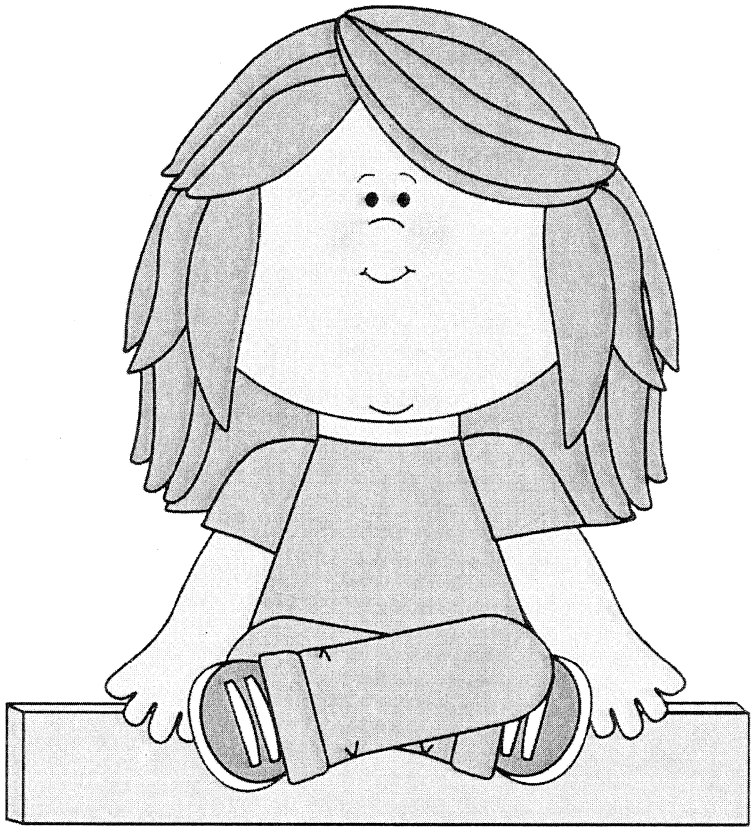
Unit 3
Study Guide

Operations



Name: _____ Date: _____

EVERYDAY MATHEMATICS—3rd Grade
Unit 3 Review: Operations

Complete the tables. Write your own number pair in the last row of each table.

1)

Rule
Add 3

in	out
6	
	14
12	
	21
	35

2)

Rule

in	out
24	16
16	8
40	
	33
	28

For each problem, use rounding to estimate and then solve.
Use your estimate to check whether your answer makes sense.
Show your work.

3) a. Estimate: _____

b.
$$\begin{array}{r} 236 \\ +\ 78 \\ \hline \end{array}$$

4) a. Estimate: _____

b.
$$\begin{array}{r} 73 \\ -\ 45 \\ \hline \end{array}$$

c. Does your answer make sense? Explain.

_____

_____

Unit 3 Review (continued)

5) a. Estimate:_____

b.
$$\begin{array}{r} 475 \\ +\ 258 \\ \hline \end{array}$$

6) a. Estimate:_____

b.
$$\begin{array}{r} 316 \\ -\ \ 79 \\ \hline \end{array}$$

7) Use the tally chart and the key to complete the picture graph.

3rd Grade Sandwich Choices	
Kind of Sandwich	**Number of Children**
turkey	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸
peanut butter and jelly	𝍸 𝍸 𝍸 𝍸
ham	𝍸 𝍸
bologna	𝍸 𝍸 𝍸

3rd Grade Sandwich Choices

turkey

peanut butter and jelly

ham

bologna

Key: ☐ = 5 children

Unit 3 Review (continued)

8) Use the turn-around rule to solve and draw arrays for each fact.

a. 5 X 4 = _____ 4 X 5 = _____

b. 10 X 6 = _____ 6 X 10 = _____

c. How does drawing arrays for these fact pairs help you understand the turn-around rule?

_____

_____

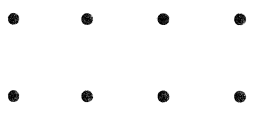
_____

_____

Unit 3 Review (continued)

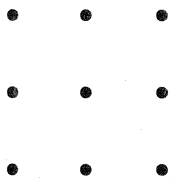
9) Write a number sentence to match each array.

a.



Number sentence: _____

b.



Number sentence: _____

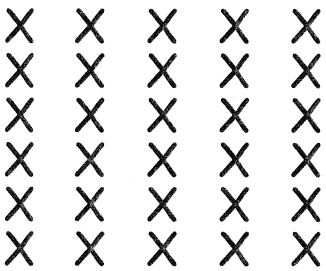
c. Which array, a or b, in Problem 9 shows a multiplication square? Explain.

_____

_____

_____

10) Victoria does not know the answer to 7 X 5.
She does know that 6 X 5 = 30, so she uses it as a helper fact.
Victoria starts by drawing this array for 6 X 5 = 30:



Show on the picture and explain how Victoria can use this array to help her figure out 7 X 5.

_____

_____

_____

Name: _____ Date: _____

EVERYDAY MATHEMATICS—3rd Grade
Unit 3 Challenge Review

1) Joshua like to skip count equal groups when he is multiplying. He has to solve 5 X 6.

a. 5 X 6 means _____ groups of _____.

6 X 5 means _____ groups of _____.

b. How are 5 X 6 and 6 X 5 alike?

_____

_____

c. Would it be easier for Joshua to skip count 6 groups of 5 or 5 groups of 6? Explain.

_____

_____

_____

_____

Unit 3 Challenge Review (continued)

2) Avery wants to solve 6 X 7. She knows 10 X 7 = 70.

a. 10 X 7 means _____ groups of _____.

6 X 7 means _____ groups of _____.

b. Avery uses the subtracting-a-group strategy with 10 X 7 to help her figure out 6 X 7. Use numbers, pictures, or words to explain what Avery did.

6 X 7 = _____

Name: _____ Date: _____

EVERYDAY MATHEMATICS—3rd Grade
Unit 3 Open Response Review
Finding a Mistake in a Subtraction Problem

Jordan wants to solve the problem: 453 – 254 = ?
He begins by making an estimate.

Estimate: 450 - 250 = 200

Then he uses expand-and-trade subtraction to find an exact answer, but his answer is not close to his estimate. This is his work.

			140		
			~~40~~	13	
453	→	400	+ ~~50~~	+ ~~3~~	
- 254	→	- 200	+ 50	+ 4	
		200	90	+ 9	299

"Oops," says Jordan, "I didn't cross out 400 and write 300."
Explain **why** not changing 400 to 300 is a mistake.

(Hint: Use what you know about place value in your answer.)

Name: *ANSWER KEY* Date: _____

EVERYDAY MATHEMATICS—3rd Grade
Unit 3 Review: Operations

Complete the tables. Write your own number pair in the last row of each table.

1)

Rule
Add 3

in	out
6	9
11	14
12	15
18	21
32	35

2)

Rule
- 8 or subtract 8

in	out
24	16
16	8
40	32
41	33
36	28

For each problem, use rounding to estimate and then solve.
Use your estimate to check whether your answer makes sense.
Show your work.

3) a. Estimate: 240 + 80 = 320

b.
$$\begin{array}{r} {\scriptstyle 1\ \ 1\ \ \ } \\ 236 \\ +\ 78 \\ \hline 314 \end{array}$$

4) a. Estimate: 70 – 50 = 20

b.
$$\begin{array}{r} {\scriptstyle 6\ 13} \\ 7\,\cancel{3} \\ -\ 45 \\ \hline 28 \end{array}$$

c. Does your answer make sense? Explain.

Yes, 73 is close to 70 and 45 is close to 50. The difference should be close to 20.

Unit 3 Review (continued) *ANSWER KEY*

5) a. Estimate: 480 + 260 = 740

b.
$$\begin{array}{r} {\scriptstyle 2} \\ 475 \\ +\ 258 \\ \hline 733 \end{array}$$

6) a. Estimate: 320 − 80 = 240

b.
$$\begin{array}{r} {\scriptstyle 2\ 10_{0}\ 16} \\ 3\ 1\ 6 \\ -\ \ 7\ 9 \\ \hline 2\ 3\ 7 \end{array}$$

7) Use the tally chart and the key to complete the picture graph.

3rd Grade Sandwich Choices	
Kind of Sandwich	**Number of Children**
turkey	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸
peanut butter and jelly	𝍸 𝍸 𝍸 𝍸
ham	𝍸 𝍸
bologna	𝍸 𝍸 𝍸

3rd Grade Sandwich Choices

turkey ☐☐☐☐☐☐

peanut butter and jelly ☐☐☐☐

ham ☐☐

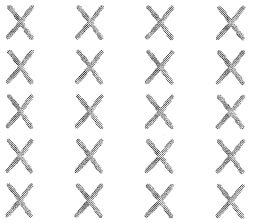
bologna ☐☐☐

Key: ☐ = 5 children

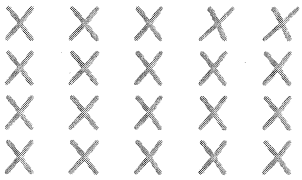
Unit 3 Review (continued) *ANSWER KEY*

8) Use the turn-around rule to solve and draw arrays for each fact.

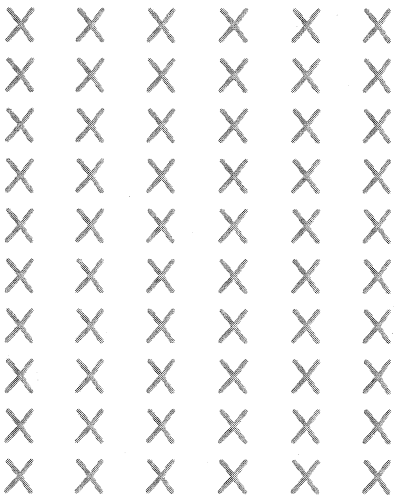
a. 5 X 4 = 20



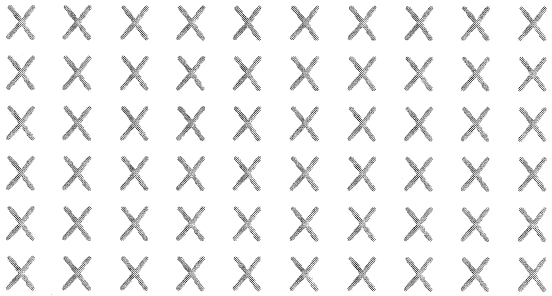
4 X 5 = 20



b. 10 X 6 = 60



6 X 10 = 60



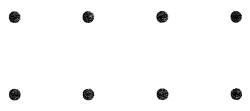
c. How does drawing arrays for these fact pairs help you understand the turn-around rule?

Answers will vary.

Unit 3 Review (continued) *ANSWER KEY*

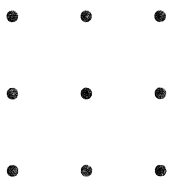
9) Write a number sentence to match each array.

a.



Number sentence: 4 X 2 = 8 or 2 X 4 = 8

b.

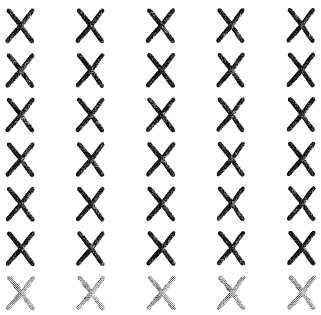


Number sentence: 3 X 3 = 9

c. Which array, a or b, in Problem 9 shows a multiplication square? Explain.

Array b, 3 X 3 = 9, shows a multiplication square. Both factors are the same, so the array forms a 3 by 3 square.

10) Victoria does not know the answer to 7 X 5.
She does know that 6 X 5 = 30, so she uses it as a helper fact.
Victoria starts by drawing this array for 6 X 5 = 30:



Show on the picture and explain how Victoria can use this array to help her figure out 7 X 5.

Possible answer: Victoria can add another row of 5 to make 7 rows.

She just has to add 5 to 30. 30 + 5 = 35, so 7 X 5 is 35.

Name: *ANSWER KEY* Date: _____

EVERYDAY MATHEMATICS—3rd Grade
Unit 3 Challenge Review

1) Joshua like to skip count equal groups when he is multiplying. He has to solve 5 X 6.

a. 5 X 6 means 5 groups of 6.

6 X 5 means 6 groups of 5.

b. How are 5 X 6 and 6 X 5 alike?

Possible answer: 5 X 6 and 6 X 5 are turn-around facts. 5 groups of 6 is the same as 6 groups of 5. They both equal 30. The products are the same.

c. Would it be easier for Joshua to skip count 6 groups of 5 or 5 groups of 6? Explain.

Possible answer: It would be easier for Joshua to skip count 6 groups of 5 because it's easier to count by 5s than by 6s.

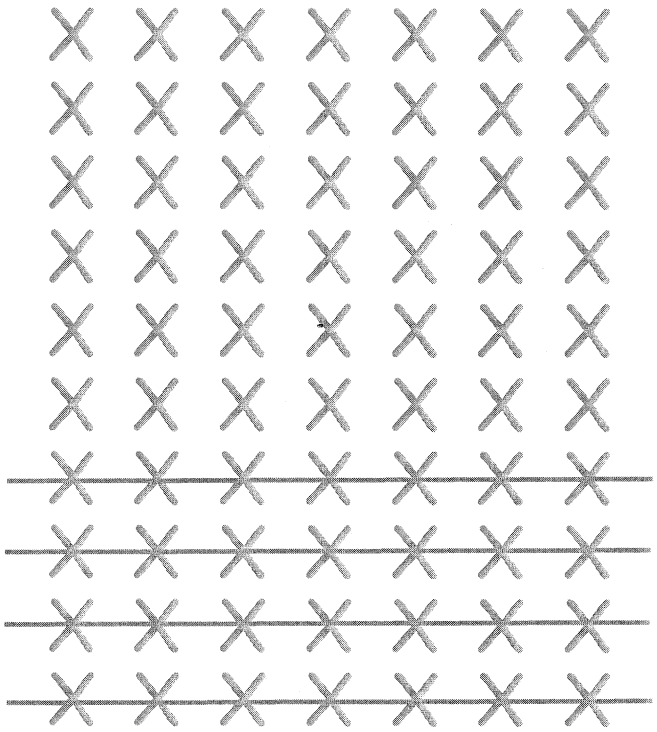
Unit 3 Challenge Review (continued) *ANSWER KEY*

2) Avery wants to solve 6 X 7. She knows 10 X 7 = 70.

a. 10 X 7 means 10 groups of 7.

6 X 7 means 6 groups of 7.

b. Avery uses the subtracting-a-group strategy with 10 X 7 to help her figure out 6 X 7. Use numbers, pictures, or words to explain what Avery did.



Possible answer: Since 6 groups of 7 is 4 fewer groups than 10 groups of 7, Jordan can start from 70 and take away 4 groups of 7. 70 – 28 = 42.

6 X 7 = 42

Name: *ANSWER KEY* Date: _____

EVERYDAY MATHEMATICS—3rd Grade
Unit 3 Open Response Review
Finding a Mistake in a Subtraction Problem

Jordan wants to solve the problem: 453 – 254 = ?
He begins by making an estimate.

Estimate: 450 - 250 = 200

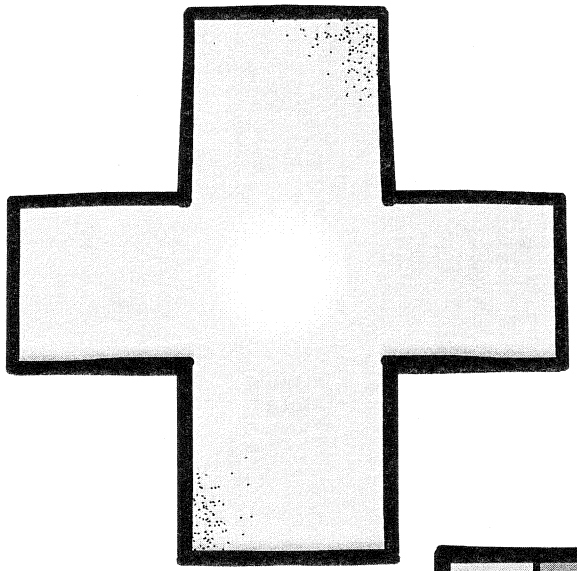
Then he uses expand-and-trade subtraction to find an exact answer, but his answer is not close to his estimate. This is his work.

			140		
			~~40~~	13	
453	→	400	+ ~~50~~	+ ~~3~~	
- 254	→	- 200	+ 50	+ 4	
		200	90	+ 9	299

"Oops," says Jordan, "I didn't cross out 400 and write 300."
Explain **why** not changing 400 to 300 is a mistake.

(Hint: Use what you know about place value in your answer.)

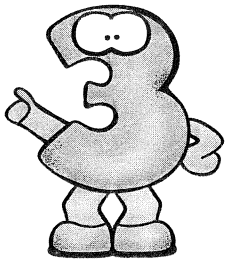
Possible answer: Jordan needed to change 400 to 300 because he could not take 5 tens away from 4 tens. He took 1 hundred for the tens to get 140 to be able to subtract in the tens place, but he forgot to cross out the 400 and change it to 300. It is a mistake because the hundreds were not regrouped. If Jordan regrouped the hundreds, his estimate would have been close.



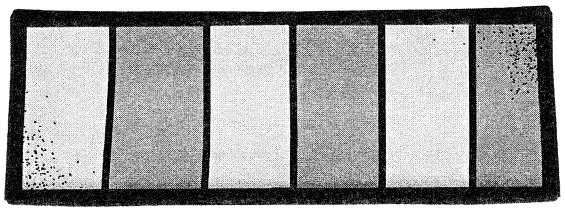
EDM
Version 4

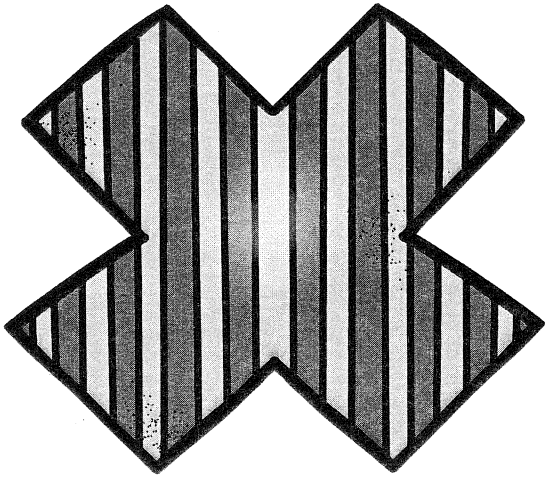
Grade 3

Everyday Math:

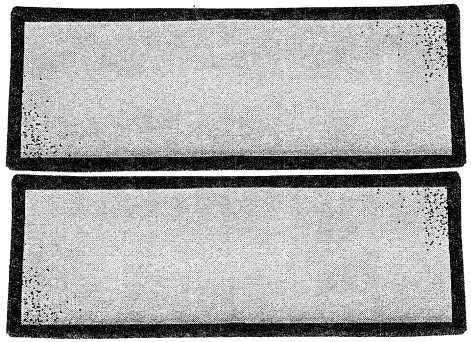


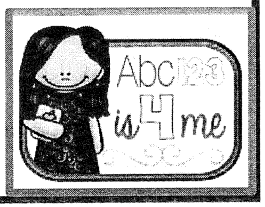
Operations





Study Guide





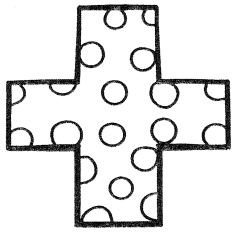
Name: _____ Test Date: ___ - ___ - ___

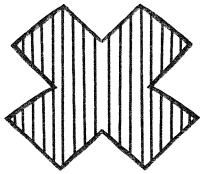
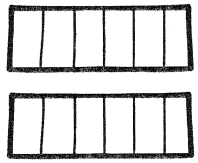
Grade 3

Everyday Math: Unit 3

Operations

Study Guide



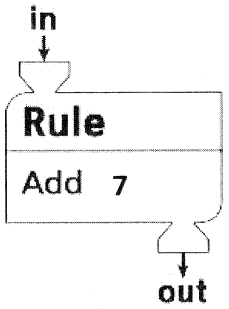



Unit Vocabulary:

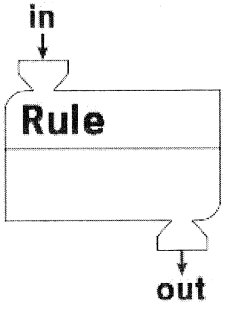
adding a group, area, close-but-easier numbers, column addition, counting up, equivalent, estimate, expand-and-trade subtraction, expanded form, expression, factors, facts table, function machine, helper fact, input, key, Multiplication/Division Facts Table, multiplication squares, name-collection box, open number line, output, partial-sums addition, partition, picture graph, precisely, reasonable, rubric, rule, scaled bar graph, scaled picture graph, square product, square units, subtracting a group, tile, turn-around rule, "What's My Rule?"

Lesson 3.1:

How do you find missing numbers and rules in "What's My Rule?" tables?



in	out
7	
	7
2	
16	
	35



in	out
10	2
12	4
20	
	52
	37

Lesson 3.2:

How do you use mental math to make reasonable estimates?

Use rounding to estimate and then solve. Then, use your estimates to check if your answers make sense. Show your work.

1. Estimate: _____

$$\begin{array}{r} 174 \\ +\ 37 \\ \hline \end{array}$$

Does your answer make sense? Explain below.

2. Estimate: _____

$$\begin{array}{r} 282 \\ -\ 75 \\ \hline \end{array}$$

Does your answer make sense? Explain below.

Lesson 3.3:

How do you use the partial-sums addition algorithm to add 2-digit and 3-digit numbers?

Solve both addition problems using partial sums. Use your estimates to make sure your answers make sense.

1. Estimate: _____

$$\begin{array}{r} 237 \\ +\ 91 \\ \hline \end{array}$$

2. Estimate: _____

$$\begin{array}{r} 277 \\ +\ 304 \\ \hline \end{array}$$

Lesson 3.4:

How do you use the column addition algorithm to find sums?

Solve using column addition. Use your estimate to make sure your answer makes sense.

Estimate: _____

98 + 36 = _____

Lesson 3.5:

How do you solve subtraction problems using the counting-up strategy?

Solve the problem. Use an open number line or a number sentence to show your work. Use your estimate to check your work.

742 – 537 = ?

Estimate: ______________________

742- 537 = _______

Lesson 3.6:

How do you use the expand-and-trade subtraction algorithm to subtract 2- and 3- digit numbers?

The expand-and-trade subtraction algorithm was used to find the exact answer; however, the exact answer doesn't match up with the estimate! Explain why.

116 - 37 = ?

Estimate: 120 – 40 = 80

Explain: ______________________

____

____

```
             100
              0̸    16
  1 1 6   100 + 1̸0̸ + 6̸
-   3 7         30 + 7
-------   ---------------
          100 +70 + 9  = 179
```

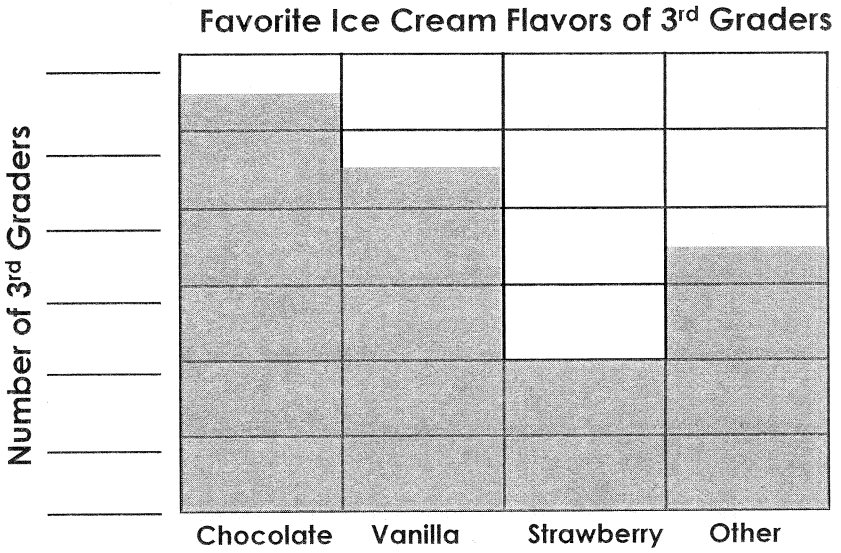
Lesson 3.7:

Exploration A: How do you create a scaled bar graph?

Favorite Ice Cream Flavors of 3rd Graders

Chocolate	Vanilla	Strawberry	Other
55	**45**	**20**	**35**

Use the chart to fill in the scale of the bar graph.



Exploration B: How do you measure area?

Fill in the blanks:

The amount of surface inside a 2-dimensional shape is called the _____.

The number of squares that cover the surface is a measurement of the area in

_____ _____

Exploration C: How do you partition rectangles into equal parts to find the area?

Partition the rectangle into 2 rows with 3 same sized squares in each row.

Lesson 3.8:

How do you create a scaled picture graph?

Use the tally chart and the key to complete the picture graph.

Ways 3rd Graders Get to School

Ways to School	Number of Children
Car	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸
Bus	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸
Walk	𝍸 𝍸 𝍸

Ways 3rd Graders Get to School

Car ☐☐☐☐☐☐

Bus

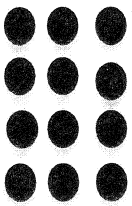
Walk

Key ☐ = 5 children

Lesson 3.9:

How do you find the products of multiplication squares?

Write a number sentence to match the array.



Number sentence: _____

Does the problem show a multiplication square? _____ Why or why not? _____

_____

Lesson 3.10:

How does knowing one multiplication fact help with knowing its turn-around fact?

1. Use the turn-around rule to solve and draw arrays for each fact.

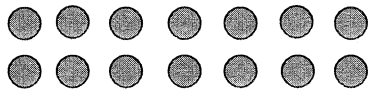
4 X 7 = _____ 7 X 4 = _____

_____ True or False?
The number of dots are the same in each array. So, the array just turned but the product is the same.

Lesson 3.11:

How does the adding-a-group strategy help to solve unknown multiplication facts?

Fred does not know the answer to 3 X 7.
He does know that 2 X 7 = 14, so he uses it as a helper fact.
Fred starts by drawing this array for 2 X 7 = 14.



Show on the array **and** explain how Fred can use the array to help him figure out 3 X 7.

_____

_____

_____

Lesson 3.12:

How do you use the subtracting-a-group strategy to help solve unknown multiplication facts?

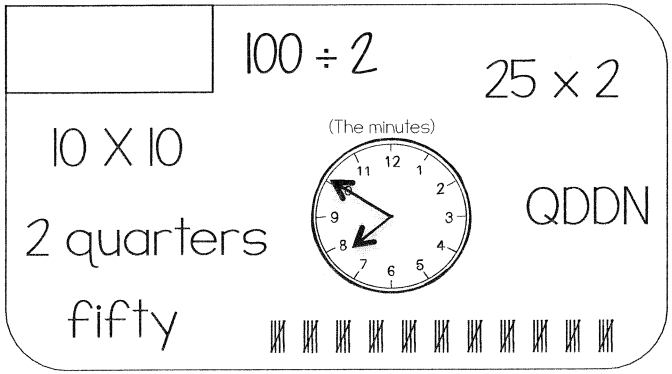
Tina uses the subtracting-a-group strategy with 10 X 4 to help her figure out 8 X 4. Use numbers, pictures, or words to explain what Tina did.

8 X 4 = _____

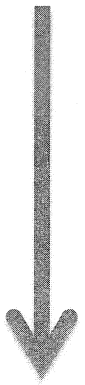
Lesson 3.13: (CC.2.1.3.B.1, CC.2.2.3.A.3)

How do you generate equivalent names for numbers using all four operations?

Two of the names do not belong in this box. Cross them out. Then write the name of the box on the tag.



ANSWER KEY



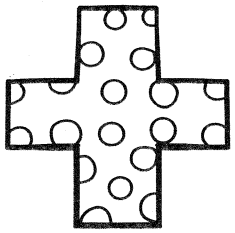
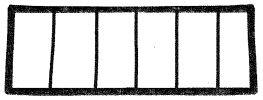
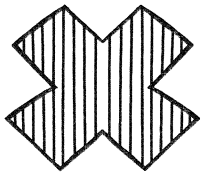
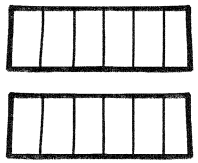
Name: Answer Key Test Date: ___ - ___ - ___

Grade 3

Everyday Math: Unit 3

Operations

Study Guide

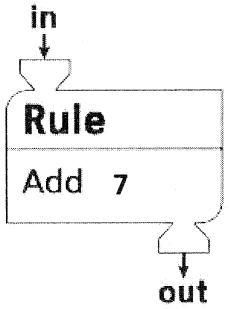





Unit Vocabulary:

adding a group, area, close-but-easier numbers, column addition, counting up, equivalent, estimate, expand-and-trade subtraction, expanded form, expression, factors, facts table, function machine, helper fact, input, key, Multiplication/Division Facts Table, multiplication squares, name-collection box, open number line, output, partial-sums addition, partition, picture graph, precisely, reasonable, rubric, rule, scaled bar graph, scaled picture graph, square product, square units, subtracting a group, tile, turn-around rule, "What's My Rule?"

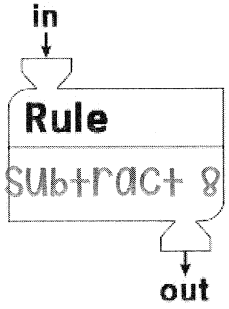
Lesson 3.1:

How do you find missing numbers and rules in "What's My Rule?" tables?



in	out
7	14
0	7
2	9
16	23
28	35

answers will vary



in	out
10	2
12	4
20	12
60	52
45	37

answers will vary

Lesson 3.2:

How do you use mental math to make reasonable estimates?

Use rounding to estimate and then solve. Then, use your estimates to check if your answers make sense. Show your work.

1. Estimate: sample answer: 170 + 40 = 210

$$\begin{array}{r} 174 \\ +\ 37 \\ \hline 211 \end{array}$$

Does your answer make sense? Explain below.

sample answer: yes, because my estimate is 170 + 40 = 210, which is close to 211.

2. Estimate: sample answer: 280 - 75 = 205

$$\begin{array}{r} 282 \\ -\ 75 \\ \hline 207 \end{array}$$

Does your answer make sense? Explain below.

sample answer: yes, because my estimate is 280 - 75 = 205, which is close to 207.

Lesson 3.3:

How do you use the partial-sums addition algorithm to add 2-digit and 3-digit numbers?

Solve both addition problems using partial sums. Use your estimates to make sure your answers make sense. Sample answers:

1. Estimate: 240 + 90 = 330

$$\begin{array}{r} 237 \\ +\ 91 \\ \hline 200 \\ +\ 120 \\ \quad\ 8 \\ \hline 328 \end{array}$$

2. Estimate: 280 + 305 = 585

$$\begin{array}{r} 277 \\ +\ 304 \\ \hline 500 \\ +\ 70 \\ \quad 11 \\ \hline 588 \end{array}$$

Lesson 3.4:

How do you use the column addition algorithm to find sums?

Solve using column addition. Use your estimate to make sure your answer makes sense.

Estimate: Sample answer: 100 + 35 = 135

98 + 36 = 134

$$\begin{array}{r|r|r} & 9 & 8 \\ + & 3 & 6 \\ \hline & 12 & 14 \\ & 13 & 4 \\ 1 & 3 & 4 \end{array}$$

Lesson 3.5:

How do you solve subtraction problems using the counting-up strategy?

Solve the problem. Use an open number line or a number sentence to show your work. Use your estimate to check your work.

742 – 537 = ?

Estimate: Sample answer: 740 - 540 = 200

742- 537 = 205

Lesson 3.6:

How do you use the expand-and-trade subtraction algorithm to subtract 2- and 3- digit numbers?

The expand-and-trade subtraction algorithm was used to find the exact answer; however, the exact answer doesn't match up with the estimate! Explain why.

116 - 37 = ?

Estimate: 120 – 40 = 80

```
                100
                ~~0~~    16
  1 1 6    100 + ~~10~~ + ~~6~~
-   3 7          30 + 7
---------  -----------------
           100 +70 + 9  = 179
```

Explain: Sample answer: The kid needed to cross off 100 and write 0 because she/he took away a hundred and put it in the tens spot to change 0 to 100.

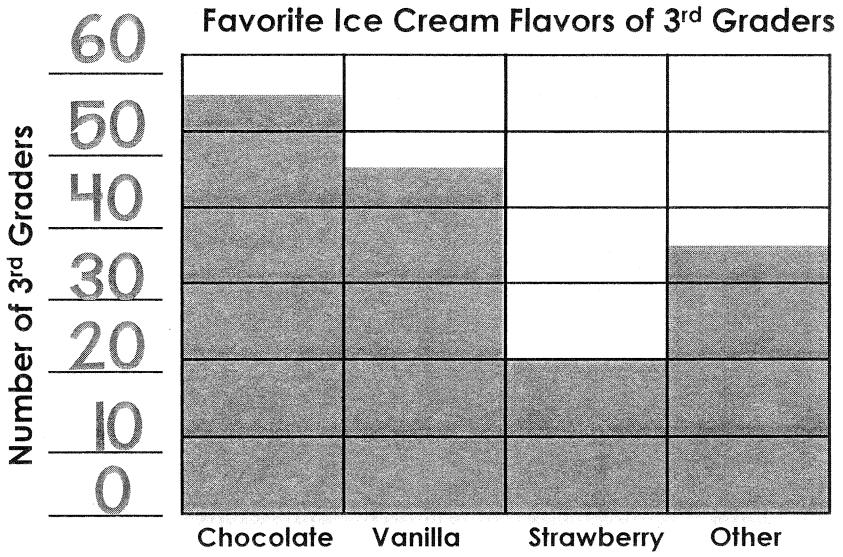
Lesson 3.7:

Exploration A: How do you create a scaled bar graph?

Favorite Ice Cream Flavors of 3rd Graders

Chocolate	Vanilla	Strawberry	Other
55	**45**	**20**	**35**

Use the chart to fill in the scale of the bar graph.



Exploration B: How do you measure area?

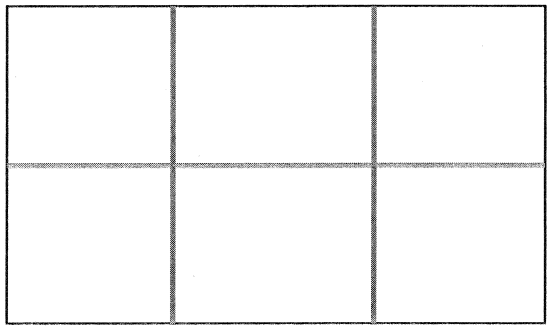
Fill in the blanks:

The amount of surface inside a 2-dimensional shape is called the area.

The number of squares that cover the surface is a measurement of the area in square units

Exploration C: How do you partition rectangles into equal parts to find the area?

Partition the rectangle into 2 rows with 3 same sized squares in each row.



Lesson 3.8:

How do you create a scaled picture graph?

Use the tally chart and the key to complete the picture graph.

Ways 3rd Graders Get to School

Ways to School	Number of Children
Car	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸
Bus	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸
Walk	𝍸 𝍸 𝍸

Ways 3rd Graders Get to School

Car ☐☐☐☐☐☐

Bus ☐☐☐☐☐☐☐☐☐

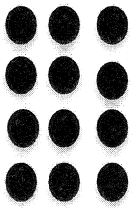
Walk ☐☐☐

Key ☐ = 5 children

Lesson 3.9:

How do you find the products of multiplication squares?

Write a number sentence to match the array.



Number sentence: 4 X 3 = 12

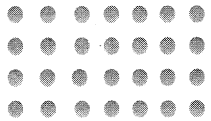
Does the problem show a multiplication square? No Why or why not? The two factors are not the same.

Lesson 3.10:

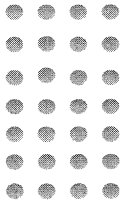
How does knowing one multiplication fact help with knowing its turn-around fact?

1. Use the turn-around rule to solve and draw arrays for each fact.

4 X 7 = 28



7 X 4 = 28



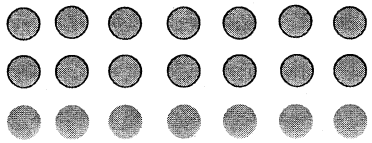
True True or False?

The number of dots are the same in each array. So, the array just turned but the product is the same.

Lesson 3.11:

How does the adding-a-group strategy help to solve unknown multiplication facts?

Fred does not know the answer to 3 X 7.
He does know that 2 X 7 = 14, so he uses it as a helper fact.
Fred starts by drawing this array for 2 X 7 = 14.



Show on the array **and** explain how Fred can use the array to help him figure out 3 X 7.

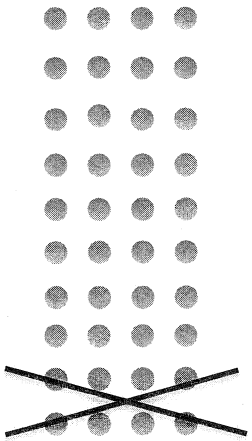
Sample answer: He drew an array for 2 X 7 and knew it was 14. To figure out 3 X 7, he can add one more row of 7 dots. 14 + 7 = 21.

Lesson 3.12:

How do you use the subtracting-a-group strategy to help solve unknown multiplication facts?

Tina uses the subtracting-a-group strategy with 10 X 4 to help her figure out 8 X 4. Use numbers, pictures, or words to explain what Tina did.

Sample answers:



Since 8 groups of 4 is two fewer than 10 groups of 4, Tina can start from 40 and take away 2 groups of 4. 40-8= 32.

8 X 4 = 32

Lesson 3.13:

How do you generate equivalent names for numbers using all four operations?

Two of the names do not belong in this box. Cross them out. Then write the name of the box on the tag.