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Divisibility Rules

It's easy to tell if a small number like 12 is divisible by another number. With bigger numbers, like 435, it can be harder to tell. You already know how to tell if a number is divisible by 2, 5, or 10. There are also rules that can help you tell if any number is divisible by 3, 6, or 9.

Rule	Example
A number is divisible by 3 if the sum of its digits is divisible by 3.	957 is divisible by 3 because 9 + 5 + 7 = 21 and 21 is divisible by 3. (21 ÷ 3 = 7)
A number is divisible by 6 if it is divisible by 3 (see above) and it is divisible by 2 (has a 0, 2, 4 6, or 8 in the ones place).	786 is divisible by 6 because 7 + 8 + 6 = 21 and 21 is divisible by 3. (21 ÷ 3 = 7) 786 also ends in 6, which means it is even (divisible by 2).
A number is divisible by 9 if the sum of its digits is divisible by 9.	837 is divisible by 9 because 8 + 3 + 7 = 18 and 18 is divisible by 9.

1 Use the chart below to help you figure out if the numbers are divisible by 3, 6, or 9. In the last column, you don't have to list all the factors of the number. Just list any other numbers you know for sure that the number is divisible by.

Number	Sum of the Digits	Divisible by 3?	Divisible by 6?	Divisible by 9?	It's also divisible by
ex 495	4 + 9 + 5 = 18	yes	no	yes	5
a 987					
b 540					
c 762					
d 747					
e 570					
f 645					
g 792					

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Using Basic Facts to Solve Larger Problems

Knowing the basic multiplication and division facts can help you multiply larger numbers. Start with the basic facts below and then complete the related fact family of larger numbers. Then make up your own fact family based on other related numbers.

Basic Fact Family	Related Fact Family	Your Own Related Fact Family
example 4 × 3 = 12 3 × 4 = 12 12 ÷ 4 = 3 12 ÷ 3 = 4	40 × 3 = 120 3 × 40 = 120 120 ÷ 40 = 3 120 ÷ 3 = 40	40 × 30 = 1,200 30 × 40 = 1,200 1,200 ÷ 40 = 30 1,200 ÷ 30 = 40
1 ___ × ___ = ___ 6 × 8 = 48 ___ ÷ ___ = ___ 48 ÷ 6 = 8	80 × 6 = 480 ___ × ___ = ___ 480 ÷ 80 = 6 ___ ÷ ___ = ___	___ × ___ = ___ ___ × ___ = ___ ___ ÷ ___ = ___ ___ ÷ ___ = ___
2 ___ × ___ = ___ 9 × 4 = 36 ___ ÷ ___ = ___ 36 ÷ 9 = 4	40 × 9 = 360 ___ × ___ = ___ 360 ÷ 40 = 9 ___ ÷ ___ = ___	___ × ___ = ___ ___ × ___ = ___ ___ ÷ ___ = ___ ___ ÷ ___ = ___
3 ___ × ___ = ___ 7 × 3 = 21 ___ ÷ ___ = ___ 21 ÷ 7 = 3	30 × 7 = 210 ___ × ___ = ___ 210 ÷ 30 = 7 ___ ÷ ___ = ___	___ × ___ = ___ ___ × ___ = ___ ___ ÷ ___ = ___ ___ ÷ ___ = ___

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Division with Menus & Sketches

1 Fill in the mutiplication menu.

a $1 \times 19 =$ _____ **b** $2 \times 19 =$ _____ **c** $10 \times 19 =$ _____

d $5 \times 19 =$ _____ **e** $20 \times 19 =$ _____ **f** $15 \times 19 =$ _____

2 Solve the two division problems using the menu above and sketches to help. You can add to the menu if you want to.

ex $304 \div 19 =$ 16	**a** $608 \div 19 =$ _____	**b** $456 \div 19 =$ _____
Computation: 1 5] 16 10 19 ⌐ 304 - 190 114 - 95 19 - 19 0	Computation:	Computation:
Sketch: 10 5 1 19 190 95 19	Sketch:	Sketch:

3 If you need to, use the divisibility rules on page 67 to help answer these.

a Are any of the numbers above (304, 608, 456) divisible by 3? If so, list them here:

b Are any of the numbers above divisible by 6? If so, list them here:

c Are any of the numbers above divisible by 9? If so, list them here:

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Division & Fraction Practice

1 Use multiplication menus to help complete each division problem.

ex $307 \div 19 =$ 16 r3

19 × 10 = 190
19 × 5 = 95
19 × 2 = 38

```
          1 ┐
          5 │ 16 r3
         10 ┘
   19 ⟌ 307
       - 190
         117
       -  95
          22
       -  19
           3
```

a $226 \div 13 =$ ________

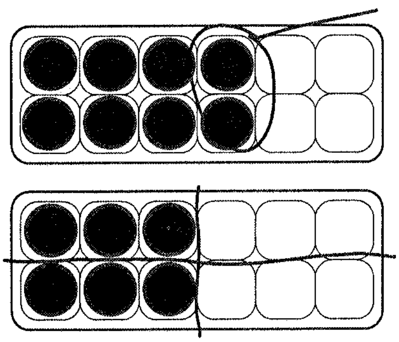
b $360 \div 16 =$ ________

2 Find the difference between each pair of fractions below.

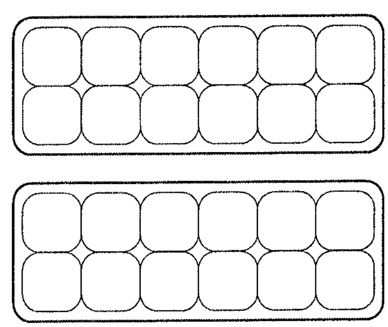
ex $\frac{8}{12} - \frac{2}{4} = \frac{2}{12}$ or $\frac{1}{6}$ — the difference

$\frac{8}{12}$

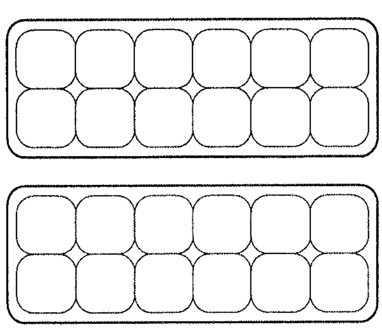
$\frac{2}{4}$



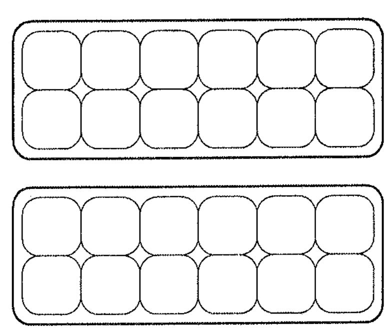
a $\frac{11}{12} - \frac{1}{4} =$



b $\frac{5}{6} - \frac{1}{3} =$



c $\frac{3}{4} - \frac{1}{6} =$



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Thinking About Divisibility

It's easy to tell if a small number like 12 is divisible by another number. With bigger numbers, like 435, it can be harder to tell. Fill in the rules for knowing if a certain number is divisible by 5 or 10. Then figure out which numbers are divisible by each number.

Rule	Circle the numbers that are divisible by the number whose rule you just described.
ex a Finish the rule: A number is divisible by 2 if... there is 0, 2, 4, 6, or 8 in the ones place.	**b** 431 (126) (902) 463 4,595 (3,008)
1 A number is divisible by 3 if the sum of its digits is divisible by 3.	**a** 117 409 423 6,151 3,213
2a Finish the rule: A number is divisible by 5 if...	**b** 205 452 600 2,365 7,004
3 A number is divisible by 6 if the sum of its digits is divisible by 3 and it is even.	**a** 132 270 588 2,706 3,512
4 A number is divisible by 9 if the sum of its digits is divisible by 9.	**a** 225 324 965 1,809 2,584
5a Finish the rule: A number is divisible by 10 if...	**b** 208 700 810 2,304 8,430

4–3

Name _____ Date _____

Homework Practice

Divide by One-Digit Numbers

Divide.

1. $5\overline{)106}$	**2.** $7\overline{)862}$	**3.** $9\overline{)775}$
4. $3\overline{)195}$	**5.** $8\overline{)451}$	**6.** $6\overline{)918}$
7. $6\overline{)310}$	**8.** $3\overline{)803}$	**9.** $5\overline{)369}$
10. $4\overline{)701}$	**11.** $6\overline{)380}$	**12.** $6\overline{)102}$

Solve.

13. A family of 4 spent $64 for tickets to a soccer game. All of the tickets were the same price. What was the cost of each ticket?

_____

14. $350 was raised at a car wash. How many cars were washed if it costs $5 to wash one car?

_____

Spiral Review

Estimate. Show your work. (Lesson 4–2)

15. 4,875 ÷ 82 = _____	**16.** 2,602 ÷ 37 = _____
17. 2,148 ÷ 62 = _____	**18.** 8,932 ÷ 451 = _____
19. 3,494 ÷ 349 = _____	**20.** 9,456 ÷ 295 = _____
21. 27,568 ÷ 9 = _____	**22.** 5,688 ÷ 34 = _____

Long Division

Name:_____ *"Use the method of your choice"* Date:_____

Divide. Continue if there is a remainder, use decimals.

1: **6)1120**

2: **5)899**

3: **9)5698**

4: **5)4.551**

Divide: Use remainders if needed!

5: **6)765.0**

6: **1 2)48.0**

7: **30)9331**

8: **10)1408**

Long Division

Name:_____ *"Use the method of your choice"* Date:_____

Divide. Continue if there is a remainder, use decimals.

1: **9)9623**

2: **5)1051**

3: **4)4698**

4: **5)4.550**

Divide: Use remainders if needed!

5: **7)865.0**

6: **1 2)14.8**

7: **11)12111**

8: **10)1450**

4-4

Name _____ Date _____

Homework Practice

Divide by Two-Digit Numbers

Divide.

1. $54\overline{)106}$ **2.** $17\overline{)862}$ **3.** $29\overline{)775}$

4. $13\overline{)195}$ **5.** $98\overline{)620}$ **6.** $26\overline{)918}$

7. $66\overline{)310}$ **8.** $53\overline{)803}$ **9.** $45\overline{)369}$

10. $14\overline{)701}$ **11.** $36\overline{)380}$ **12.** $54\overline{)710}$

Solve.

13. A ticket seller collected $990 for selling tickets. Each ticket costs $15. How many tickets did she sell?

_____

14. DVDs cost $20 each. How many DVDs can Miguel buy for $180?

_____

Spiral Review

Estimate. Then divide. (Lesson 4–3)

15. 975 ÷ 8 = _____ **16.** 702 ÷ 7 = _____

17. 248 ÷ 6 = _____ **18.** 832 ÷ 4 = _____

19. 594 ÷ 3 = _____ **20.** 556 ÷ 9 = _____

21. 668 ÷ 9 = _____ **22.** 788 ÷ 3 = _____

4-1

Name _____ Date _____

Homework Practice

Division Patterns

Divide mentally.

1. 270 ÷ 3 = _____ **2.** 480 ÷ 60 = _____ **3.** 180 ÷ 9 = _____

4. 2,000 ÷ 10 = _____ **5.** 300 ÷ 20 = _____ **6.** 400 ÷ 4 = _____

7. 560 ÷ 7 = _____ **8.** 3,200 ÷ 80 = _____ **9.** 600 ÷ 30 = _____

10. 4,500 ÷ 5 = _____ **11.** 8,100 ÷ 90 = _____ **12.** 600 ÷ 2 = _____

13. 2,800 ÷ 7 = _____ **14.** 1,800 ÷ 30 = _____ **15.** 500 ÷ 8 = _____

Solve.

16. Peyton has collected 120 aluminum cans for recycling. If 20 cans will fit in each blue plastic bag, how many bags will she need to carry all the cans?

_____

Spiral Review

Solve each problem. If there is extra information, identify it. If there is not enough information, tell what information is needed.

17. Kelly is making sandwiches for a picnic. She has ham, tuna, and cheese. How many loaves of bread will she need to make 4 sandwiches of each kind?

_____

18. Jake is building a birdhouse out of wood. Each side of the birdhouse will measure about one square foot. The roof panels will measure about 1.5 square feet total. He wants to attract robins and blue jays. How much wood will Jake need to build the birdhouse?

_____

Name _____ Date _____

4–2 Homework Practice

Estimate Quotients

Estimate. Show your work.

1. 231 ÷ 6 _____

2. 149 ÷ 4 _____

3. 4,748 ÷ 7 _____

4. 275 ÷ 4 _____

5. 314 ÷ 6 _____

6. 5,603 ÷ 9 _____

7. $8\overline{)629}$ _____

8. $9\overline{)290}$ _____

9. $9\overline{)342}$ _____

10. $5\overline{)9{,}461}$ _____

11. $8\overline{)2{,}943}$ _____

12. $7\overline{)33{,}875}$ _____

Solve.

13. Each of the 9 parking lots at an automobile plant holds the same number of new cars. The lots are full. If there are 4,131 cars in the lots, about how many cars are in each lot? Show your work.

_____

14. A total of 176 valves were used for 8 cars as they were being assembled. About how many valves were used for each car? Show your work.

_____

Spiral Review

Divide mentally. (Lesson 4–1)

15. 360 ÷ 6 = _____

16. 4,500 ÷ 5 = _____

17. 8,000 ÷ 100 = _____

18. 400 ÷ 8 = _____

19. 180 ÷ 30 = _____

20. 1,600 ÷ 400 = _____

21. 4,900 ÷ 7 = _____

22. 5,400 ÷ 60 = _____

23. 7,200 ÷ 80 = _____

4-7

Name _____ Date _____

Homework Practice

Extending Division

Estimate each quotient.

1. 18.4 ÷ 6 = _____

2. 32.1 ÷ 6 = _____

3. 50.3 ÷ 7 = _____

4. 26.6 ÷ 9 = _____

5. 12.3 ÷ 5 = _____

6. 10.8 ÷ 5 = _____

7. 17.5 ÷ 5 = _____

8. 120.6 ÷ 2 = _____

9. 32.1 ÷ 8 = _____

10. 88.9 ÷ 3 = _____

11. 31.6 ÷ 5 = _____

12. 41.5 ÷ 5 = _____

13. $7.80 ÷ 6 = _____

14. $89.10 ÷ 4 = _____

15. $26.14 ÷ 4 = _____

16. $7.30 ÷ 5 = _____

17. $15.12 ÷ 8 = _____

18. $33.39 ÷ 6 = _____

Spiral Review

Solve. Explain how you interpreted the remainder. (Lesson 4–6)

19. A package of 25 pencils is divided among 10 students. How many pencils does each student get?

_____

20. One car can seat 5 people. If Kate's parents take her and 6 friends to the movies, how many cars will be needed?

_____

6-4

Name _____ Date _____

Homework Practice

5NS2.1, 5NS2.2

Dividing Decimals by Whole Numbers

Divide. Round to the nearest tenth if necessary.

1. 4.79 ÷ 3 _____ **2.** 9.99 ÷ 7 _____ **3.** 0.55 ÷ 5 _____

4. 6.95 ÷ 6 _____ **5.** 55.35 ÷ 52 _____ **6.** 72.9 ÷ 4 _____

7. 853.7 ÷ 25 _____ **8.** 457.4 ÷ 32 _____ **9.** 158.6 ÷ 45 _____

10. 64.3 ÷ 6 _____ **11.** 49.7 ÷ 4 _____ **12.** 74.2 ÷ 2 _____

Find the mean for each set of data. Round to the nearest tenth.

13. 25.8, 26.9, 24.2, 23.9, 25.4 _____ **14.** 2.56, 1.72, 2.85, 3.10, 2.65 _____

Spiral Review

Solve. Is each answer reasonable? Explain. (Lesson 6-3)

15. Laura thinks that a horse weighs 750 ounces. Is her estimate reasonable?

_____

16. Vito's living room is 13 feet wide and 10 feet long. Will 2 yards of carpet cover the floor?

_____

17. Esse has a recipe that calls for 2 quarts of tomato sauce. Will 8 cups be enough?

_____