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Student Guide

Workshop: Division Strategies
(SG pp. 315–319)
Questions 1–12

1. **A.*** Estimates will vary. Possible response: 150; I thought $8 \times 100 = 800$, but that was too low. $8 \times 200 = 1600$, and that is too high, so I estimated 150 stickers because it was in the middle.

   B.

   $$
   \begin{array}{r|l}
   135 \text{ Stickers} & \\
   \hline
   8)\,1080 & 100 \\
   -\,\,800 & \\
   \hline
   280 & 30 \\
   -\,240 & \\
   \hline
   40 & 5 \\
   -\,\,40 & \\
   \hline
   0 & 135 \\
   \end{array}
   $$

   C.

   $$8$$

$8 \times 100 = 800$	100	
$8 \times 300 = 240$	300	
$8 \times 5 = 40$	5	

   $$
   \begin{array}{r}
   1080 \\
   -\,800 \\
   \hline
   280 \\
   -\,240 \\
   \hline
   40 \\
   -\,\,40 \\
   \hline
   0
   \end{array}
   $$

   D.

								Into the bins	Amount Remaining
5	5	5	5	5	5	5	5	40	0
30	30	30	30	30	30	30	30	240	40
100	100	100	100	100	100	100	100	800	280
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**		

*Answers and/or discussion are included in the lesson.

2. A. 10

B. 8 or 80

C. The lollipops are grouped in 10 bunches of 8. 80 lollipops have been put in bunches.

D. 10

E. 44 lollipops are not in bunches of 8 yet.

F. 5

G. 25 bunches of lollipops.

H. 4 lollipops

3. 40 popcorn balls; $200 \div 5 = 40$ popcorn balls

4. 121 toys; $363 \div 3 = 121$ toys

5. A. Estimation strategies will vary. Possible response: It's more than 12 and less than 20, $9 \times 12 = 108$ and $9 \times 20 = 180$, so between 12 and 20 balloons.

B. Answers will vary. Two possible responses: 17 balloons on each table with 2 balloons left over or 17 balloons on 7 tables and 8 balloons on 2 tables.

C. Possible response: My answer is between 12 and 20 balloon per table so it's reasonable.

6. A. 324 strips; $27 \times 12 = 324$ strips

B. 81 strips; $324 \div 4 = 81$ strips

7. 41 R5 toys; $456 \div 11 = 41$ R 5; 5 toys will be left over

8. A. Estimates will vary. Possible response: about 200

B. 176 sets of 25 tickets; $4400 \div 25 = 176$

★**2.** Rosa has 204 lollipops. She is going to divide them into bunches of 8. How many bunches will she have? Will any lollipops be left over? Help Rosa think through her solution.

$$8\overline{)204} \quad 10$$
$$\underline{80}$$
$$124 \quad 10$$
$$\underline{80}$$
$$44 \quad 5$$
$$\underline{40}$$
$$4 \quad 25$$

A. First try: _____ bunches of eight.

B. You have used 10 × _____ or _____ lollipops.

C. What does the 80 mean?

D. Second try: _____ bunches of eight.

E. What does the 44 mean?

F. Next try: _____ bunches of eight.

G. How many bunches of 8 lollipops does she have?

H. How many lollipops are left over?

★**3.** Five parents made 200 popcorn balls to sell at the school fair. Each parent made the same number. How many popcorn balls did each parent make?

★**4.** Three stores gave 363 toys for prizes at the school fair. Each store gave the same number of toys. How many did each store give?

★●**5.** The boys and girls decorated the tables with balloons. They used 155 balloons for 9 tables. They planned to put the same number on each table.

A. Estimate the number of balloons on each table. Is it less than 10? More than 10? More than 12? Less than 20?

B. How many did they put on each table?

C. Show or tell how you know your answer is reasonable.

●■**6.** The students decorated the gym with 27 packages of crepe paper. They cut the paper in each package into 12 strips.

A. How many strips did they have altogether?

B. They wanted to decorate the four walls of the gym. How many strips could they use on each wall?

●■**7.** Kathy is making surprise packages for the grab bag at the school fair. She has 456 small toys. She wants to put 11 toys in each box. How many boxes of 11 toys will she have? Will any toys be left over?

●■**8.** There are 1100 tickets in one roll and Jerome has 4 rolls of tickets. He needs to make sets of 25 tickets. How many sets can Jerome make?

A. Estimate the number of sets of 25 tickets.

B. Find the exact number of sets Jerome can make.

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9. A. 47 pages; $278 \div 6 = 46$ R2 or 47 pages.

B. No. Suzanne made a multiplication error. She would have caught that error had she estimated with convenient numbers.

C. Use convenient numbers numbers to estimate to do mental computation. Check your quotient by using multiplication.

10. A. Both Levi and Nila used the partial quotient method and they got the same answer. They used different partial quotients. Levi used more steps.

B. 20

C. 50

D. Responses will vary. Some students may say that they know 20×5 is 100 and that is easy to multiply and subtract. Others may say they want to start with a larger number so they will not have as many steps.

E. Nila used fewer steps because her first try was a larger number so she subtracted more toys sooner.

F. Possible response:

$$
\begin{array}{r|r}
5)\overline{375} & 70 \\
\underline{350} & \\
25 & 5 \\
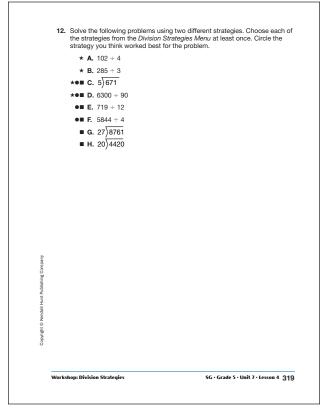\underline{25} & \\
\hline
& 75
\end{array}
$$

11. A. Estimates will vary. Possible response: about 250 cups of counters; I thought 9 times what is about 2225. $9 \times 200 = 1800$ and $9 \times 300 = 2700$, so somewhere in between 200 and 300.

B.

Into Bins	Amount Remaining
63	②
360	65
1800	425

C.

247 R2
9)2225   200
− 1800
425   40
− 360
65   7
− 63
2

D. 247 cups of counters

E. 2 counters are left over. That is what the remainder 2 means in the solution.

12. Answers will vary. Two sample solutions are given for each problem.

A. 25 R2;

Partial Quotients

25 R2
4)102 | 10
   40
   62 | 10
   40
   22 | 5
   20
   2 | 25

Mental Math

I think about money. There are 4 quarters in one dollar, so 4×25 cents = 100 cents. There are two cents left over. So the answer is 25 R2.

B. 95;

Partial Quotients

3)285 | 50
  150
  135 | 40
  120
  15 | 5
     | 95

Mental Math

My cluster of problems:

$3 \times 90 = 270$

$3 \times 5 = \underline{15}$
      285

so, $285 \div 3 = 90 + 5 = 95$

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C. 134 R1;
Column Method

4	4	4	4	4	Into the bins	Amount Remaining
10	10	10	10	10	20	①
20	20	20	20	20	50	21
100	100	100	100	100	100	71
1	**2**	**3**	**4**	**5**	500	171

Partial Quotient

```
      134  R1
   5) 671      100
    − 500
      171       20
    − 100
       71       10
    −  50
       21        4
    −  20
        1
```

D. 70;

Mental Math

$90 \times \ ? = 6300$
$90 \times \ 7 = 630$
$90 \times 70 = \ 9 \times 10 \times 7 \times 10$
$\qquad\qquad = 63 \times 100$
$\qquad\qquad = 6300$

Partial Quotients

```
                  70
   90) 6300    50
     − 4500
       1800    20
     − 1800
          0    70
```

F. 461;

Partial Quotient

```
      1461
   4) 5844   1000
    − 4000
      1844    100
    −  400
      1444    200
    −  800
       644    100
    −  400
       244     50
    −  200
        44     11
    −   44
         0
```

Mental Math

```
            4
```

$4 \times 1000 = 4000$	1000
$4 \times 200 = 800$	200
$4 \times 250 = 1000$	250
$4 \times 11 = 44$	11

```
        5844
      − 4000
        1844
      −  800
        1044
      − 1000
          44
      −   44
           0
        1461
```

E. 59 R11;

Partial Quotient

```
       59 R11
   12) 719   50
    − 600
      119    9
    − 108
       11   59
```

Mental Math

$12 \times 60 = 720$
$12 \times \circled{50} = 600$
$719 − 600 = 119$
$12 \times 10 = 120$
$12 \times \circled{9} = 108$
$119 − 108 = 11$
59 R11

H. 221;

Mental Math

$4420 \div \ 2 = 2210$
$2210 \div 10 = \circled{221}$

Partials Quotients

```
                221
   20) 4420    200
     − 4000
        420     20
     −  400
         20      1
     −   20
          0    221
```

G. 324 R13;

Rectangle Model

```
          27
```

$27 \times 100 = 2700$	100
$27 \times 200 = 5400$	200
$27 \times 20 = 540$	20
$27 \times 4 = 108$	4

```
   8761
 − 2700
   6061
 − 5400
    661
 −  540
    121
 −  108
     13
    324
```

Partial Quotient

```
       324 R13
   27) 8761     300
    − 8100
       661      20
    −  540
       121       4
    −  108
        13     324
```