Name _____

Estimate Quotients Using Compatible Numbers

Essential Question How can you use compatible numbers to estimate quotients?

Common Core **Number and Operations in Base Ten—4.NBT.B.6**

MATHEMATICAL PRACTICES
MP1, MP5, MP7

Unlock the Problem

Real World

A horse's heart beats 132 times in 3 minutes. About how many times does it beat in 1 minute?

You can use compatible numbers to estimate quotients.

Compatible numbers are numbers that are easy to compute mentally.

- Will a horse's heart beat more or fewer than 132 times in 1 minute?

_____

- What operation will you use to solve the problem?

_____

Example 1 Estimate. 132 ÷ 3

STEP 1 Find a number close to 132 that divides easily by 3. Use basic facts.

12 ÷ 3 is a basic fact. 120 divides easily by 3.

15 ÷ 3 is a basic fact. 150 divides easily by 3.

Think: Choose 120 because it is closer to 132.

STEP 2 Use place value.

120 = _____ tens

12 ÷ 3 = _____

12 tens ÷ 3 = _____ tens

120 ÷ 3 = _____

So, a horse's heart beats about _____ times a minute.

Example 2 Use compatible numbers to find two estimates that the quotient is between. 1,382 ÷ 5

STEP 1 Find two numbers close to 1,382 that divide easily by 5.

_____ ÷ 5 is a basic fact.
1,000 divides easily by 5.

_____ ÷ 5 is a basic fact.
1,500 divides easily by 5.

1,382 is between _____ and _____.

STEP 2 Divide each number by 5. Use place value.

1,000 ÷ 5

_____ hundreds ÷ 5 = _____ hundreds, or _____

1,500 ÷ 5

_____ hundreds ÷ 5 = _____ hundreds, or _____

So, 1,382 ÷ 5 is between _____ and _____.

Math Talk

MATHEMATICAL PRACTICES 6

Explain which estimate you think is more reasonable.

Share and Show

MATH BOARD

1. Estimate. 1,718 ÷ 4

Think: What number close to 1,718 is easy to divide by 4?

_____ is close to 1,718. What basic fact can you use? _____ ÷ 4

_____ is close to 1,718. What basic fact can you use? _____ ÷ 4

Choose 1,600 because _____ _____.

16 ÷ 4 = _____

1,600 ÷ _____ = _____

1,718 ÷ 4 is about _____

Math Talk

MATHEMATICAL PRACTICES 3

Apply How might your estimate change if the problem were 1,918 ÷ 4?

Use compatible numbers to estimate the quotient.

2. 455 ÷ 9

_____

3. 1,509 ÷ 3

_____

4. 176 ÷ 8

_____

5. 2,795 ÷ 7

_____

On Your Own

Use compatible numbers to find two estimates that the quotient is between.

6. 5,321 ÷ 6

_____

7. 1,765 ÷ 6

_____

8. 1,189 ÷ 3

_____

9. 2,110 ÷ 4

_____

MATHEMATICAL PRACTICE 2 **Reason Abstractly** **Algebra** **Estimate to compare. Write <, >, or =.**

10. 613 ÷ 3 ◯ 581 ÷ 2

_____ estimate _____ estimate

11. 364 ÷ 4 ◯ 117 ÷ 6

_____ estimate _____ estimate

12. 2,718 ÷ 8 ◯ 963 ÷ 2

_____ estimate _____ estimate

13. GO DEEPER If Cade shoots 275 free throw baskets in 2 hours, about how many can he shoot in 5 hours?

_____

_____

14. GO DEEPER A carpenter has 166 doorknobs in his workshop. Of those doorknobs, 98 are round and the rest are square. If he wants to place 7 square doorknobs in each bin, about how many bins would he need?

_____

Name _____

Problem Solving • Applications

Use the table for 15–17.

Animal Heartbeats in 5 Minutes	
Animal	**Number of Heartbeats**
Whale	31
Cow	325
Pig	430
Dog	520
Chicken	1,375

15. About how many times does a chicken's heart beat in 1 minute?

_____

16. GO DEEPER About how many times does a cow's heart beat in 2 minutes?

_____

17. MATHEMATICAL PRACTICE 2 **Use Reasoning** About how many times faster does a cow's heart beat than a whale's?

_____

WRITE Math • Show Your Work

18. THINK SMARTER Martha had 154 stamps and her sister had 248 stamps. They combined their collections and put the stamps in an album. If they want to put 8 stamps on each page, about how many pages would they need?

_____

19. Jamie and his two brothers divided a package of 125 toy cars equally. About how many cars did each of them receive?

_____

20. THINK SMARTER Harold and his brother collected 2,019 cans over a 1-year period. Each boy collected the same number of cans. About how many cans did each boy collect? Explain how you found your answer.

_____

_____

_____

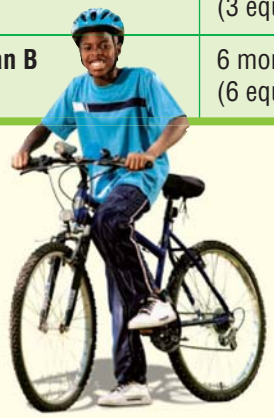
Connect to Reading

Cause and Effect

The reading skill *cause and effect* can help you understand how one detail in a problem is related to another detail.

Chet wants to buy a new bike that costs $276. Chet mows his neighbor's lawn for $15 each week. Since Chet does not have money saved, he needs to decide which layaway plan he can afford to buy the new bike.

Bike Shop Layaway Plans	
Plan A	3 months (3 equal payments)
Plan B	6 months (6 equal payments)



Cause:	→	**Effect:**
Chet does not have money saved to purchase the bike.		Chet will have to decide which layaway plan he can afford to purchase the bike.

Which plan should Chet choose?

3-month layaway:

$276 ÷ 3

Estimate.

$270 ÷ 3 _____

6-month layaway:

$276 ÷ 6

Estimate.

$300 ÷ 6 _____

Chet earns $15 each week. Since there are usually 4 weeks in a month, multiply to see which payment he can afford.

$15 × 4 = _____

So, Chet can afford the _____ layaway plan.

Use estimation to solve.

21. Sofia wants to buy a new bike that costs $214. Sofia helps her grandmother with chores each week for $18. Estimate to find which layaway plan Sofia should choose and why.

_____

_____

_____

_____

22. WRITE *Math* Describe a situation when you have used cause and effect to help you solve a math problem.

_____

_____

_____

_____

_____

Name _____

Estimate Quotients Using Compatible Numbers

COMMON CORE STANDARD—4.NBT.B.6
Use place value understandings and properties of operations to perform multi-digit arithmetic.

Use compatible numbers to estimate the quotient.

1. 389 ÷ 4

400 ÷ 4 = 100

2. 358 ÷ 3 _____

3. 784 ÷ 8 _____

4. 179 ÷ 9 _____

5. 315 ÷ 8 _____

6. 2,116 ÷ 7 _____

7. 4,156 ÷ 7 _____

8. 474 ÷ 9 _____

Use compatible numbers to find two estimates that the quotient is between.

9. 1,624 ÷ 3 _____

10. 2,593 ÷ 6 _____

11. 1,045 ÷ 2 _____

12. 1,754 ÷ 9 _____

Problem Solving Real World

13. A CD store sold 3,467 CDs in 7 days. About the same number of CDs were sold each day. About how many CDs did the store sell each day?

_____

14. Marcus has 731 books. He puts about the same number of books on each of 9 shelves in his bookcase. About how many books are on each shelf?

_____

15. WRITE Math How can you estimate 1,506 ÷ 2 so that it is close to the actual answer of 753?

_____

_____

_____

Lesson Check (4.NBT.B.6)

1. Jamal is planting seeds for a garden nursery. He plants 9 seeds in each container. If Jamal has 296 seeds to plant, about how many containers will he use?

2. Winona purchased a set of vintage beads. There are 2,140 beads in the set. If she uses the beads to make bracelets that have 7 beads each, about how many bracelets can she make?

Spiral Review (4.NBT.A.1, 4.NBT.A.3, 4.NBT.B.5, 4.NBT.B.6)

3. A train traveled 360 miles in 6 hours. How many miles per hour did the train travel?

4. An orchard has 12 rows of pear trees. Each row has 15 pear trees. How many pear trees are there in the orchard?

5. Megan rounded 366,458 to 370,000. To which place did Megan round the number?

6. Mr. Jessup, an airline pilot, flies 1,350 miles a day. How many miles will he fly in 8 days?

FOR MORE PRACTICE GO TO THE Personal Math Trainer