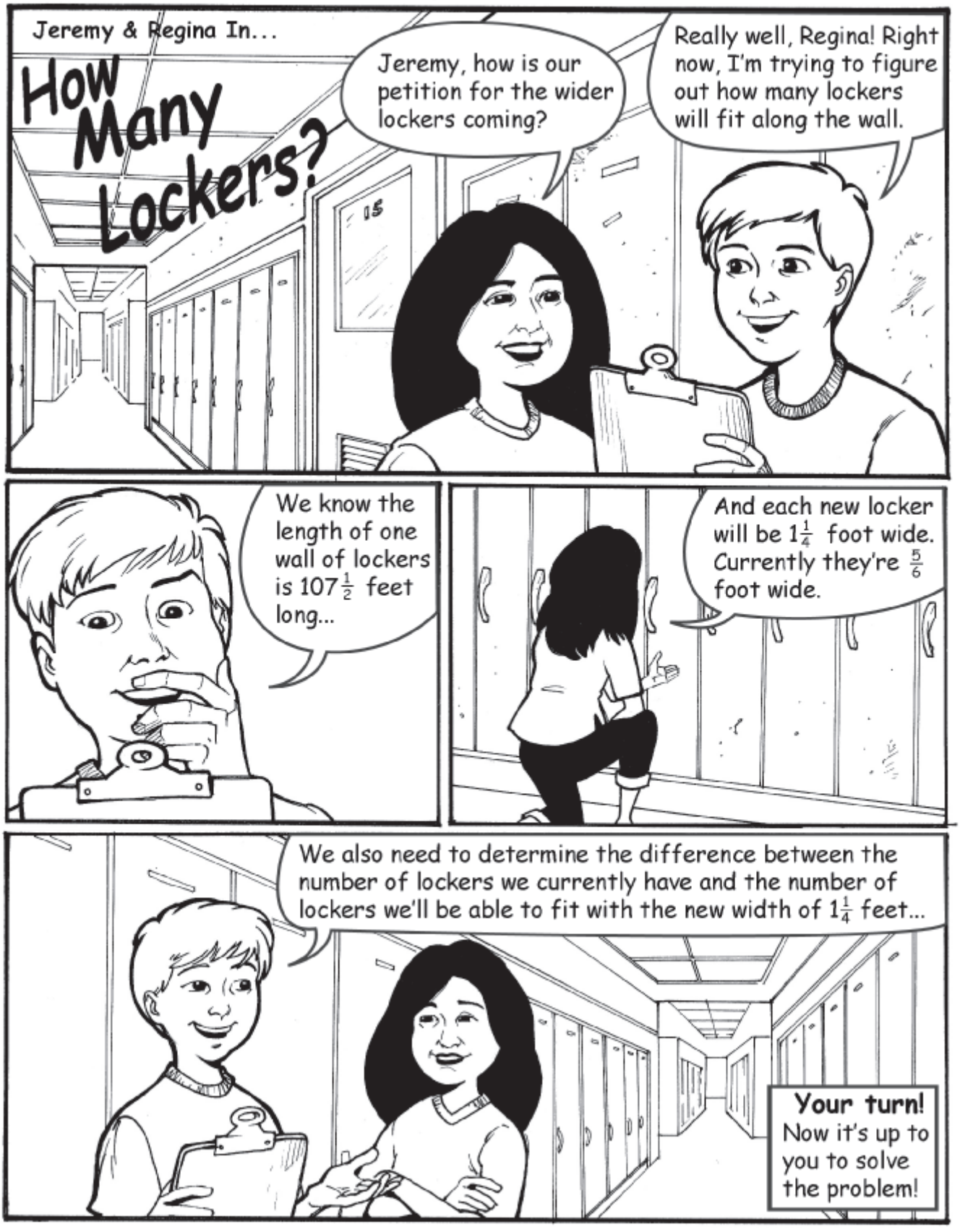
DREW, ALAMEDA, AND JASMINE IN:
THE FRY BREAD FIASCO
Navajo Fry Bread
2⅔ cups vegetable oil
cups of flour
¼ cup baking powder
2 tablespoons + 2 teaspoons salt
3⅓ cups warm milk
makes 12 servings
OH NO! IT'S SMUDGED!
I TOTALLY CANNOT READ THIS!
WELL, I REMEMBER MY GRANDMOTHER USED 3 ½ CUPS OF FLOUR TO MAKE 8 SERVINGS.
WHAT DO WE DO?
THAT'S ALL THE INFO WE NEED!

Number Sense 1: Proportions (*continued*)


3½ × 12 = 42
8 × c = 8 c
LIKE I WAS SAYING. . . FIND THE CROSS PRODUCTS.
8c = 42
WRITE AN EQUATION STATING THE CROSS PRODUCTS ARE EQUAL.
8c/8 = 42/8
DIVIDE EACH SIDE BY 8.
42/8 = 5¼ CUPS
YOU GET AN IMPROPER FRACTION. CONVERT IT TO A MIXED NUMBER IN ITS LOWEST TERMS AND BINGO!
I. . . UH. . . KNEW YOU COULD DO IT!
3½ CUPS FLOUR / 8 SERVINGS = c CUPS FLO / 12 SERVI
3½ × 12 = 42
8 × c = 8c
8c/8 = 42/8 = 5¼c
5¼ CUPS
30 MINUTES LATER. . .
MMM. . .HMM. MMM-HMM HMM HMM-HMMFH.
HE SAID "SERVE HOT!"

Number Sense 2: Order Rational Numbers

Number Sense 3: Divide Fractions



PRACTICE

On Your Own...

Number Sense

Read each question. Then fill in the correct answer on the answer document provided by your teacher or on a sheet of paper.

1. Marcello earns $108 for working 8 hours. Which equation could be used to find the amount A, in dollars, that he earns in 10 hours?

A $108 \cdot 8 = 10A$

B $\frac{108}{8} = \frac{A}{10}$

C $8 + 10 = 108 + A$

D $8A = 108 \div 10$

2. The density of oxygen is approximately 1.439×10^{-3} grams per cubic centimeter. Which of the following represents this number in standard form?

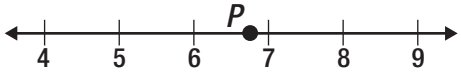
F 1,439

G 0.1439

H 0.0001439

J 0.001439

3. Point P on the number line best represents which square root?



A $\sqrt{35}$

B $\sqrt{47}$

C $\sqrt{51}$

D $\sqrt{60}$

4. A bolt of fabric $12\frac{5}{6}$ feet in length will be cut into five pieces of equal length. How could you find the length of each piece?

F Subtract 5 from $12\frac{5}{6}$.

G Divide $12\frac{5}{6}$ by 5.

H Divide 5 by $12\frac{5}{6}$.

J Multiply 5 by $12\frac{5}{6}$.

5. List 3.7, $-3\frac{1}{3}$, -3.1, and $3\frac{4}{5}$ in order from least to greatest.

A 3.7, -3.1, $-3\frac{1}{3}$, $3\frac{4}{5}$

B $-3\frac{1}{3}$, -3.1, $3\frac{4}{5}$, 3.7

C -3.1, 3.7, $-3\frac{1}{3}$, $3\frac{4}{5}$

D $-3\frac{1}{3}$, -3.1, 3.7, $3\frac{4}{5}$

6. Darla bought three notebooks priced at $1.29 each and five pens priced at $0.79 each. Which of the following equations can be used to find t, the total cost, in dollars, of the items she bought?

F $t = 3 + 1.29 + 5 + 0.79$

G $t = 8(1.29 + 0.79)$

H $t = 3(1.29) + 5(0.79)$

J $t = 5(1.29) + 3(0.79)$

7. Which fraction is between $\frac{4}{11}$ and $\frac{5}{8}$?

A $\frac{9}{20}$

B $\frac{4}{5}$

C $\frac{3}{4}$

D $\frac{7}{11}$

8. A hotel charges $255 for a three-night stay. At this rate, how much would a five-night stay cost?

F $1,275

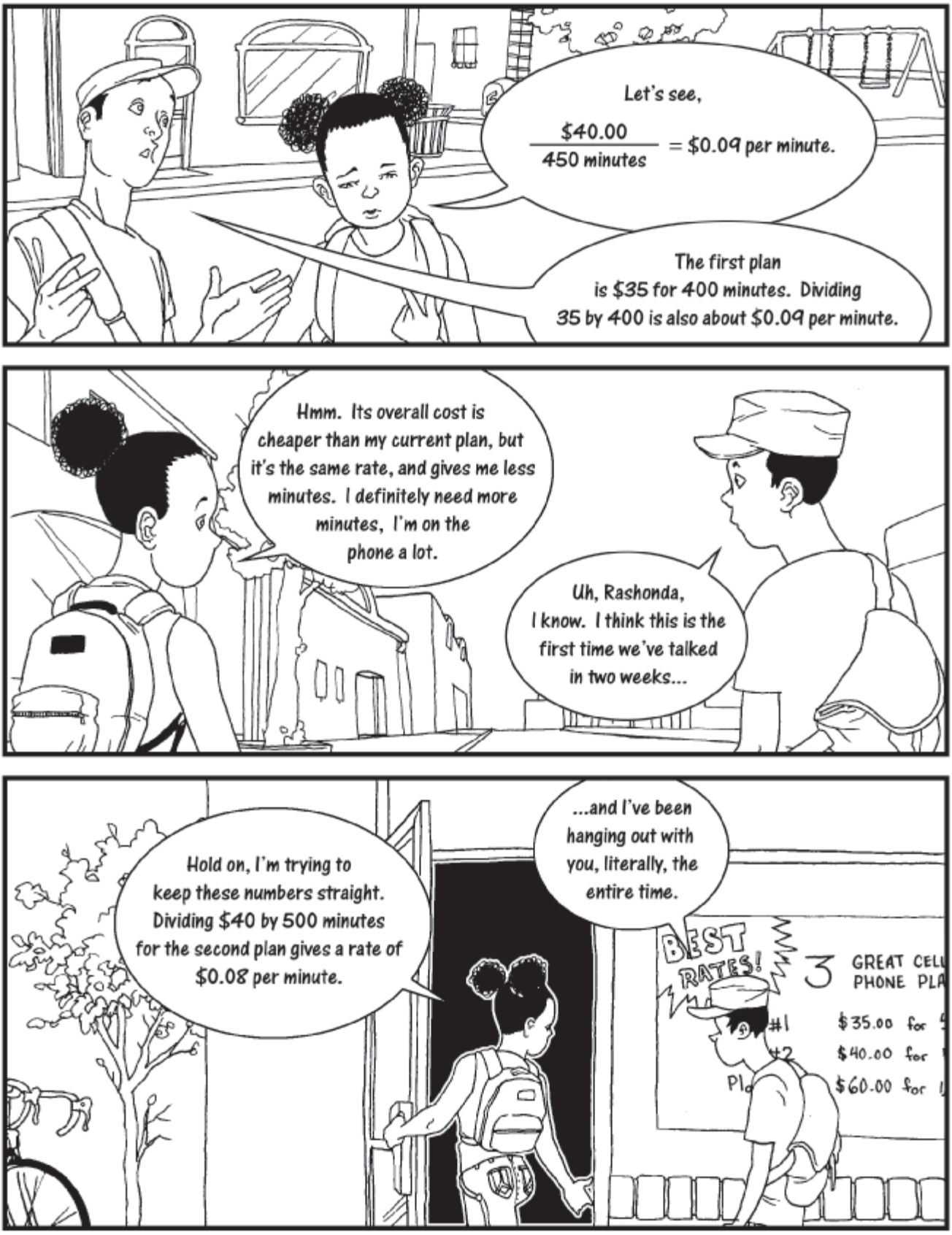
G $850

H $510

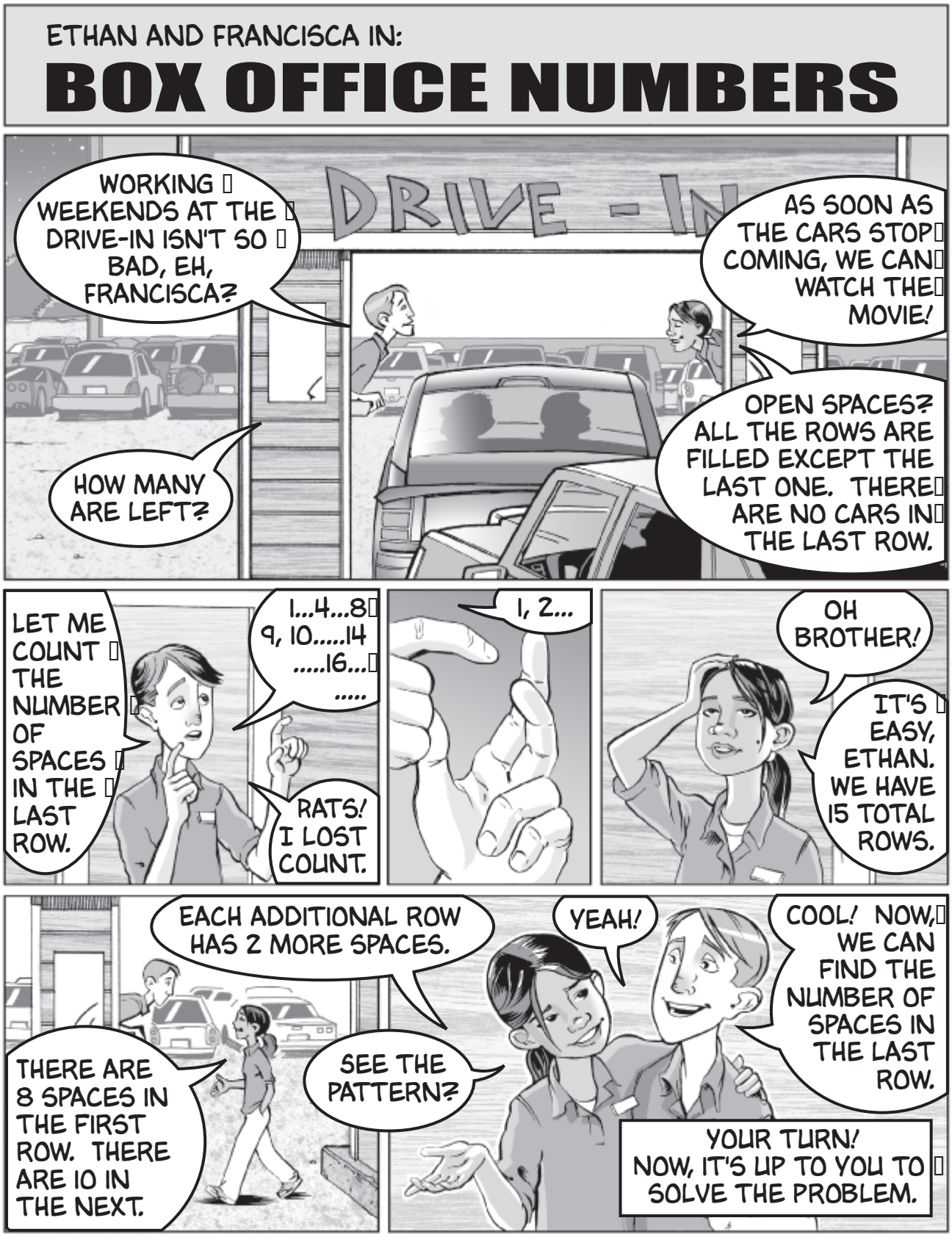
J $425

Rashonda and Jordan in
Talk is Cheap
Um, Roshanda, I'm pretty sure your phone is ringing.
I know. I've used up all my minutes for the month already. Its too expensive to talk after my minutes are gone.
RATES
3 GREAT CELL PHONE PLANS!
Plan #1 $35.00 for 400 monthly minutes!
Plan #2 $40.00 for 500 monthly minutes!
Plan #3 $60.00 for 1,000 monthly minutes!
You should get a better plan. Are any of these cheaper per minute?
Well, right now I pay $40.00 for 450 minutes per month.

Algebraic Thinking 1: Rates (*continued*)



talk
onger!
But, yeah that is a better deal by the minute.
Yeah, but is it the best? The third plan is $60 for 1,000 minutes. $60 ÷ 1,000 = $0.06.
I'll go with the third plan. This way I'll be able to talk longer and pay less per minute.
Oh great. I guess the only way we'll talk anymore is if I get a cell phone.


ETHAN AND FRANCISCA IN:
BOX OFFICE NUMBERS
DRIVE - IN
WORKING WEEKENDS AT THE DRIVE-IN ISN'T SO BAD, EH, FRANCISCA?
AS SOON AS THE CARS STOP COMING, WE CAN WATCH THE MOVIE!
HOW MANY ARE LEFT?
OPEN SPACES? ALL THE ROWS ARE FILLED EXCEPT THE LAST ONE. THERE ARE NO CARS IN THE LAST ROW.
LET ME COUNT THE NUMBER OF SPACES IN THE LAST ROW.
1...4...8 9, 10.....14 .....16... .....
RATS! I LOST COUNT.
1, 2...
OH BROTHER!
IT'S EASY, ETHAN. WE HAVE 15 TOTAL ROWS.
EACH ADDITIONAL ROW HAS 2 MORE SPACES.
THERE ARE 8 SPACES IN THE FIRST ROW. THERE ARE 10 IN THE NEXT.
SEE THE PATTERN?
YEAH!
COOL! NOW, WE CAN FIND THE NUMBER OF SPACES IN THE LAST ROW.
YOUR TURN! NOW, IT'S UP TO YOU TO SOLVE THE PROBLEM.

Algebraic Thinking 3: Ratios

PRACTICE

On Your Own...

Algebraic Thinking

Read each question. Then fill in the correct answer on the answer document provided by your teacher or on a sheet of paper.

1. A sequence of numbers was generated using the rule $5n + 3$, where n represents a number's position in the sequence. Which sequence fits this rule?

A 5, 8, 11, 14, 17, …
B 8, 13, 18, 23, 28, …
C 8, 11, 14, 17, 20, …
D 5, 10, 15, 20, 25, …

2. A survey of 250 students found that 28 were left-handed. If the survey is representative of the entire school, about how many of the 1,575 students in the school are left-handed?

F 176
G 223
H 492
J 518

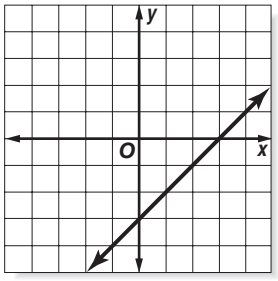
3. The following table represents a relationship.

x	y
−2	5
−1	3
0	1
1	−1
2	−3

Which equation represents the same relationship?

A $y = x + 7$
B $y = 2x - 1$
C $y = -2x + 1$
D $y = -2x - 3$

4. The following graph represents a relationship?



Which equation represents the same relationship?

F $y = x + 3$
G $y = x - 3$
H $y = -x + 3$
J $y = -x - 3$

5. Gina's Pizza charges $15.98 for two large one-topping pizzas. At this rate, how much will six large one-topping pizzas cost?

A $39.95
B $47.94
C $63.92
D $95.88

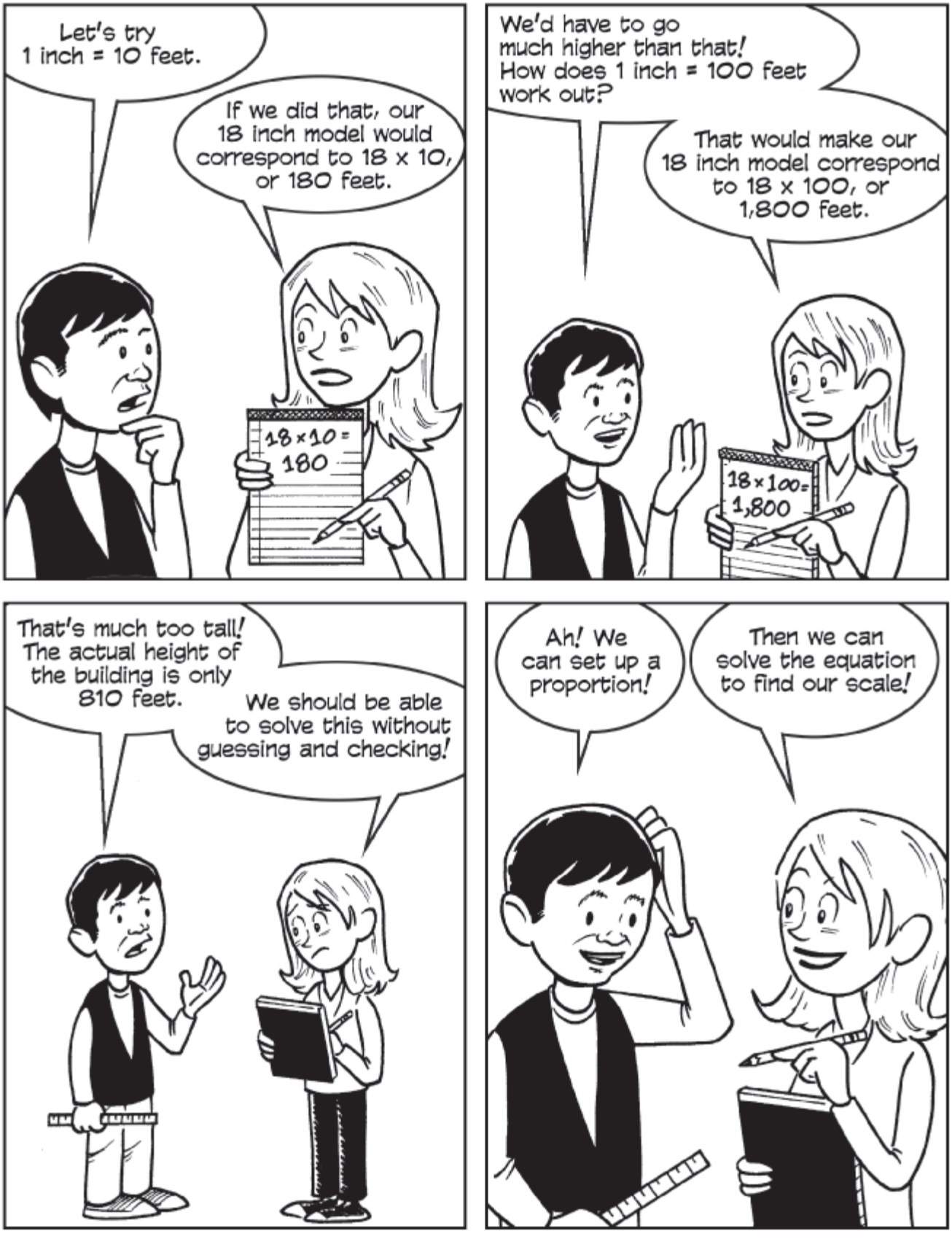
6. Let n represent a term's position in a sequence. Which algebraic expression can be used to find the nth term of the sequence below?

13, 19, 25, 31, …

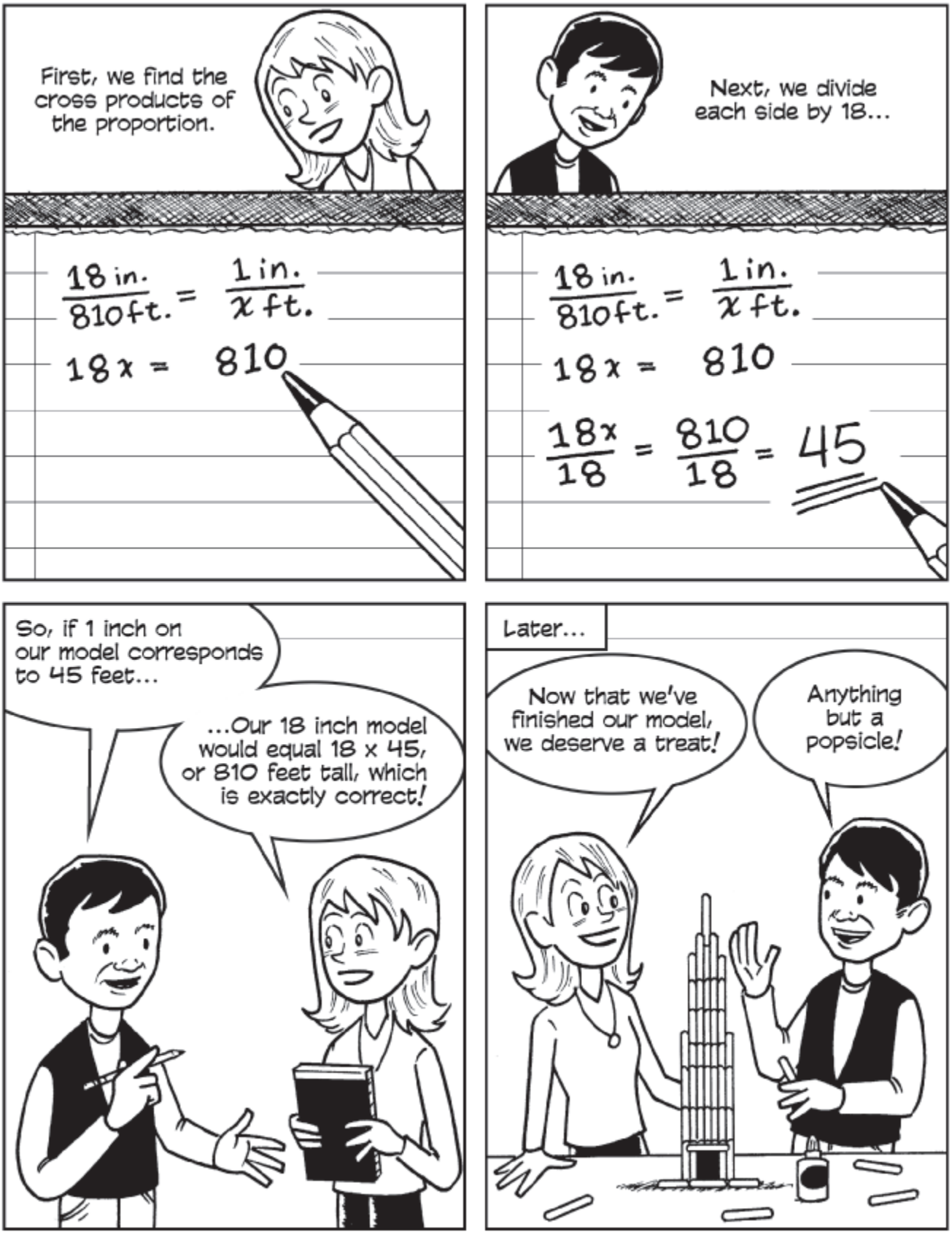
F $7n + 6$
G $6n + 7$
H $n + 6$
J $n + 7$

Miguel and Anabeth in: A TALE of SCALE
We need a good idea for our geometry project.
We both like architecture, so let's make a scale model of a building.
My mom works in the Central City Tower, and she told me that it's 810 feet high!
It's the tallest building in town!
What height should we make our model?
Not too tall... We have to carry it into class!
On the other hand, it has to be large enough to see!
How does this 18-inch ruler look to you?
That's perfect! We'll be able to carry our model on the school bus!
Now we just have to choose the scale.

Geometry 1: *Scale Drawings (continued)*

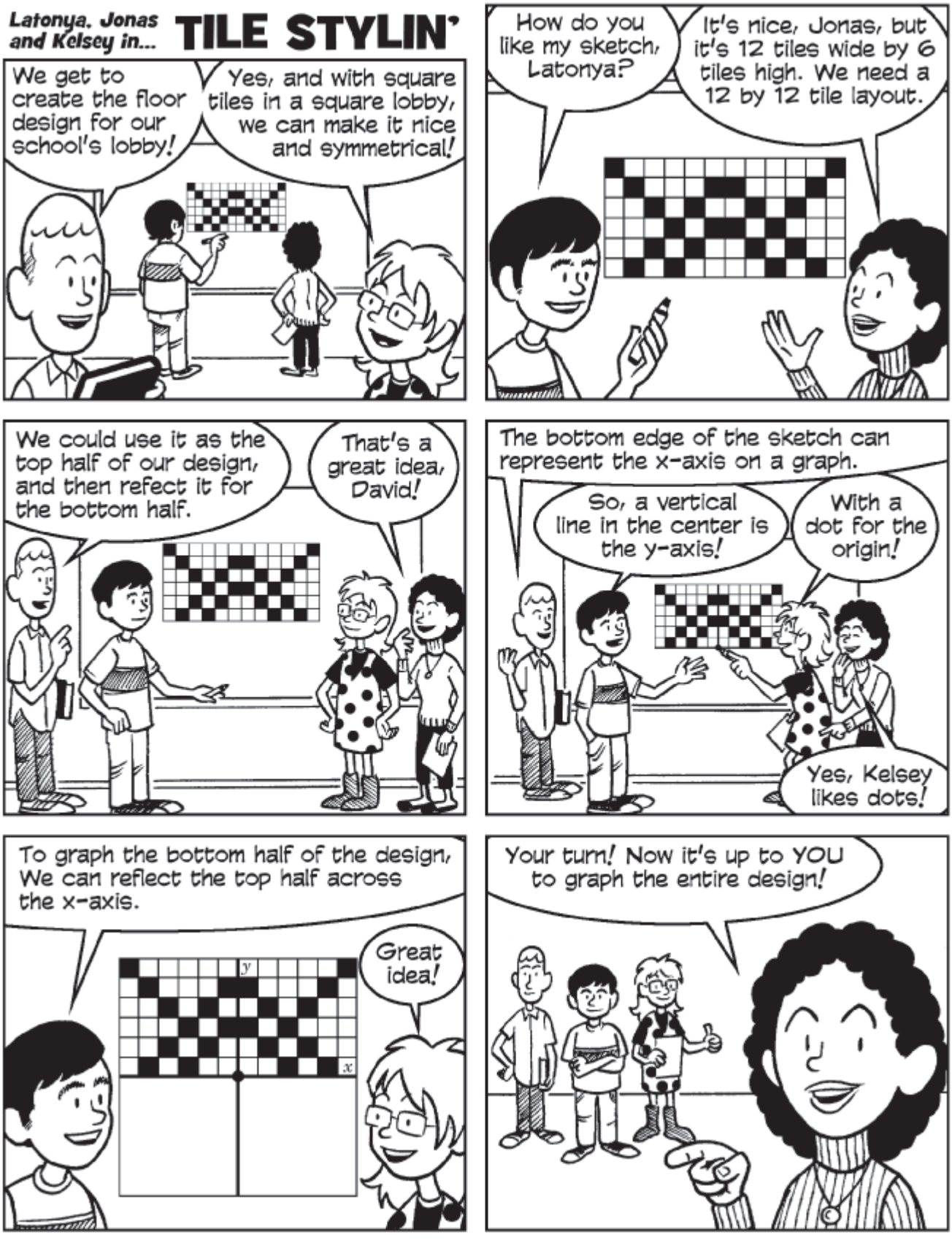


Geometry 1: *Scale Drawings (continued)*



Geometry 2: Pythagorean Theorem

Geometry 3: Reflections



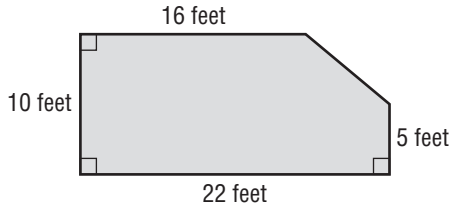
PRACTICE

On Your Own...

Geometry

Read each question. Then fill in the correct answer on the answer document provided by your teacher or on a sheet of paper.

1. Natalie would like to carpet her basement. The dimensions of the basement are shown below.



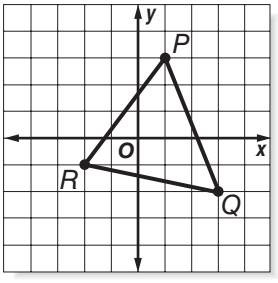
How many square feet of carpet are needed?

A 60.81 ft^2 **C** 176 ft^2
B 88 ft^2 **D** 205 ft^2

2. Which set of numbers below could represent the lengths of the sides of a right triangle?

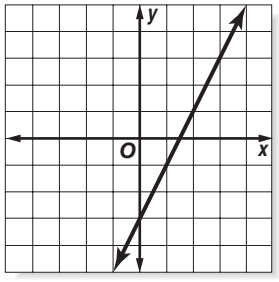
F 8, 15, 17 **H** 5, 12, 15
G 6, 7, 8 **J** 3, 4, 4

3. What are the coordinates of triangle *PQR* after a reflection across the *y*-axis?



A $P'(1, -3)$, $Q'(3, 2)$, $R'(-2, 1)$
B $P'(-1, -3)$, $Q'(-3, 2)$, $R'(2, 1)$
C $P'(-1, 3)$, $Q'(-3, -2)$, $R'(2, -1)$
D $P'(1, 3)$, $Q'(3, -2)$, $R'(-2, -1)$

4. Which of the following points lies on the line graphed?

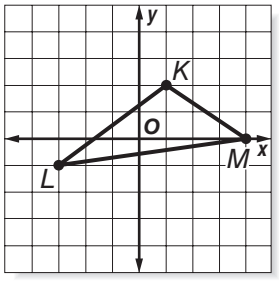


F (0, −1) **H** (4, −2)
G (3, 3) **J** (−1, 3)

5. A circle with a radius of 14 yards is dilated by reducing its radius by 35%. What is the radius of the dilated circle?

A 4.9 yd **C** 12.3 yd
B 9.1 yd **D** 18.9 yd

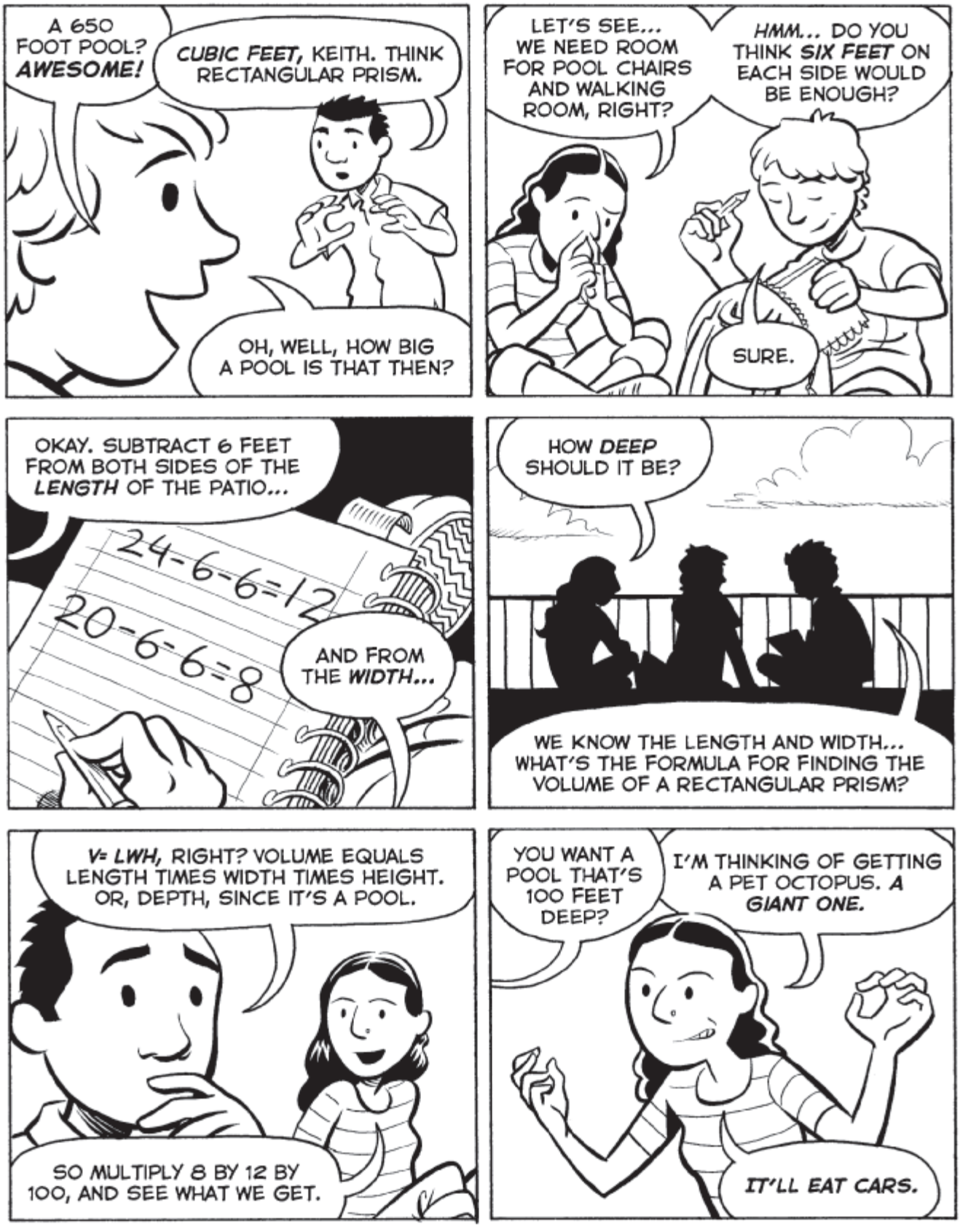
6. Triangle *KLM* is dilated by a scale factor of 4 using the origin as the center of dilation. What are the coordinates of the triangle after the dilation?



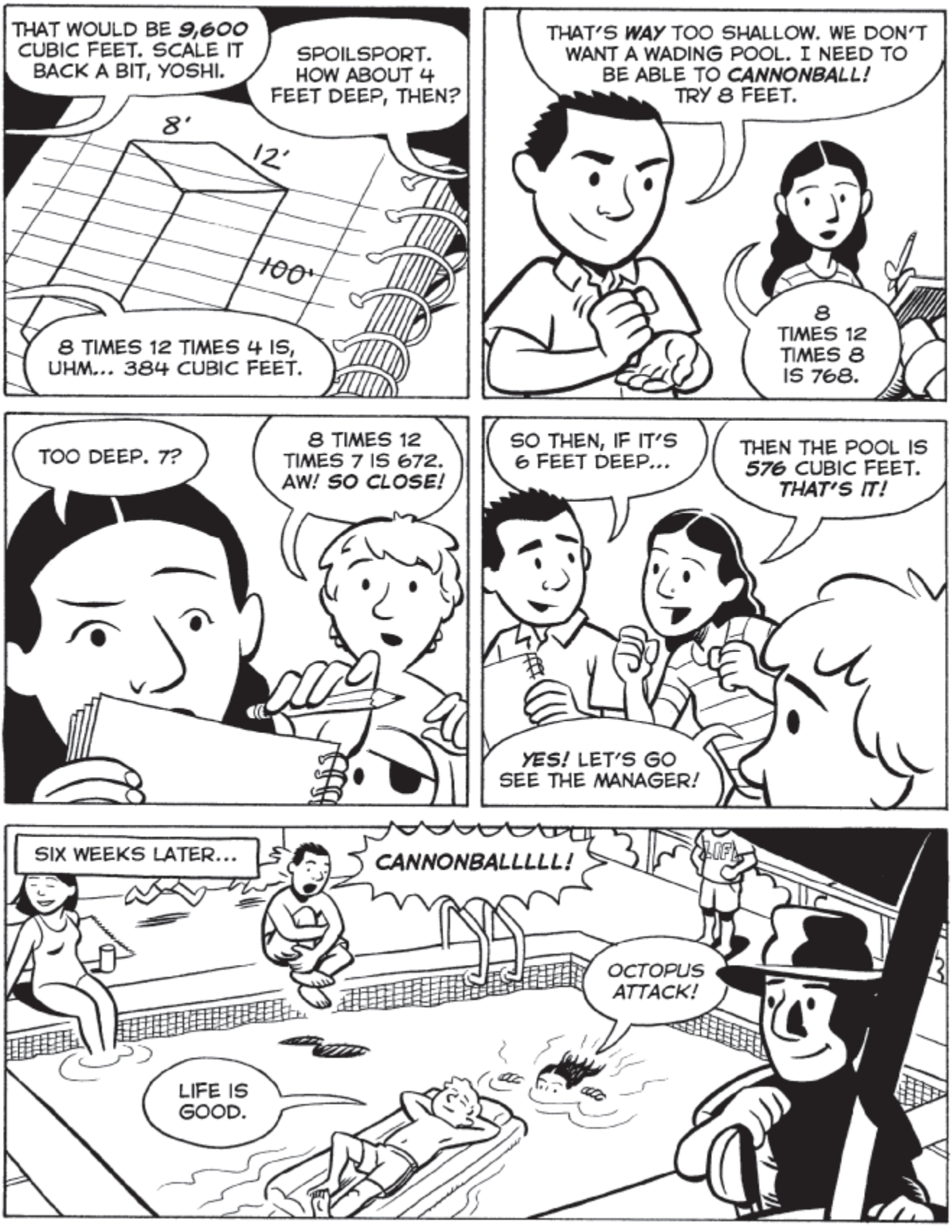
F $K'(1, -2)$, $L'(-3, 1)$, $M'(4, 0)$
G $K'(1, -8)$, $L'(-3, 4)$, $M'(4, 0)$
H $K'(4, -2)$, $L'(-12, 1)$, $M'(16, 0)$
J $K'(4, 8)$, $L'(-12, -4)$, $M'(16, 0)$

Measurement 1: *Volume of Prisms*

Measurement 1: *Volume of Prisms (continued)*

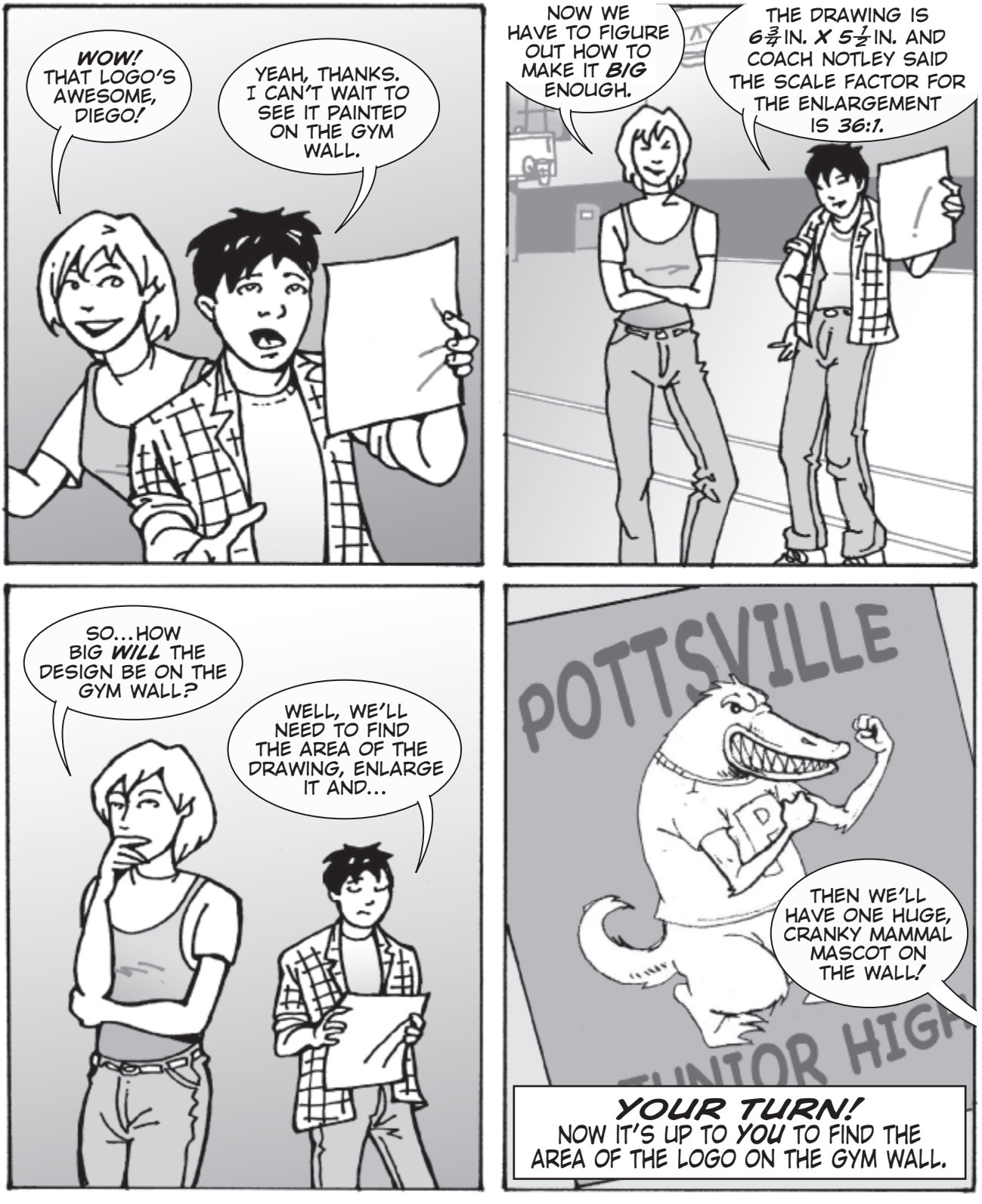


Measurement 1: *Volume of Prisms (continued)*



Measurement 2: Similar Figures

LOGO BOOSTER *with Karen and Diego*



PRACTICE

On Your Own...

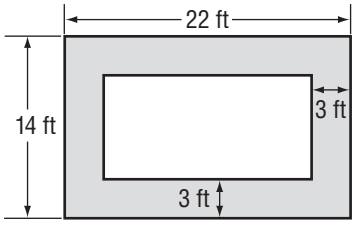
Measurement

Read each question. Then fill in the correct answer on the answer document provided by your teacher or on a sheet of paper.

1. A triangle with an area of 32 square centimeters is dilated by a scale factor of 2. What is the area of the new triangle?

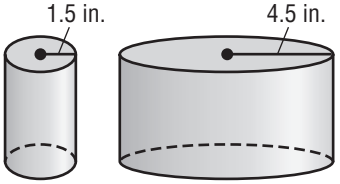
A 128 cm^2 **C** 64 cm^2
B 96 cm^2 **D** 34 cm^2

2. A rectangular swimming pool will be bordered by a walkway that is 3 feet wide, as shown. What is the area of the pool?



F 72 ft^2 **H** 308 ft^2
G 128 ft^2 **J** 560 ft^2

3. A manufacturer of cans of tuna decides to enlarge the radius of the can by a factor of 3. The height of the can will remain the same. If the original can of tuna has a radius of 1.5 inches, how many times greater will the volume of the new can be than the old one?

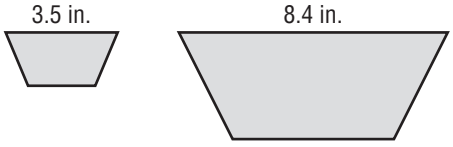


A 3 **C** 15
B 9 **D** 27

4. Sunil built a scale model of the Space Shuttle. The length of the model is 27.6 inches and the wingspan is 11.7 inches. If the actual length of the Space Shuttle is 184 feet, how wide is its wingspan?

F 434.1 ft **H** 92 ft
G 126 ft **J** 78 ft

5. The two trapezoids below are similar.



What is the ratio of the area of the larger trapezoid to the area of the smaller trapezoid?

A 8.4 : 3.5 **C** 5.76 : 1
B 4.9 : 1 **D** 70.56 : 1

6. Find the approximate volume of a cylinder whose height is 11 inches and whose base has a radius of 4 inches.

F 138.16 in^2 **H** 552.64 in^2
G 276.32 in^2 **J** 1,519.76 in^2

7. An 13-foot ladder is leaning against the side of a house. The bottom of the ladder is 3 feet from the base of the house. About how high on the side of the house does the ladder reach?

A 18 ft **C** 12.65 ft
B 13.93 ft **D** 8 ft

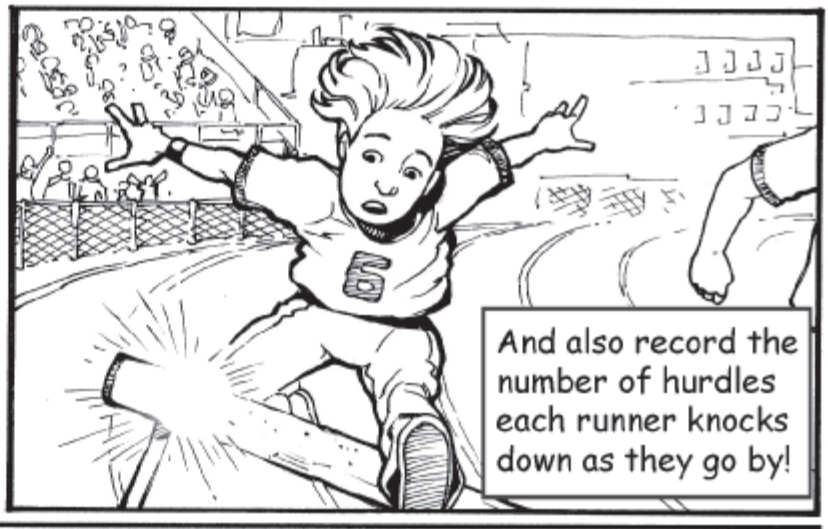
Statistics and Probability 1: Sampling Methods

Statistics and Probability 1: Sampling Methods (*continued*)

The following Saturday afternoon, a random sample is taken by the team.
We're down to our last four houses. Then let's go to Lisa's and tally the results.
The Farm Team over in Clarkfield plays on Friday nights, too. I'd come see you if I could, but I've got season tickets this year.
Thank you, sir.
We've heard that same thing a lot today. I wonder if coach will let us switch our schedule?
Looks like the whole town is here to see us tonight!
That survey really paid off. Go Isabel! Great hit!
Later in the season, now on Thursday night.

YES! THAT'S MY TWELFTH BASKET OUT OF TWENTY!
NOT BAD...OF COURSE, I MADE FOURTEEN OUT OF TWENTY.
RICO AND TRENT IN:
NOTHING BUT NET
OKAY, HERE'S THE DEAL: WE'LL LEAVE AFTER WE EACH SINK TEN MORE.
HOW LONG WILL THAT TAKE?
WE CAN FIGURE IT OUT!
WHAT DO YOU MEAN?
PROBABILITY, MAN! BASED ON WHAT WE'VE DONE SO FAR, WE CAN PREDICT HOW MANY SHOTS WE EACH NEED TO TAKE TO GET TEN IN.
WHAT ARE YOU, A MATH TEACHER?
YOUR TURN!
NOW IT'S UP TO YOU TO SOLVE THE PROBLEM!
SO, UH, DID YOU BRING PAPER AND PENCILS?

Statistics and Probability 3: Scatter Plots



Runner	Number of Hurdles Knocked Down	Finish Time (seconds)
1	0	42
2	0	41
3	0	44
4	1	43
5	2	45
6	0	43
7	2	46
8	3	48
9	2	47
10	0	47
11	3	49
12	2	48

Your turn! Now it's up to you to determine if there is a relationship between the number of hurdles knocked down and the finish time!

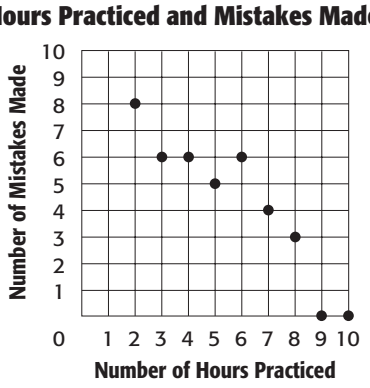
PRACTICE

On Your Own...

Statistics and Probability

Read each question. Then fill in the correct answer on the answer document provided by your teacher or on a sheet of paper.

1. The scatter plot shows the relationship between the number of hours spent practicing the piano and the number of mistakes made during a recital.



What trend is shown in the scatter plot?

A There is no trend shown.

B As the number of hours practiced increases, the number of mistakes made increases.

C The number of hours practiced is equal to the number of mistakes made.

D As the number of hours practiced increases, the number of mistakes made decreases.

2. What is the probability of rolling a 4 or a 5 on a fair number cube numbered 1 through 6?

F $\frac{1}{6}$ **H** $\frac{2}{5}$

G $\frac{1}{3}$ **J** $\frac{3}{4}$

3. A city planner randomly surveyed 220 adults visiting the city park and found that 88 of them visit the park at least once a week. On average, about 760 adults visit the park daily. Of these, what is the best estimate of the number of adults who visit the park at least once a week?

A 220 **C** 304

B 286 **D** 350

4. The table shows the sales for a flower shop for five weeks.

Week	Sales
1	$525
2	$488
3	$602
4	$627
5	$412

Find the mean of the data set.

F $530.80 **H** $627

G $525 **J** There is no mean.

5. The number of miles Marcia ran on each of eight consecutive days was 2, 1.5, 4, 2.5, 3, 2, 1.5, and 3. If she runs for six more days, which is the best prediction for the number of days in which Marcia will run for more than 2 miles?

A about 2 out of 6 days

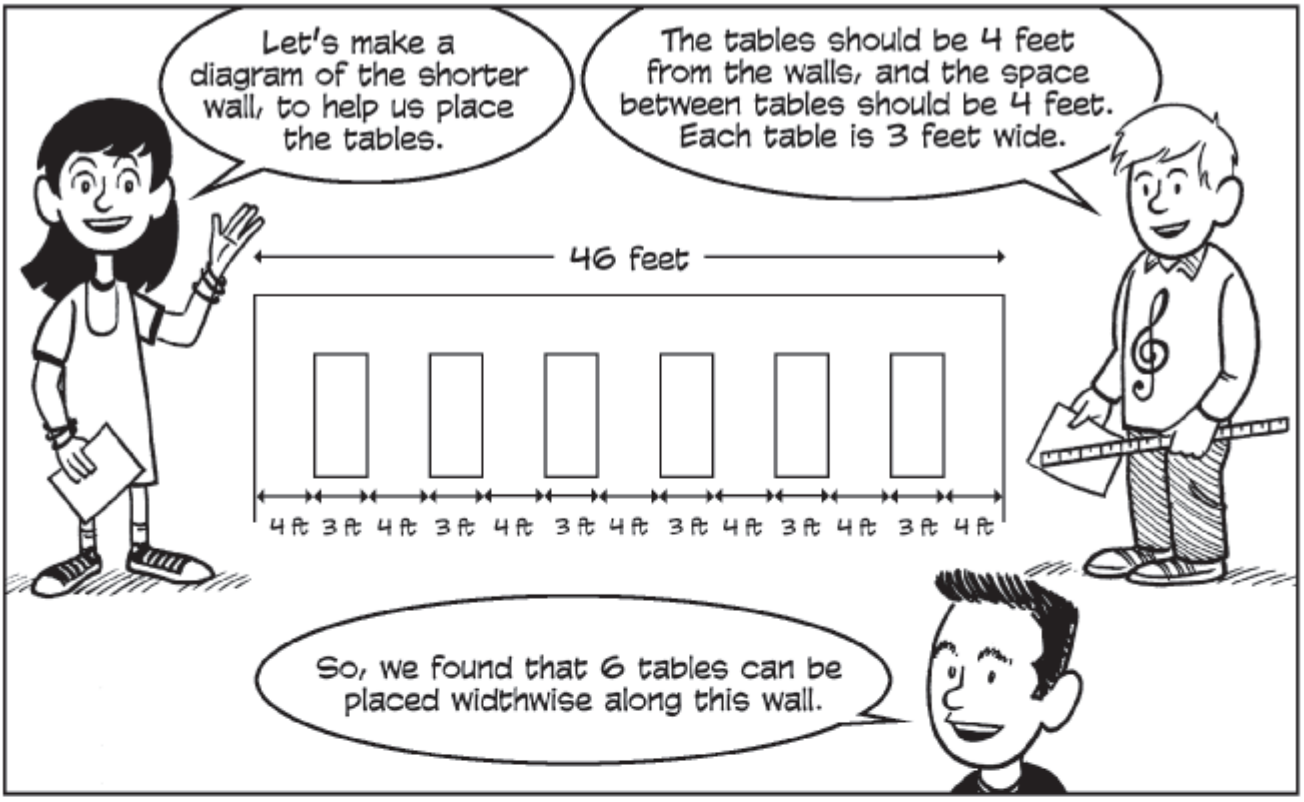
B about 3 out of 6 days

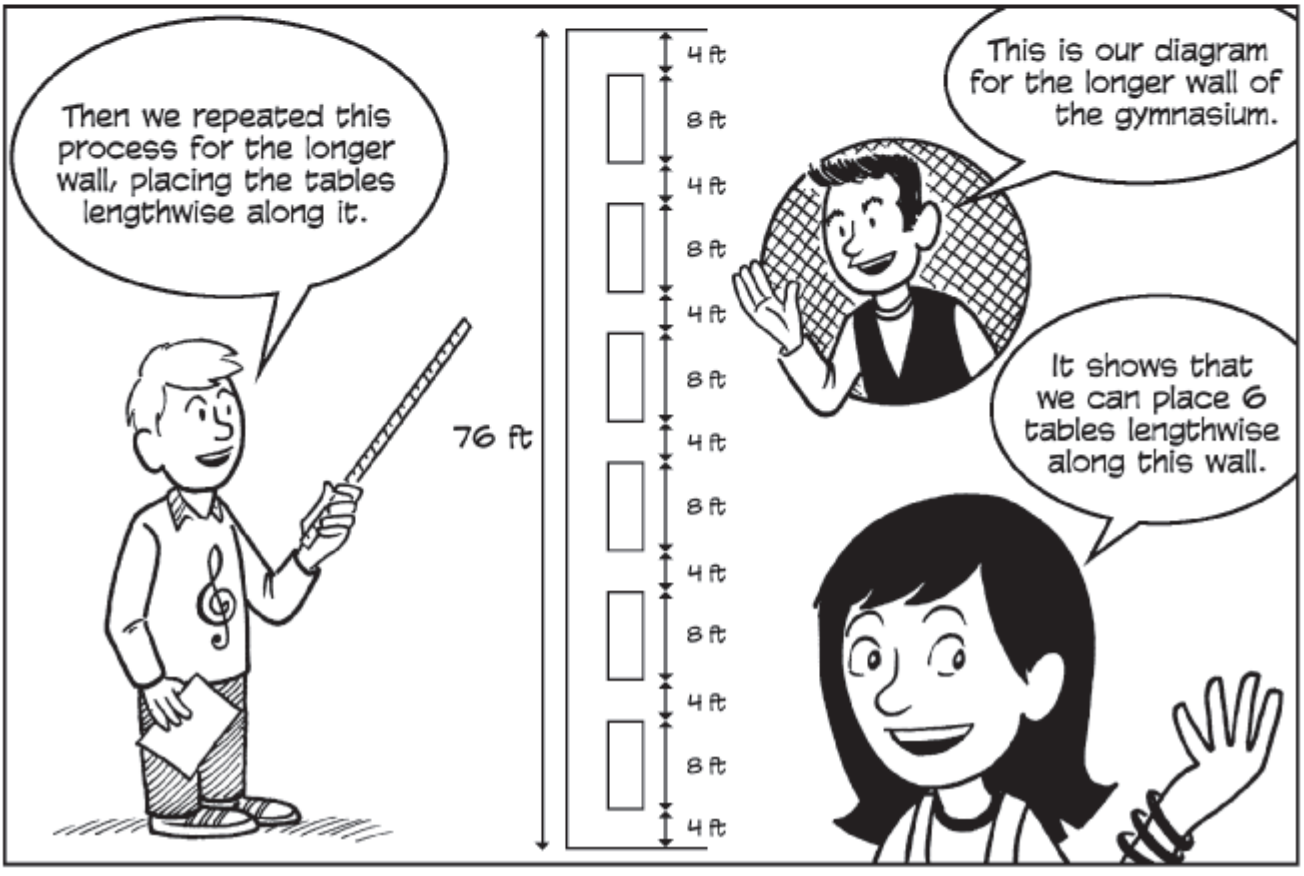
C about 4 out of 6 days

D about 5 out of 6 days

Mathematical Reasoning 1: Draw a Diagram

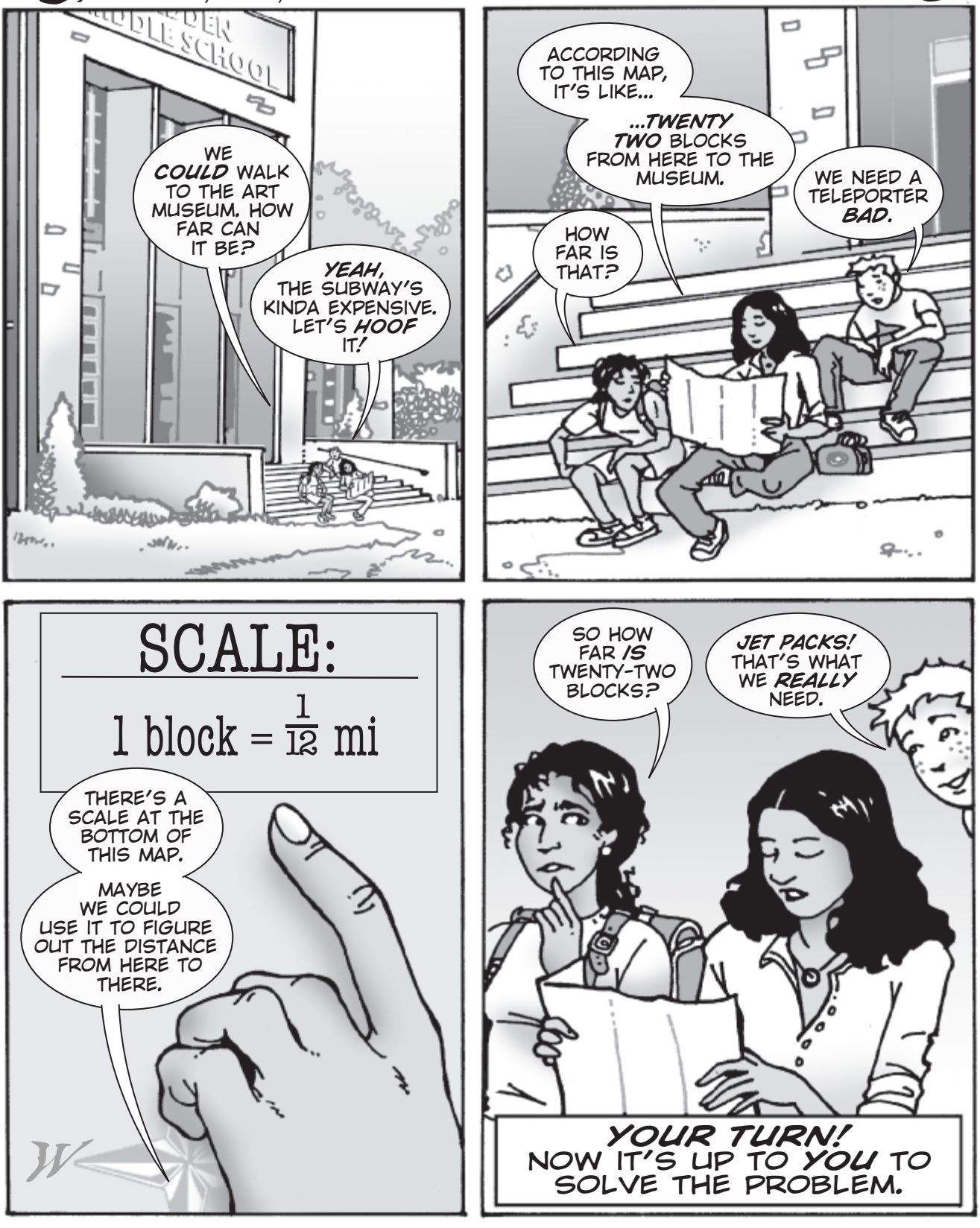
Mathematical Reasoning 1: *Draw a Diagram* (*continued*)





Mathematical Reasoning 1: Draw a Diagram (*continued*)

Jacinta, Eric, and Fatima in: **HERE TO THERE**



Mathematical Reasoning 3: Four-Step Plan

TO ISLAND	FROM ISLAND
9:00 am	9:28 am
9:56 am	10:24 am
11:52 am	11:20 am
12:48 pm	1:16 pm
1:44 pm	2:12 pm
2:40 pm	3:08 pm
3:36 pm	4:04 pm
4:32 pm	5:00 pm
-	5:56 pm

Ride time is 18 minutes

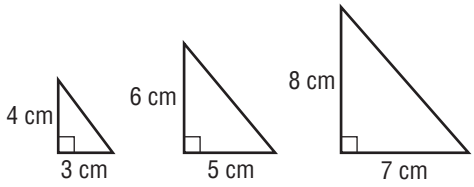
PRACTICE

On Your Own...

Mathematical Reasoning

Read each question. Then fill in the correct answer on the answer document provided by your teacher or on a sheet of paper.

1. The figures below form a pattern.



What would be the approximate length of the hypotenuse of the next figure in the pattern?

A 9 cm
B 10 cm
C 13.45 cm
D 15 cm

2. Which statement best describes the pattern of the terms in the sequence below?

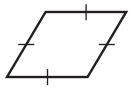
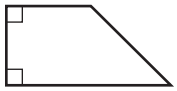
1.7, 2.6, 3.5, 4.4, 5.3, …

F The sum of the ones digit and the tenths digit is nine.
G Add 1.1 to each term.
H Subtract 0.9 from each term.
J The sum of the ones digit and the tenths digit is eight.

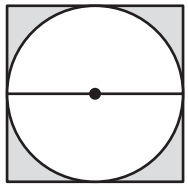
3. At a restaurant, Cassandra's meal totaled $14.85. She decided to leave a 20% tip. If she paid with a $20 bill, what is the first step to determine the amount of change that Cassandra should receive?

A Find 20% of $14.85.
B Find $20 − $14.85.
C Find 80% of $14.85.
D Find 20% of $20.

4. Which figure does not belong in this group?

F 
H 
G
J

5. In the figure below, the diameter of the circle is 6 inches.



Which expression represents the shaded area, in square inches?

A $6^2 - \pi \cdot 6^2$
B $6^2 - \pi \cdot 3^2$
C $6^2 + \pi \cdot 3^2$
D $12^2 - \pi \cdot 6^2$

6. Jeremiah's car averages 27 miles per gallon of gasoline. What other information is necessary to find how much Jeremiah will spend on gasoline for a 850-mile trip?

F the cost per gallon of gasoline
G the number of hours traveled
H the number of times Jeremiah plans to stop for gas
J the size of the gas tank