BRIDGES IN MATHEMATICS 5

GRADE 5 SUPPLEMENT

Set B1 Algebra: Diagrams & Equations

Includes

Activity 1: The Carnival	B1.1
Independent Worksheet 1: Padre's Pizza	B1.7
Independent Worksheet 2: Choosing Equations & Diagrams	B1.11

Skills & Concepts

- ★ represent an unknown quantity using a letter or a symbol
- ★ express mathematical relationships using equations
- ★ use diagrams and equations to draw conclusions about problem situations

Published by The MATH LEARNING CENTER *Salem, Oregon*

P201304

Bridges in Mathematics Grade 5 Supplement
Set B1 Algebra: Diagrams & Equations

The Math Learning Center, PO Box 12929, Salem, Oregon 97309. Tel. 1 800 575–8130.
© 2013 by The Math Learning Center
All rights reserved.
Prepared for publication on Macintosh Desktop Publishing system.
Printed in the United States of America.

P201304

The Math Learning Center grants permission to classroom teachers to reproduce blackline masters in appropriate quantities for their classroom use.

Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

Set B1 ★ Activity 1

ACTIVITY

The Carnival

Overview

Students practice writing equations and drawing diagrams to go with a variety of problem situations. Then they select equations and diagrams that best represent a problem situation.

Skills & Concepts

★ represent an unknown quantity using a letter or a symbol

★ express mathematical relationships using equations

★ use diagrams and equations to draw conclusions about problem situations

You'll need

★ The Carnival (page B1.3, run 1 copy on a transparency)

★ More Carnival Problems (pages B1.4–B1.6, run 1 copy on a transparency, plus a class set)

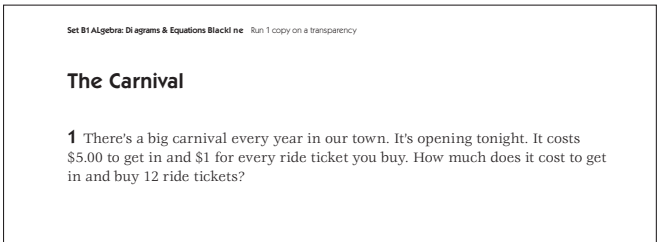
★ overhead pens

★ piece of paper to mask parts of the overhead

★ Student Math Journals or 1 piece of lined or grid paper per student

Instructions for The Carnival

1. Place the top portion of The Carnival overhead on display, keeping the other 3 problems covered for now. Read the problem with the class, and ask students to give the thumbs-up sign when they have the answer. Invite a couple of volunteers to share and explain their solutions.



Set B1 ALgebra: Di agrams & Equations Blackl ne Run 1 copy on a transparency

The Carnival

1 There's a big carnival every year in our town. It's opening tonight. It costs $5.00 to get in and $1 for every ride ticket you buy. How much does it cost to get in and buy 12 ride tickets?

Gabe *It's $17.00 because you have to pay $5.00 to get in and $1.00 for each ticket. If you get 12 tickets, that's $12.00. Five more dollars makes 17 in all.*

Alyssa *I said the same thing. I just went 12 + 5 because I knew it was a dollar for every ride ticket.*

2. Have students get out their math journals. Ask them to write an equation to show the amount of money it would take to get in and buy 12 ride tickets. Have them pair-share their responses and then call on volunteers to read theirs to the class. Record the suggested equations at the overhead.

3. Explain that sometimes people use a lettrt, such as x, to represent the quantity to be determined. How would you write the equation if you used x to stand for the total amount of money in this problem? Discuss this with the class and record their ideas at the overhead.

© The Math Learning Center

Activity 1 The Carnival (cont.)

Set B1 Algebra: Diagrams & Equations Blackline Run 1 copy on a transparency

The Carnival

1 There's a big carnival every year in our town. It's opening tonight. It costs $5.00 to get in and $1 for every ride ticket you buy. How much does it cost to get in and buy 12 ride tickets?

$5.00 + $12.00 = $17.00
$5.00 + $12.00 = ×

$5.00 + (12 × $1.00) = $17.00
× = $5.00 + (12 × $1.00)

4. Reveal each of the other 3 problems one by one. In each case, have students respond in their journals and pair-share their responses before asking volunteers to share their thinking with the class. Press students to explain how they made their selections in problems 2 and 4, and why some of the other choices don't work. (The answers have been marked on the copy below for your reference. Some of your students may have other valid responses to problem 3.)

2 Miguel is going with his friend, Corey. Miguel is planning to buy 16 ride tickets. Which equation could be used to find x, the amount of money he'll need to get in and buy ride tickets?

ⓐ $x = \$5.00 + (16 \times \$1.00)$
b $x = \$5.00 \times (16 \times \$1.00)$
c $x = \$16.00 - \$5.00$
d $x = (16 \times \$1.00) \div \$5.00$

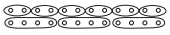
3 Corey has $27.00 to spend on admission and tickets. How many tickets will he be able to buy? Write an equation in your journal to show. Use the letter x to stand for the number of tickets Corey will be able to buy.

× = $27.00 - $5.00

4 Miguel's favorite ride is the Teacup. Some of the cups hold 2 people. Others hold 4 people. There are 9 cups in all, and when the ride is full, it holds 24 people. Which diagram best represents this problem? Why?

a

b

ⓒ 

d

5. Ask students to use the information in problem 4, including diagram c to solve the following problem: How many of the teacups seat 2 people, and how many seat 4 people?

6. Give students each a copy of More Carnival Problems. Review the sheets with the class. When students understand what to do, have them go to work. Encourage them to share and compare strategies and solutions as they work.

7. Reconvene the class as time allows to discuss solutions and strategies for some or all of the problems.

INDEPENDENT WORKSHEET

See Set B1 Independent Worksheets 1 and 2 for more practice selecting equations and diagrams to represent meaningful problem situations.

© The Math Learning Center

The Carnival

1 There's a big carnival every year in our town. It's opening tonight. It costs $5.00 to get in and $1 for every ride ticket you buy. How much does it cost to get in and buy 12 ride tickets?

2 Miguel is going with his friend, Corey. Miguel is planning to buy 16 ride tickets. Which equation could be used to find x, the amount of money he'll need to get in and buy ride tickets?

○ $x = \$5.00 + (16 \times \$1.00)$

○ $x = \$5.00 \times (16 \times \$1.00)$

○ $x = \$16.00 - \$5.00$

○ $x = (16 \times \$1.00) \div \$5.00$

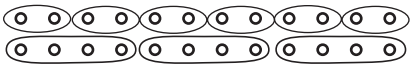
3 Corey has $27.00 to spend on admission and tickets. How many tickets will he be able to buy? Write an equation in your journal to show. Use the letter x to stand for the number of tickets Corey will be able to buy.

4 Miguel's favorite ride is the Teacup. Some of the cups hold 2 people. Others hold 4 people. There are 9 cups in all, and when the ride is full, it holds 24 people. Which diagram best represents this problem? Why?

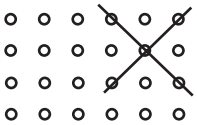
○

○

○



○



© The Math Learning Center

NAME _____ **DATE** _____

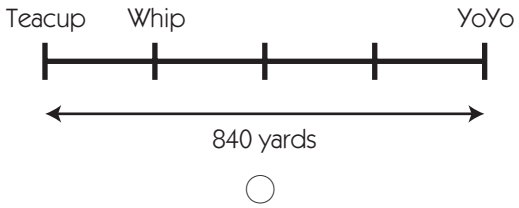
More Carnival Problems page 1 of 3

1 Each of the seats on the giant ferris wheel holds 3 people. There are 26 seats in all. Which equation could be used to find x, the number of people riding when the ferris wheel is full?

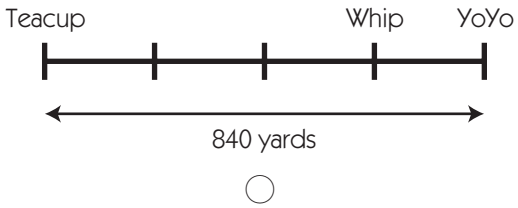
$3 \div 26 = x$ ○ $x + 26 = 3$ ○ $3 \times 26 = x$ ○ $x - 3 = 26$ ○

2 After they rode on the Teacup, Miguel and Corey wanted to go on the Yoyo. In order to get there, they had to walk past the Whip. It is three times as far from the Teacup to the Whip as it is from the Whip to the Yoyo. It is 840 yards from the Teacup to the Yoyo. How far is it from the Teacup to the Whip?

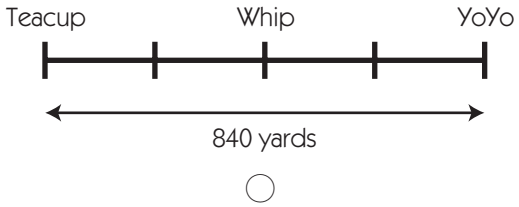
a Which diagram below best shows this problem?



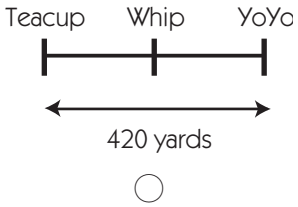
○



○



○



○

b Use the diagram you picked to help solve the problem. Show all of your work.

© The Math Learning Center

More Carnival Problems page 2 of 3

3 Some of the rides take 2 tickets and some of them take 3 tickets.

a If Marisa had 17 tickets and used all of them, how many 2-ticket and 3-ticket rides did she take?

○ 5 two-ticket rides and 4 three-ticket rides

○ 10 two-ticket rides and 7 three-ticket rides

○ 3 two-ticket rides and 3 three-ticket rides

○ 4 two-ticket rides and 3 three-ticket rides

b Use numbers, words, and/or labeled sketches to explain your answer to part a.

4 Darius has 9 rides tickets. His sister Deja has 3 more ride tickets than Darius. Their friend Camila has twice as many ride tickets as Deja.

a Which equation could be used to find x, the number of tickets Camila has?

$(9 + 3) \times 2 = x$ ○ $9 \times 3 = x$ ○ $(9 + 3) \div 2 = x$ ○ $9 \times 3 \div 2 = x$ ○

b Use numbers, words, and/or labeled sketches to explain your answer to part a.

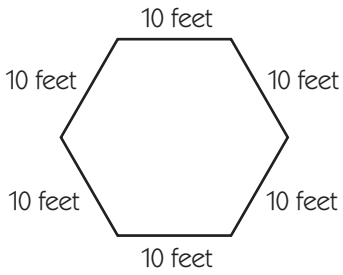
© The Math Learning Center

NAME _____ **DATE** _____

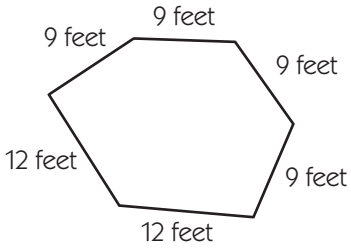
More Carnival Problems page 3 of 3

5 There is a bumper-car ride for little kids next to the hotdog stand. The fence around the ride is a hexagon with 2 long sides that are equal and 4 short sides that are equal.

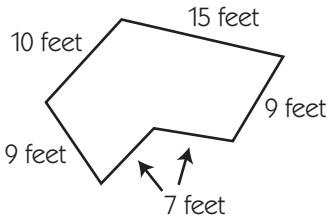
a Which diagram below best shows the fence around the bumper car ride?



○



○



○

b Use the diagram you picked to write and solve an equation for the perimeter of the fence.

© The Math Learning Center

NAME _____ **DATE** _____

Set B1 ★ Independent Worksheet 1

INDEPENDENT WORKSHEET

Padre's Pizza

1 It costs $9.50 for a large pizza with cheese at Padre's Pizza. Each extra topping is $1.00.

a Which equation could be used to find y, the amount of money it would cost for a large pizza with 4 extra toppings?

$y = \$9.50 - \$4.00$ ○

$y = \$9.50 \times (4 \times \$1.00)$ ○

$y = \$9.50 + (4 \times \$1.00)$ ○

$y = (4 \times \$1.00) \div \$9.50$ ○

b Explain your answer to part a. Why did you choose this equation instead of the others?

2 It's Ty's birthday. For his party, his mom bought 4 large pizzas with a total of 9 extra toppings.

a Which equation could be used to find y, the amount of money she had to pay?

$y = \$9.50 + (9 \times \$1.00)$ ○

$y = (4 \times \$9.50) + (4 \times \$1.00)$ ○

$y = \$9.50 - (9 \times \$1.00)$ ○

$y = (4 \times \$9.50) + (9 \times \$1.00)$ ○

b Explain your answer to part a. Why did you choose this equation instead of the others?

(Continued on back.)

© The Math Learning Center

Independent Worksheet 1 Padre's Pizza (cont.)

3 The marching band went to Padre's after the Friday night football game They ordered 7 large pizzas with 3 extra toppings each and 4 large pizzas with 4 extra toppings each.

a Which equation could be used to find t, the total number of extra toppings?

$t = (7 \times 3) + (4 \times 4)$ ○

$t = 7 \times 3 \times 4 \times 4$ ○

$t = (7 + 3) \times (4 + 4)$ ○

$t = 7 + 3 + 4 + 4$ ○

b Use the equation you picked to solve the problem. How many extra toppings did they order in all? Show your work.

c How much did they have to pay for all the pizzas they ordered? Show all your work.

4 The cook at Padre's Pizza has 12 pizzas lined up for a special order. She put cheese and sausage on all of them. She added pineapple to every second pizza and olives to every third pizza.

a Which pizzas in the line will have all 4 toppings (cheese, sausage, pineapple, and olives)? Mark the row you could use to solve this problem.

○ P | PC | PO | PC T | P | PC O | P | PC T | PO | PC | P | PC OT

○ C | CS | CP | CS O | C | CS P | C | CS O | CP | CS | C | CS PO

○ CS | CS P | CS O | CS P | CS | CS PO | CS | CS P | CS O | CS P | CS | CS PO

(Continued on next page.)

© The Math Learning Center

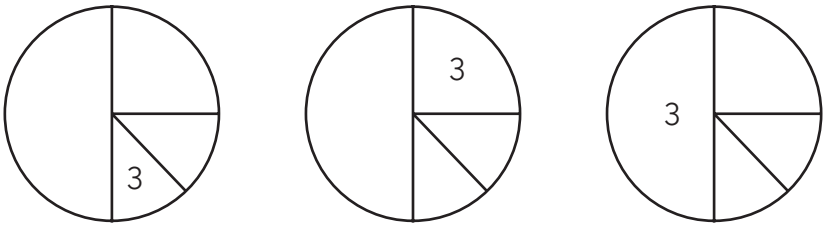
NAME _____ **DATE** _____

Independent Worksheet 1 Padre's Pizza (cont.)

4b Which of the 12 pizzas got all 4 toppings?

5 The boy's basketball team came into Padre's on Wednesday night after practice. Half the boys on this team also play soccer, $\frac{1}{4}$ play baseball, and $\frac{1}{8}$ are in the school band. The remaining 3 boys aren't in any other activities. No one is in more than 2 activities.

a How many boys are there on the basketball team? Circle the diagram that will give you the most help solving this problem.



b Use the diagram you picked to help solve the problem. Show all of your work.

© The Math Learning Center

© The Math Learning Center

NAME _____ **DATE** _____

Set B1 ★ Independent Worksheet 2

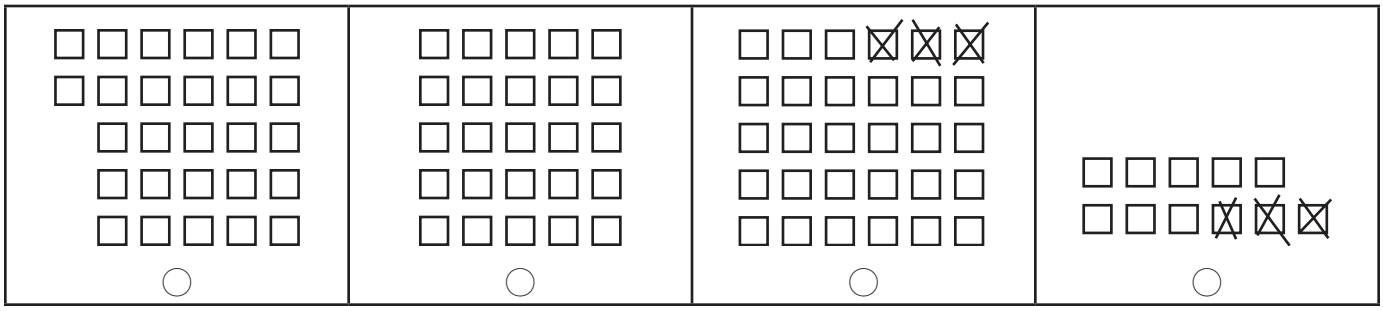
INDEPENDENT WORKSHEET

Choosing Equations & Diagrams

Select the diagram and equation that best represent each problem situation below.

1 There are 5 rows of 6 desks in the classroom. Today, 3 of the desks are empty. How many students are in class today?

a Which diagram below best shows this problem?



b If x represents the number of students in class, which equation could be used to solve the problem?

$5 + 3 + 6 = x$ ○	$(5 \times 6) - 3 = x$ ○	$(5 \times 3) + 6 = x$ ○	$(5 \times 6) + 3 = x$ ○

c Explain your answer to part b. Why did you choose this equation instead of the others?

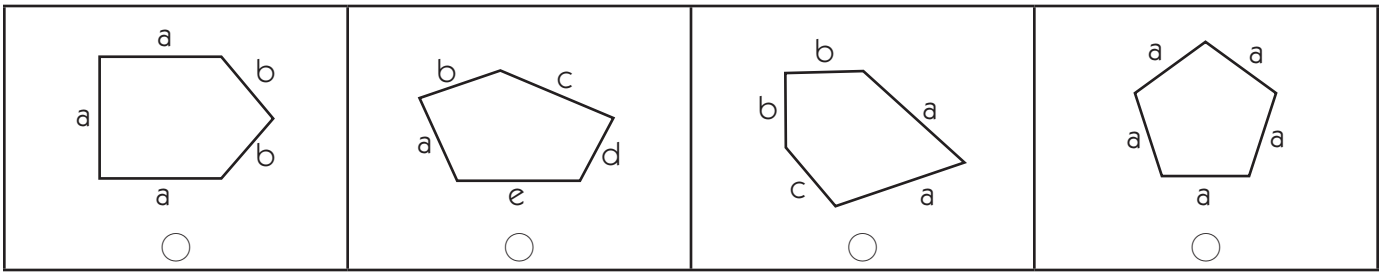
(Continued on back.)

© The Math Learning Center

Independent Worksheet 2 Choosing Equations & Diagrams (cont.)

2 A pentagon has three longer sides that are all the same length and two shorter sides that are both the same length.

a Which diagram shows the pentagon described above?

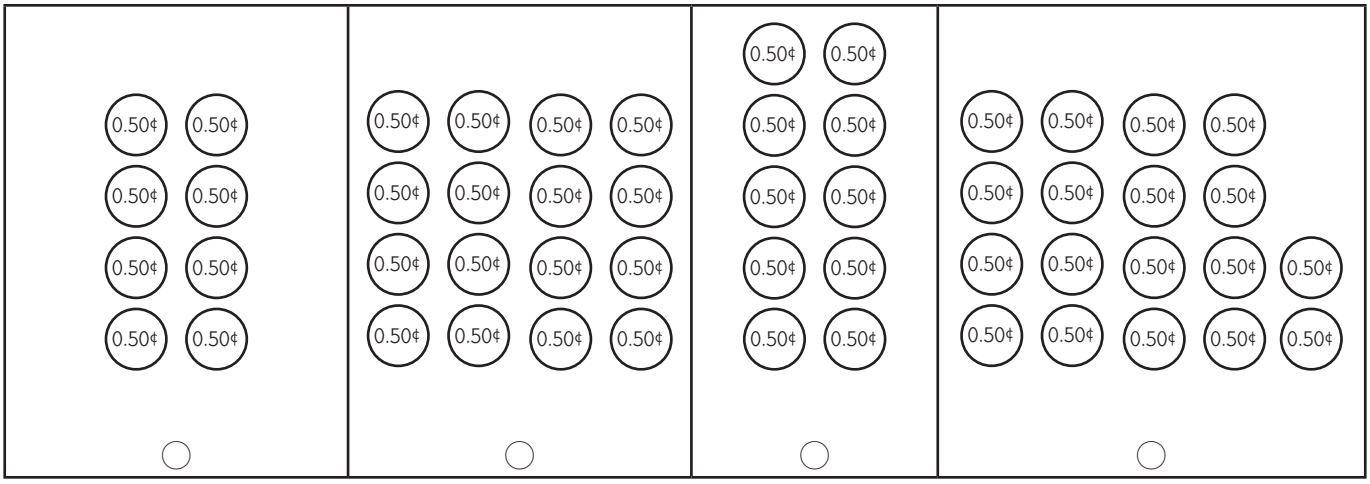


b Which equation could be used to find the perimeter of the pentagon?

$P = 5 \times a$	$P = 3 + a + 2 + b$	$P = (2 \times a) + (2 \times b)$	$P = (3 \times a) + (2 \times b)$
○	○	○	○

3 Destiny is having a party. She wants to get two cookies for each of the 8 people, including herself, who will be at the party. If each cookie costs 50¢, how much money will she spend on cookies?

a Which diagram below best shows this problem?



b Explain your answer to part a. Why did you choose this diagram instead of the others?

(Continued on next page.)

© The Math Learning Center

NAME _____ **DATE** _____

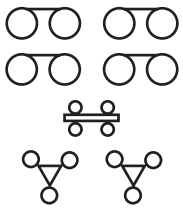
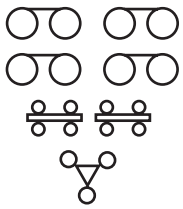
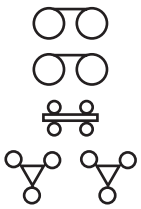
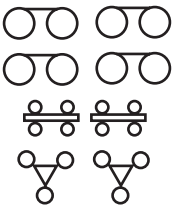
Independent Worksheet 2 Choosing Equations & Diagrams (cont.)

c If x represents the amount of money Destiny is going to spend, which equation could be used to solve the problem?

$(2 + 8) \times 0.50 = x$ ○	$(2 \times 8) \times 1.00 = x$ ○	$(2 \times 8) - 0.50 = x$ ○	$(2 \times 8) \times 0.50 = x$ ○

4 There are 4 bikes, 2 skateboards, and a tricycle in Milo's garage How many wheels are there altogether?

a Which diagram below best shows this problem?

 ○	 ○	 ○	 ○

b If x represents the number of wheels in Milo's garage, which equation could be used to solve the problem?

$2 \times (4 + 2 + 1) = x$ ○	$(2 + 4 + 3) \times 2 = x$ ○	$2 \times 4 \times 3 = x$ ○	$(4 \times 2) + (2 \times 4) + 3 = x$ ○

c Explain your answer to part b. Why did you choose this equation instead of the others?

5 There are some bikes and trikes on the playground. There are 36 wheels in all, and 15 bikes and trikes. How many bikes are there? How many trikes are there? Make a labeled diagram to solve the problem. Show your work. Use the back of the page if you need more room.

© The Math Learning Center

© The Math Learning Center