Estimate Quotients Using Multiples

Essential Question How can you use multiples to estimate quotients?

Unlock the Problem Real World

The bakery made 110 pumpkin muffins. They will be packed in boxes with 8 muffins in each box. About how many boxes will there be?

You can use multiples to estimate.

A **multiple** of a number is the product of a number and a counting number. 1, 2, 3, 4, and so on, are counting numbers.

🔑 **Estimate. 110 ÷ 8**

Think: What number multiplied by 8 is about 110?

STEP 1 List the multiples of 8 until you reach 110 or greater.

Counting number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Multiple of 8	8	16	24	32			56	64				96		112

STEP 2 Find the multiples of 8 that 110 is between.

$13 \times 8 =$ _____

$14 \times 8 =$ _____

110 is between _____ and _____, so 110 ÷ 8 is between 13 and 14.

110 is closest to _____, so 110 ÷ 8 is about _____.

So, there will be about _____ boxes.

Math Talk

MATHEMATICAL PRACTICES ⑦

Identify Relationships When estimating a quotient, how do you know which two numbers it is between?

Try This!

List the next 8 multiples of 10.

10, 20, _____

List the next 7 multiples of 100.

100, 200, _____

🔒 Example Estimate. 196 ÷ 4

Think: What number times 4 is about 196?

STEP 1 List the next 6 multiples of 4.

4, 8, 12, 16, _____

Are any multiples close to 196? _____

_____

Think: If I multiply by multiples of 10, the products will be greater. Using multiples of 10 will get me to 196 faster.

STEP 2 Multiply 4 by multiples of 10.

$10 \times 4 = 40$

$20 \times 4 = 80$

$30 \times 4 = $ _____

$40 \times 4 = $ _____

$50 \times 4 = $ _____

The quotient is between 40 and 50.

_____ $\times$ 4 is closest to _____, so 196 ÷ 4 is about _____.

Share and Show 🖊 MATH BOARD

1. A restaurant has 68 chairs. There are six chairs at each table. About how many tables are in the restaurant?

   Estimate. 68 ÷ 6

   Think: What number times 6 is about 68?

   $10 \times 6 = $ _____

   $11 \times 6 = $ _____

   $12 \times 6 = $ _____

   68 is closest to _____, so the best estimate is

   about _____ tables are in the restaurant.

Math Talk

MATHEMATICAL PRACTICES ⑤

Communicate When do you multiply the divisor by multiples of 10 to estimate a quotient? Explain.

Find two numbers the quotient is between. Then estimate the quotient.

2. 41 ÷ 3

_____

_____

3. 192 ÷ 5

_____

_____

On Your Own

Find two numbers the quotient is between. Then estimate the quotient.

4. 90 ÷ 7

_____

_____

5. 67 ÷ 4

_____

_____

6. 281 ÷ 9

_____

_____

7. 102 ÷ 7

_____

_____

8. 85 ÷ 6

_____

_____

9. 220 ÷ 8

_____

_____

Decide whether the actual quotient is greater than or less than the estimate given. Write < or >.

10. 83 ÷ 8 ◯ 10

11. 155 ÷ 4 ◯ 40

12. 70 ÷ 6 ◯ 11

13. **What's the Question?** A dolphin's heart beats 688 times in 6 minutes. Answer: about 100 times.

_____

_____

14. **MATHEMATICAL PRACTICE ①** **Analyze** A mother bottlenose ate about 278 pounds of food in one week. About how much food did she eat in a day?

_____

_____

15. **GO DEEPER** Tanya has $42 to spend at the Dolphin Island store. T-shirts sell for $7 each and a pair of sunglasses sells for $6. Tanya buys 3 T-shirts. How many pairs of sunglasses can she buy with the amount of money she has left?

_____

Problem Solving • Applications *Real World*

16. **THINK SMARTER** If a bottlenose dolphin can eat 175 pounds of fish, squid, and shrimp in a week, about how many pounds of food does it eat in a day? Milo says the answer is about 20 pounds. Leah says the answer is about 30 pounds. Who is correct? Explain.

_____

_____

_____

_____

_____

17. **GO DEEPER** Four families went out for lunch. The total food bill came to $167. The families also left a $30 tip for the waitress. If each family spent the same amount, about how much did each family spend on dinner? Explain how you found your answer.

_____

_____

_____

_____

WRITE *Math*
Show Your Work

18. **THINK SMARTER** There are 6 showings of a film about Van Gogh at the Art Museum. A total of 459 people saw the film. The same number of people were at each showing. About how many people were at each showing? Circle the numbers the quotient is between. Then explain how you found your answer.

40   50   60   70   80

_____

_____

Estimate Quotients Using Multiples

Find two numbers the quotient is between. Then estimate the quotient.

1. $175 \div 6$

between 20 and

30 about 30

Think: $6 \times 20 = 120$ and $6 \times 30 = 180$.
So, $175 \div 6$ is between 20 and 30. Since 175 is closer to 180 than to 120, the quotient is about 30.

2. $53 \div 3$

3. $75 \div 4$

4. $215 \div 9$

5. $284 \div 5$

6. $191 \div 3$

7. $100 \div 7$

Problem Solving Real World

8. Joy collected 287 aluminum cans in 6 hours. About how many cans did she collect per hour?

9. Paul sold 162 cups of lemonade in 5 hours. About how many cups of lemonade did he sell each hour?

10. **WRITE** *Math* Write a word problem that you can solve using multiples to estimate the quotient. Include a solution.

Lesson Check (4.NBT.B.6)

1. Abby did 121 sit-ups in 8 minutes. Estimate the number of sit-ups she did in 1 minute.

2. The Garibaldi family drove 400 miles in 7 hours. Estimate the number of miles they drove in 1 hour.

Spiral Review (4.OA.A.2, 4.OA.A.3, 4.NBT.B.4, 4.NBT.B.5)

3. Twelve boys collected 16 aluminum cans each. Fifteen girls collected 14 aluminum cans each. How many more cans did the girls collect than the boys?

4. George bought 30 packs of football cards. There were 14 cards in each pack. How many cards did George buy?

5. Sarah made a necklace using 5 times as many blue beads as white beads. She used a total of 30 beads. How many blue beads did Sarah use?

6. This year, Ms. Webster flew 145,000 miles on business. Last year, she flew 83,125 miles on business. How many more miles did Ms. Webster fly on business this year?

FOR MORE PRACTICE
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