Day 1

Divisibility

Divisibility Rules

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The divisibility rules make math easier. Did you ever wonder how people could tell if something was divisible by a number just by looking at it? These rules are how they do it. Memorize a few simple rules and simplifying fractions and prime factorization will be so much easier.

Number	Divisibility Rule	Example
Two (2)	A number is divisible by two if it is **even**. Another way to say a word is even is to say it ends in 0, 2, 4, 6 or 8.	642 is divisible by two because it ends in a two, which makes it an even number
Three (3)	A number is divisible by three if the **sum of the digits adds up to a multiple of three**.	423 is divisible by three because 4 + 2 + 3 = 9. Since nine is a multiple of three (or is divisible by three), then 423 is divisible by three
Four (4)	A number is divisible by four if it is even and **can be divided by two twice**.	128 is divisible by four because half of it is 64 and 64 is still divisible by two
Five (5)	A number is divisible by five if it **ends in a five or a zero**.	435 is divisible by five because it ends in a five
Six (6)	A number is divisible by six if it is **divisible by both two and three**.	222 is divisible by six because it is even, so it is divisible by two and its digits add up to six, which makes it divisible by three
Nine (9)	A number is divisible by nine if the **sum of the digits adds up to a multiple of nine**. This rule is similar to the divisibility rule for three.	9243 is divisible by nine because the sum of the digits adds up to eighteen, which is a multiple of nine
Ten (10)	A number is divisible by ten if it **ends in a zero**. This rule is similar to the divisibility rule for five.	730 is divisible by ten because it ends in zero

Divisibility Rules Practice Problems

Use the divisibility rules to circle the answers.

Number	**Divisible By:**						
Example: 10	***2***	3	4	***5***	6	9	***10***
15	2	3	4	5	6	9	10
27	2	3	4	5	6	9	10
36	2	3	4	5	6	9	10
16	2	3	4	5	6	9	10
28	2	3	4	5	6	9	10
57	2	3	4	5	6	9	10
102	2	3	4	5	6	9	10
268	2	3	4	5	6	9	10
4518	2	3	4	5	6	9	10
93	2	3	4	5	6	9	10
144	2	3	4	5	6	9	10
256	2	3	4	5	6	9	10
75	2	3	4	5	6	9	10
450	2	3	4	5	6	9	10
70	2	3	4	5	6	9	10

1-minute multiplication

Name: _____

Multiplication Facts to 12: How Many Can You Do In 1 Minute?

1. 9 × 11 =	2. 10 × 3 =	3. 5 × 9 =	4. 10 × 4 =
5. 9 × 5 =	6. 7 × 1 =	7. 2 × 6 =	8. 4 × 8 =
9. 8 × 8 =	10. 1 × 3 =	11. 6 × 6 =	12. 4 × 2 =
13. 5 × 10 =	14. 0 × 1 =	15. 3 × 8 =	16. 6 × 10 =
17. 7 × 5 =	18. 3 × 1 =	19. 5 × 0 =	20. 5 × 7 =
21. 5 × 3 =	22. 10 × 1 =	23. 0 × 5 =	24. 8 × 6 =
25. 4 × 4 =	26. 11 × 3 =	27. 6 × 9 =	28. 11 × 7 =
29. 9 × 9 =	30. 0 × 2 =	31. 11 × 9 =	32. 10 × 8 =
33. 1 × 9 =	34. 9 × 2 =	35. 12 × 11 =	36. 1 × 10 =
37. 12 × 0 =	38. 6 × 3 =	39. 4 × 7 =	40. 2 × 10 =
41. 9 × 8 =	42. 10 × 0 =	43. 1 × 7 =	44. 3 × 4 =
45. 6 × 2 =	46. 12 × 8 =	47. 7 × 10 =	48. 8 × 2 =
49. 3 × 2 =	50. 3 × 9 =	51. 5 × 4 =	52. 12 × 1 =
53. 4 × 11 =	54. 10 × 6 =	55. 10 × 11 =	56. 1 × 6 =
57. 7 × 6 =	58. 3 × 5 =	59. 5 × 8 =	60. 9 × 4 =

Multiplication Table

I.D, I.E and I.F Multiplication Table

Fill out the following 12 x 12 multiplication table. Do NOT use notes or a calculator.

X	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

Answer the following questions using the multiplication table

1. What is 12 * 5?

2. What is 9 * 2?

3. What are some factors of 36 (numbers that go into 36)?

4. Find all the factors between 1 and 12 of 48

5. What is 48 ÷ 8?

6. Find 12 ÷ 4

7. What is the rule for multiplying by 1?

8. What is the rule for multiplying by 0?

9. What happens when you multiply any number by 2?

10. What is another name for any number which is DIVISIBLE by 2?

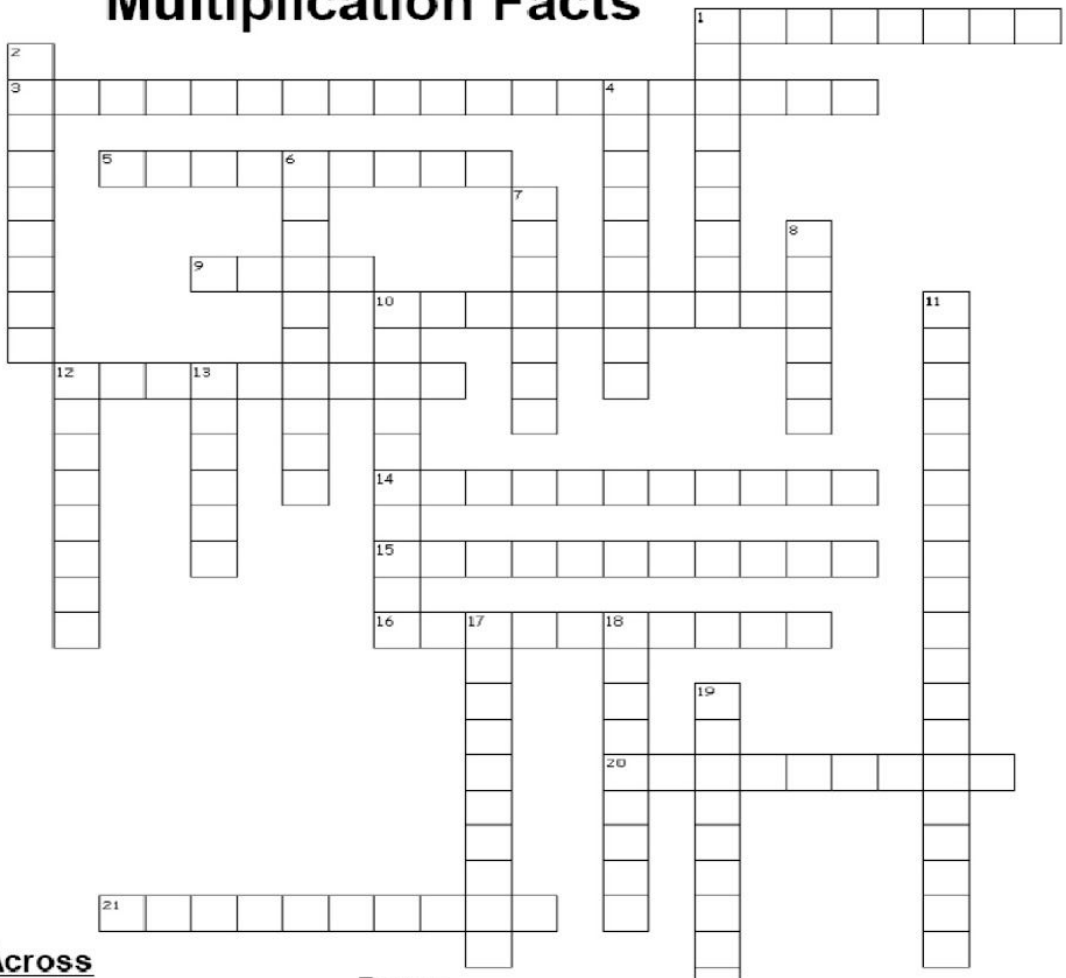
11. What happens when you multiply a number by 5?

12. What happens when you multiply a number by 10?

Can you fill in all of the empty squares?

x	2	5	9	12	0	6	7	10	3	8	1	11	4
12									36		12		
1				12									4
5		25									5		
0									0				
8	16						56					88	
2													
4			36					40					
11						66							
7								70					
10										80			
3				36								33	
9							63						
6		30		72									

Multiplication Facts



Across

1. six times seven
3. twelve times twelve
5. six times six
9. one million times zero
10. nine times seven
12. eleven times five
14. twenty-three times one
15. seven times four
16. ten times ten
20. seven times three
21. eight times three

Down

1. six times nine
2. seven times seven
4. eight times four
6. seven times five
7. three times five
8. four times three
10. eight times nine
11. eleven times eleven
12. eight times seven
13. six times five
17. twelve times seven
18. twelve times eight
19. nine times three

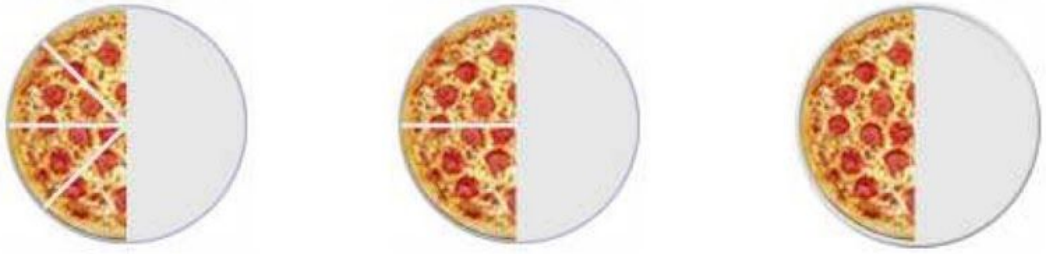
Day 2

Comparing Fractions

Fractions: Simplifying Fractions

Simplifying (or *reducing*) fractions means to make the fraction as simple as possible. Why say four-eighths ($^4/_8$) when you really mean half ($^1/_2$) ?

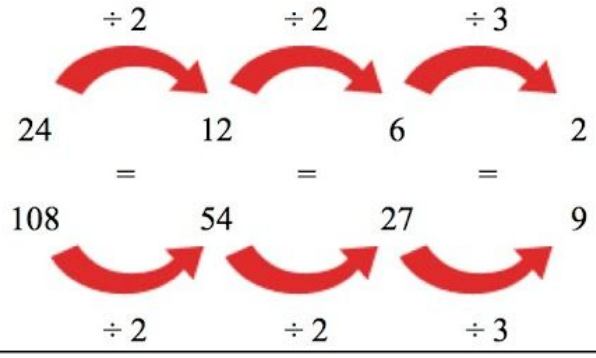
$^4/_8$ (Four-Eighths) ==> $^2/_4$ (Two-Quarters) ==> $^1/_2$ (One-Half)



Method

Divide both the top and bottom of the fraction until you can't go any further

Example: Simplify the fraction $^{24}/_{108}$:



Reduce each fraction to lowest terms (smallest numbers possible).

4. $\frac{3}{9} = \frac{1}{3}$ $\frac{4}{8} =$ $\frac{4}{6} =$ $\frac{6}{9} =$ $\frac{6}{8} =$

5. $\frac{4}{10} =$ $\frac{8}{12} =$ $\frac{4}{16} =$ $\frac{10}{14} =$ $\frac{12}{16} =$

6. $\frac{12}{20} =$ $\frac{8}{10} =$ $\frac{8}{32} =$ $\frac{10}{24} =$ $\frac{28}{64} =$

Fractions: Adding and Subtracting

To add **like fractions** (fractions that have the same denominator), add the numerators and place the sum over the denominator.

** Simplify if possible!

Example 1.

Add 5 + 1.

$$\begin{array}{r} \frac{5}{8} \\ +\ \frac{1}{8} \\ \hline \frac{6}{8} \end{array}$$ Add

Write 8 as the denominator.

$$\begin{array}{r} \frac{5}{8} \\ +\ \frac{1}{8} \\ \hline \frac{6}{8} = \frac{3}{4} \end{array}$$

↑ Simplify $\frac{6}{8}$.

To add **unlike fractions** (fractions that have different denominators), rewrite them as like fractions. Then, add as usual.

Example 1.

Write like fractions, using 8 as the **common denominator**. Add.

$$\begin{array}{rcl} \frac{2}{4} & = & \frac{4}{8} \\ +\ \frac{3}{8} & = & +\ \frac{3}{8} \\ \hline & & \frac{7}{8} \end{array}$$

$\left(\frac{2}{4}\right.$ is raised to higher terms.$)$

$\left(\frac{3}{8}\right.$ is unchanged.$)$

Example 2.

Write like fractions, using 12 as the **common denominator**. Add.

$$\begin{array}{rcl} \frac{6}{12} & = & \frac{6}{12} \\ +\ \frac{1}{3} & = & +\ \frac{4}{12} \\ \hline & & \frac{10}{12} = \frac{5}{6} \end{array}$$

$\left(\frac{6}{12}\right.$ is unchanged.$)$

$\left(\frac{1}{3}\right.$ is raised to higher terms.$)$

Simplify $\frac{10}{12}$.

**Follow the SAME rules for subtraction-just subtract the numerators instead of adding!

Add. Simplify each answer.

1. $\begin{array}{r} \frac{1}{3} \\ +\ \frac{1}{3} \\ \hline \end{array}$ $\begin{array}{r} \frac{2}{4} \\ +\ \frac{1}{4} \\ \hline \end{array}$ $\begin{array}{r} \frac{5}{8} \\ +\ \frac{2}{8} \\ \hline \end{array}$ $\begin{array}{r} \frac{3}{6} \\ +\ \frac{1}{6} \\ \hline \end{array}$ $\begin{array}{r} \frac{5}{10} \\ +\ \frac{3}{10} \\ \hline \end{array}$ $\begin{array}{r} \frac{9}{16} \\ +\ \frac{5}{16} \\ \hline \end{array}$

2. $\begin{array}{r} \frac{3}{4} \\ +\ \frac{1}{4} \\ \hline \end{array}$ $\begin{array}{r} \frac{2}{3} \\ +\ \frac{1}{3} \\ \hline \end{array}$ $\begin{array}{r} \frac{4}{8} \\ +\ \frac{2}{8} \\ \hline \end{array}$ $\begin{array}{r} \frac{7}{12} \\ +\ \frac{3}{12} \\ \hline \end{array}$ $\begin{array}{r} \frac{5}{6} \\ +\ \frac{1}{6} \\ \hline \end{array}$ $\begin{array}{r} \frac{8}{16} \\ +\ \frac{4}{16} \\ \hline \end{array}$

Add or Subtract.

3.

$$\begin{array}{r} \frac{3}{5} \\ -\ \frac{1}{2} \\ \hline \end{array} \qquad \begin{array}{r} \frac{5}{7} \\ -\ \frac{1}{2} \\ \hline \end{array} \qquad \begin{array}{r} \frac{3}{4} \\ +\ \frac{2}{3} \\ \hline \end{array} \qquad \begin{array}{r} \frac{7}{10} \\ +\ \frac{3}{4} \\ \hline \end{array}$$

4.

$$\begin{array}{r} \frac{3}{5} \\ +\ \frac{2}{3} \\ \hline \end{array} \qquad \begin{array}{r} \frac{7}{9} \\ +\ \frac{3}{4} \\ \hline \end{array} \qquad \begin{array}{r} \frac{5}{8} \\ +\ \frac{2}{3} \\ \hline \end{array} \qquad \begin{array}{r} \frac{1}{2} \\ -\ \frac{1}{3} \\ \hline \end{array} \qquad \begin{array}{r} \frac{3}{5} \\ -\ \frac{5}{12} \\ \hline \end{array}$$

5.

$$\begin{array}{r} \frac{4}{5} \\ -\ \frac{2}{3} \\ \hline \end{array} \qquad \begin{array}{r} \frac{7}{10} \\ -\ \frac{1}{4} \\ \hline \end{array} \qquad \begin{array}{r} \frac{7}{8} \\ -\ \frac{2}{3} \\ \hline \end{array} \qquad \begin{array}{r} \frac{2}{5} \\ -\ \frac{1}{12} \\ \hline \end{array} \qquad \begin{array}{r} \frac{13}{16} \\ -\ \frac{1}{3} \\ \hline \end{array} \qquad \begin{array}{r} \frac{15}{16} \\ -\ \frac{3}{5} \\ \hline \end{array}$$

Fractions: Multiplication and Division

Multiplying fractions is the same for both like fractions and u
- Multiply the numerators to find the numerator of the answe
- Multiply the denominators to find the denominator of the an

Example 1.

Multiply the numerators.

$\frac{3}{4} \times \frac{1}{2} = \frac{3}{}$

Multiply the denominators.

$\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$

Example 2.

Multiply the numerators.

$\frac{2}{3} \times \frac{3}{8} = \frac{6}{}$

Multiply the denominators.

$\frac{2}{3} \times \frac{3}{8} = \frac{6}{24}$

Reduce the answer.

$\frac{6}{24} = \frac{6 \div 6}{24 \div 6} = \frac{1}{4}$

Multiply. Simplify answers when possible.

1. $\frac{1}{3} \times \frac{1}{2} =$ $\frac{1}{4} \times \frac{1}{4} =$ $\frac{2}{3} \times \frac{1}{5} =$

2. $\frac{2}{5} \times \frac{1}{4} =$ $\frac{5}{6} \times \frac{1}{2} =$ $\frac{2}{5} \times \frac{7}{8} =$

3. $\frac{5}{8} \times \frac{2}{3} =$ $\frac{3}{7} \times \frac{3}{5} =$ $\frac{7}{8} \times \frac{1}{3} =$

4. $\frac{2}{3} \times \frac{2}{3} =$ $\frac{3}{4} \times \frac{3}{8} =$ $\frac{5}{12} \times \frac{1}{4} =$

5. $\frac{1}{2} \times \frac{2}{3} =$ $\frac{3}{4} \times \frac{1}{3} =$ $\frac{2}{3} \times \frac{7}{10} =$

When dividing fractions by fractions:

- **Invert** the divisor (the fraction you're dividing by). To invert means to ***turn upside down***. To invert a fraction, switch the top and bottom numbers. When you invert a fraction, you write its **reciprocal**.
- Change the division sign to a multiplication sign.
- Multiply the fractions.

Example 1.

Write the reciprocals of the fractions below.

Fraction	Reciprocal
$\frac{1}{4}$	$\frac{4}{1}$
$\frac{3}{8}$	$\frac{8}{3}$

Example 2.

To divide, write the reciprocal of the divisor (the second fraction), change ÷ to ×, and multiply.

Invert the divisor.

$$\frac{2}{3} \div \frac{1}{5} = \frac{2}{3} \times \frac{5}{1} = \frac{10}{3} = 3\frac{1}{3}$$

Change ÷ to ×.

▶ Write the reciprocal of each fraction.

1. $\frac{2}{3}$ $\frac{7}{8}$ $\frac{5}{6}$ $\frac{4}{3}$ $\frac{9}{4}$

▶ Divide. Simplify answers.

2. $\frac{5}{8} \div \frac{1}{2} =$ $\frac{3}{4} \div \frac{1}{2} =$ $\frac{1}{3} \div \frac{3}{8} =$

3. $\frac{4}{5} \div \frac{4}{5} =$ $\frac{3}{6} \div \frac{1}{3} =$ $\frac{11}{16} \div \frac{1}{4} =$

4. $\frac{2}{3} \div \frac{2}{4} =$ $\frac{3}{4} \div \frac{1}{3} =$ $\frac{7}{8} \div \frac{1}{8} =$

5. $\frac{3}{2} \div \frac{3}{4} =$ $\frac{5}{3} \div \frac{1}{2} =$ $\frac{11}{8} \div \frac{3}{16} =$

Day 3

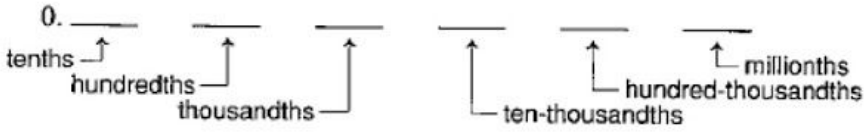
Decimals – Rounding

Smaller Place Values

Once in a while, you may see a decimal fraction with more than three decimal places. Because of this, you should be familiar with place values smaller than 0.001.

0.1 one-tenth
0.01 one-hundredth
0.001 one-thousandth
0.0001 one ten-thousandth
0.00001 one hundred-thousandth
0.000001 one-millionth

Decimal Place Values



Rounding to a Chosen Place Value

As was discussed on the previous two pages, **rounding** mixed decimals ***before doing the math*** is a good way to estimate an answer.

Rounding also is used to simplify an exact answer ***after the math is done***. Most often, an answer is rounded to a chosen place value, giving the answer fewer decimal digits.

To round a decimal fraction to a chosen place value, look at the digit to the **right** of the chosen place value.

- If the digit is ***5 or more***, ***round up***.
- If the digit is ***less than 5***, ***leave*** the digit in the chosen place value ***unchanged***.

Rounding to the tenths place (nearest tenth)

Check the digit in the hundredths place.

$0.65 \approx 0.7$ ↑ 5 or more

$2.61 \approx 2.6$ ↑ less than 5

$8.672 \approx 8.7$ ↑ 5 or more

Rounding to the hundredths place (nearest hundredth)

Check the digit in the thousandths place.

$0.429 \approx 0.43$ ↑ 5 or more

$2.384 \approx 2.38$ ↑ less than 5

$4.168 \approx 4.17$ ↑ 5 or more

Rounding to the thousandths place (nearest thousandth)

Check the digit in the ten-thousandths place.

$0.2756 \approx 0.276$ ↑ 5 or more

$1.0852 \approx 1.085$ ↑ less than 5

$3.4635 \approx 3.464$ ↑ 5 or more

Practice

▶ **Round each number to the tenths place.**

1. 0.38 ≈	0.29 ≈	0.53 ≈	0.147 ≈	0.824 ≈
2. 3.25 ≈	1.93 ≈	2.804 ≈	3.062 ≈	7.952 ≈

▶ **Round each number to the hundredths place.**

3. 0.235 ≈	0.812 ≈	0.349 ≈	0.892 ≈	0.246 ≈
4. 2.825 ≈	1.052 ≈	6.500 ≈	7.806 ≈	21.875 ≈

▶ **Round each number to the thousandths place.**

5. 0.4737 ≈	0.9734 ≈	1.9472 ≈	3.4889 ≈	17.3375 ≈
6. 0.3075 ≈	0.6403 ≈	4.2507 ≈	6.0089 ≈	12.1052 ≈

7. A grocery clerk used a calculator to multiply ***pounds (lb.)*** by ***dollars per pound ($ per lb.)*** to find the selling price of each package of beef listed on the chart below. Her exact calculator answers are shown.

Find the selling price of the packages by rounding each calculator answer to the nearest cent (hundredths place).

	Weight (lb.)		Price ($ per lb.)	Calculator Answer	Selling Price
Hamburger	4.05	×	$1.83	7.4115	(a) $_____
Round steak	7.1	×	$2.19	15.549	(b) _____
Sirloin steak	3.90	×	$3.88	15.132	(c) _____
Rib steak	2.75	×	$4.09	11.2475	(d) _____
T-bone steak	2.1	×	$5.12	6.894	(e) _____
Tenderloin steak	2.08	×	$6.15	12.792	(f) _____

Note: A calculator does not display a dollar sign ($).

(g) The clerk made a mistake when writing one of the calculator answers. Using estimation, determine which calculator answer is incorrect.

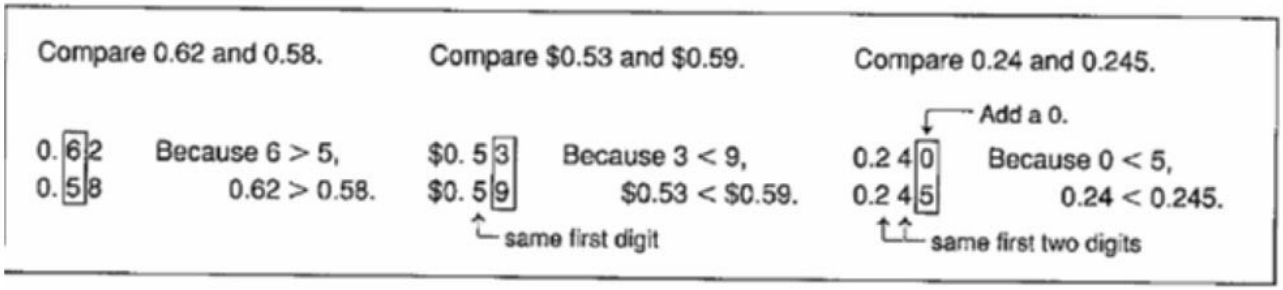
Decimals – Comparing Name: _____

To compare decimals, **begin** in the tenths place and compare each digit. If the digit is the same, move to the next place until the two digits are different. If two decimals do not have the same number of digits, give them an equal number by adding one or more place-holding zeros.

Use the following symbols when comparing numbers:

< means "is less than" 5 < 9
> means "is greater than" 8 > 4
= means "is equal to" 7 = 5 + 2

Example



Practice

For each problem use the greater than (>), less than (<), or equal symbol to compare the decimals. If you prefer, simply <u>circle</u> the decimal that is greater.

1.	0.42	_____	0.5	2.	2650.54399	_____	2605.54399
3.	0.953	_____	0.953	4.	0.87	_____	0.29
5.	0.30300	_____	0.303	6.	0.08865400	_____	0.088633
7.	0.893	_____	89.3	8.	7533.491960	_____	7533.49196
9.	0.92	_____	0.29	10.	0.730	_____	0.03

11.	0.936	_____	9.36	12.	0.940	_____	0.83
13.	0.96	_____	9.6	14.	7612.68713	_____	7621.68713
15.	5.4	_____	0.091	16.	0.02828100	_____	0.028216
17.	0.8	_____	0.97	18.	0.06914	_____	0.069136
19.	0.5470	_____	0.547	20.	0.155	_____	15.5

Multiplying/Dividing Decimals

To multiply a decimal by a whole number:

- Multiply the numbers just as you would whole numbers.
- Count the number of decimal places in the decimal to see how many decimal places are in the answer.
- Count off the number of decimal places, starting at the right of the answer, and then write the decimal point.

Example 1. 5.71×3

Multiply the numbers. Count the number of decimal places.

$$\begin{array}{r} {\scriptstyle 2} \\ 5.71 \\ \times \quad 3 \\ \hline 17.13 \end{array} \quad \begin{array}{l} \leftarrow \text{2 decimal places} \\ \leftarrow \text{+ 0 decimal places} \\ \text{2 decimal places} \end{array}$$

↑ Place the decimal point so that the answer has 2 decimal places.

Example 2. 8.372×4

Multiply the numbers. Count the number of decimal places.

$$\begin{array}{r} {\scriptstyle 1\ 2} \\ 8.372 \\ \times \quad 4 \\ \hline 33.488 \end{array} \quad \begin{array}{l} \leftarrow \text{3 decimal places} \\ \leftarrow \text{+ 0 decimal places} \\ \text{3 decimal places} \end{array}$$

↑ Place the decimal point so that the answer has 3 decimal places.

▶ Multiply. Use estimating to check problems involving mixed decimals.

1.	0.8 × 5	0.9 × 4	0.6 × 7	0.4 × 8	0.7 × 9	0.8 × 7
2.	6.5 × 3	8.4 × 6	4.7 × 8	5.8 × 9	7.8 × 6	9.5 × 4
3.	3.42 × 8	7.54 × 2	8.05 × 14	9.54 × 12	7.425 × 15	8.737 × 21
4.	\$0.80 × 5	\$0.75 × 6	\$ 0.48 × 9	\$2.75 × 17	\$8.50 × 28	\$15.00 × 14

▶ Multiply. Round each answer to the tenths place.

5. $0.91 \times 8 =$ $8.32 \times 7 =$ $3.26 \times 12 =$ $8.625 \times 15 =$

To multiply a decimal by a decimal:

- Multiply the numbers just as you would whole numbers.
- Count the number of decimal places in ***both decimals*** to see how many decimal places ar in the answer.
- Count off the number of decimal places, starting at the right of the answer.
- Write the decimal point, using place-holding zeros if necessary.

Example 1. 4.63×0.5

Multiply the numbers. Count the number of decimal places.

$$\begin{array}{rl} 4.63 & \longleftarrow \text{ 2 decimal places} \\ \times\ 0.5 & \longleftarrow \text{ + 1 decimal place} \\ \hline 2.315 & \text{3 decimal places} \end{array}$$

Place the decimal point so that the answer has 3 decimal places.

Example 2. 4.86×0.004

Multiply the numbers. Count the number of decimal places.

$$\begin{array}{rl} 4.86 & \longleftarrow \text{ 2 decimal places} \\ \times\ 0.004 & \longleftarrow \text{ + 3 decimal places} \\ \hline 0.01944 & \text{5 decimal places} \end{array}$$

Write a place-holding zero so that the answer has 5 decimal places.

▶ Multiply. Use estimating to check problems involving mixed decimals.

1.	0.6×0.4	0.7×0.2	0.8×0.5	0.9×0.06	0.5×0.02	0.6×0.006
2.	7.5×0.4	9.3×0.6	5.9×0.7	6.8×0.08	5.4×0.05	8.5×0.007
3.	3.42×0.05	6.84×0.04	9.11×0.007	2.54×0.12	8.41×0.24	6.52×0.033
4.	$\$0.75 \times 0.8$	$\$0.90 \times 0.6$	$\$5.00 \times 0.05$	$\$8.80 \times 0.75$	$\$10.00 \times 0.15$	$\$25.00 \times 0.25$

▶ Multiply. Round each answer to the hundredths place.

5. $0.61 \times 0.4 =$ $\quad 5.6 \times 0.06 =$ $\quad 2.9 \times 0.007 =$ $\quad 12 \times 0.009 =$

To divide a decimal by a whole number:

- Place a decimal point in the quotient directly above its position in the **dividend**.
- Divide, using one or more zeros as placeholders in the dividend as needed.

Example 1. Divide 28.5 by 5.

Place a decimal point in the quotient. Divide as you do with whole numbers.

Be sure the decimal points are lined up.

```
  5.7
5)28.5  ← dividend
- 25
  35
- 35
```

Example 2. Divide 7 into 0.154.

Place a decimal point in the quotient. Since you can't divide 7 into 1, write a zero above the 1. Now divide 7 into 15.

Write a leading zero in the answer.

```
 0.022
7)0.154
- 14
  14
- 14
```

▶ Divide.

1. $4\overline{)4.48}$ $5\overline{)0.655}$ $3\overline{)18.6}$ $12\overline{)0.528}$ $14\overline{)4.284}$

2. $6\overline{)0.276}$ $8\overline{)0.424}$ $6\overline{)0.882}$ $13\overline{)1.105}$ $27\overline{)0.0567}$

3. $4\overline{)\$10.16}$ $3\overline{)\$7.29}$ $5\overline{)\$12.75}$ $4\overline{)\$0.20}$ $8\overline{)\$0.32}$

▶ In the following problems, use a zero as a placeholder and then continue to divide.

4. $3\overline{)0.087}$ $12\overline{)0.108}$ $9\overline{)0.486}$ $7\overline{)0.0063}$ $4\overline{)0.0504}$

5. $8\overline{)0.4}$ $4\overline{)0.2}$ $28\overline{)1.4}$ $80\overline{)4.8}$ $60\overline{)1.2}$

To divide a decimal by a decimal:

- Change the divisor to a whole number by moving its decimal point to the far right.
- Move the decimal point in the dividend an equal number of places to the right, adding place-holding zeros if needed.
- Divide.

Example 1. $0.4\overline{)6.52}$

Move the decimal point in the divisor and dividend 1 place to the right. Divide 4 into 65.2.

$0\,4.\overline{)6\,5.\,2}$

No added zeros.

$$\begin{array}{r} 16.3 \\ 4\overline{)65.2} \\ -4 \\ \hline 25 \\ -24 \\ \hline 12 \\ -12 \\ \hline \end{array}$$

Example 2. $0.005\overline{)2.5}$

Move the decimal point in the divisor 3 places to the right. Add two zeros to the dividend, and move its decimal point 3 places to the right. Divide 5 into 2500.

Two added zeros.

$0\,005.\overline{)2\,500.}$

$$\begin{array}{r} 500 \\ 5\overline{)2500} \\ -25 \\ \hline 000 \\ 00 \\ \hline \end{array}$$

▶ **Divide.**

1. $0.2\overline{)0.38}$ $0.6\overline{)0.42}$ $0.3\overline{)5.4}$ $1.2\overline{)2.64}$ $5.6\overline{)8.96}$

2. $0.03\overline{)1.5}$ $0.014\overline{)30.8}$ $4.7\overline{)14.899}$ $2.5\overline{)26.5}$ $3.6\overline{)0.01944}$

▶ **To divide a whole number by a decimal, write a decimal point *to the right* of the whole number. Then use place-holding zeros and move the decimal point the appropriate number of places.**

3. $0.07\overline{)21}$ $0.03\overline{)18}$ $0.05\overline{)10}$ $0.8\overline{)16}$ $0.4\overline{)24}$

4. $2.5\overline{)50}$ $1.2\overline{)48}$ $4.2\overline{)840}$ $1.5\overline{)315}$ $2.3\overline{)483}$

Mixed Practice

Evaluate each of these statements. Show your work.

1. $59 \times .03 =$

2. $85 \times .3$

3. $9.5 \times .05$

4. 3.5×3.45

5. $0.0324 \times .42$

6. 0.78×0.2

5. $1.2 \div 3 =$

5. $0.032 \div .8 =$

5. $3.2 \div 8 =$

5. $.63 \div 7 =$

5. $.005 \div .01 =$

5. $1.08 \div 0.12 =$

Day 4

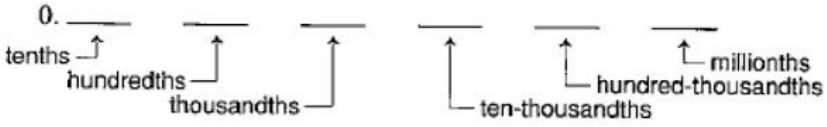
Decimals – Rounding

Smaller Place Values

Once in a while, you may see a decimal fraction with more than three decimal places. Because of this, you should be familiar with place values smaller than 0.001.

0.1 one-tenth
0.01 one-hundredth
0.001 one-thousandth
0.0001 one ten-thousandth
0.00001 one hundred-thousandth
0.000001 one-millionth

Decimal Place Values



Rounding to a Chosen Place Value

As was discussed on the previous two pages, **rounding** mixed decimals ***before doing the math*** is a good way to estimate an answer.

Rounding also is used to simplify an exact answer ***after the math is done***. Most often, an answer is rounded to a chosen place value, giving the answer fewer decimal digits.

To round a decimal fraction to a chosen place value, look at the digit to the **right** of the chosen place value.

- If the digit is ***5 or more***, ***round up***.
- If the digit is ***less than 5***, ***leave*** the digit in the chosen place value ***unchanged***.

Rounding to the tenths place (nearest tenth)

Check the digit in the hundredths place.

$0.65 \approx 0.7$ ↑ 5 or more

$2.61 \approx 2.6$ ↑ less than 5

$8.672 \approx 8.7$ ↑ 5 or more

Rounding to the hundredths place (nearest hundredth)

Check the digit in the thousandths place.

$0.429 \approx 0.43$ ↑ 5 or more

$2.384 \approx 2.38$ ↑ less than 5

$4.168 \approx 4.17$ ↑ 5 or more

Rounding to the thousandths place (nearest thousandth)

Check the digit in the ten-thousandths place.

$0.2756 \approx 0.276$ ↑ 5 or more

$1.0852 \approx 1.085$ ↑ less than 5

$3.4635 \approx 3.464$ ↑ 5 or more

Practice

▶ **Round each number to the tenths place.**

1. 0.38 ≈ 0.29 ≈ 0.53 ≈ 0.147 ≈ 0.824 ≈

2. 3.25 ≈ 1.93 ≈ 2.804 ≈ 3.062 ≈ 7.952 ≈

▶ **Round each number to the hundredths place.**

3. 0.235 ≈ 0.812 ≈ 0.349 ≈ 0.892 ≈ 0.246 ≈

4. 2.825 ≈ 1.052 ≈ 6.500 ≈ 7.806 ≈ 21.875 ≈

▶ **Round each number to the thousandths place.**

5. 0.4737 ≈ 0.9734 ≈ 1.9472 ≈ 3.4889 ≈ 17.3375 ≈

6. 0.3075 ≈ 0.6403 ≈ 4.2507 ≈ 6.0089 ≈ 12.1052 ≈

7. A grocery clerk used a calculator to multiply ***pounds (lb.)*** by ***dollars per pound ($ per lb.)*** to find the selling price of each package of beef listed on the chart below. Her exact calculator answers are shown.

Find the selling price of the packages by rounding each calculator answer to the nearest cent (hundredths place).

	Weight (lb.)		Price ($ per lb.)	Calculator Answer	Selling Price
Hamburger	4.05	×	$1.83	7.4115	(a) $_____
Round steak	7.1	×	$2.19	15.549	(b) _____
Sirloin steak	3.90	×	$3.88	15.132	(c) _____
Rib steak	2.75	×	$4.09	11.2475	(d) _____
T-bone steak	2.1	×	$5.12	6.894	(e) _____
Tenderloin steak	2.08	×	$6.15	12.792	(f) _____

Note: A calculator does not display a dollar sign ($).

(g) The clerk made a mistake when writing one of the calculator answers. Using estimation, determine which calculator answer is incorrect.

Converting between decimals and fractions

To Change a Fraction into a decimal…

To change a fraction into a decimal, divide the denominator into the numerator.

- Write a decimal point to the right of the dividend (**numerator**) and add place-holding zeros as needed.
- Divide until there is no remainder or until you have all the decimal places you want.

Example 1. Change $\frac{2}{5}$ to a decimal.

Divide 5 into 2. Add one place-holding zero.
Place a decimal point in the quotient.
Divide, and write a leading zero in the answer.

$$\begin{array}{r} 0.4 \\ 5\overline{)2.0} \\ -20 \\ \hline \end{array}$$

Example 2. Change $\frac{3}{4}$ to a decimal.

Divide 4 into 3. Add two place-holding zeros.
Place a decimal point in the quotient.
Divide, and write a leading zero in the answer.

$$\begin{array}{r} 0.75 \\ 4\overline{)3.00} \\ -28 \\ \hline 20 \\ -20 \\ \hline \end{array}$$

To Change a Decimal into a Fraction…

Decimal numbers (Decimals) are special fractions which have denominators of 10, 100, 1000 or any powers of ten.

Examples:
0.8 has only one decimal place, therefore the denominator of the fraction should be ten.

$$0.8 = \frac{8}{10} = \frac{4}{5}$$

0.34 has two decimal places, therefore the denominator of the fraction should be hundred.

$$0.34 = \frac{34}{100} = \frac{17}{50}$$

Let's convert 0.083 to a fraction.
0.083 has three decimal places, therefore the denominator of the fraction should be a thousand.

$$0.083 = \frac{83}{1000}$$

Day 5

Converting between decimals, fractions, and percents

Percent to Decimal

Percent-to-decimal conversions are easy; you mostly just move the decimal point two places. The way I keep it straight is to remember that 50%, or one-half, of a dollar is $0.50.

Example:

27% = 0.27
104% = 1.04
0.5% = 0.005

Decimal to Percent

Decimal-to-percent conversions are simple: just move the decimal point two places to the right.

Example:

0.23 = 23%
2.34 = 234%
0.0097 = 0.97%

Fraction to Percent

First change the fraction to a decimal using long division. Then follow the rule above to change the decimal to a percent.

Example:

$$\frac{3}{2} = 3 \div 2 = 1.5 = 150\%$$

$$\frac{3}{4} = 3 \div 4 = 0.75 = 75\%$$

Percent to Fraction

Convert the percent to a decimal using the steps above. Then convert the decimal to a fraction-be sure to reduce.

Example:

$$40\% = 0.40 = \frac{40}{100} \qquad \frac{40}{100} = \frac{4}{10} = \frac{2}{5}$$

$$0.5\% = 0.005 = \frac{5}{1000} = \frac{1}{200}$$

1. Change the following decimals to percents.

0.7 = _____ 0.4 = _____ 0.89 = _____ 0.25 = _____

2.
Change the following percents to decimals.

30% = _____ 2%=_____ 0.5% = _____ 235% =_____

3. Change the following fractions to decimals.

$\frac{2}{10}$ = _____ $\frac{2}{100}$ = _____ $\frac{6}{10}$ = _____ $\frac{60}{100}$ = _____

4. Change the following fractions to percents.

$\frac{2}{10}$ = _____ $\frac{2}{100}$ = _____ $\frac{6}{10}$ = _____ $\frac{60}{100}$ = _____

5. Put the following sets of numbers in order from least to greatest.

A. $\frac{75}{100}$, 83%, 0.80 _____ _____ _____

B. $\frac{1}{10}$, 0.09, 8% _____ _____ _____

C. 2%, $\frac{2}{100}$, 0.2 _____ _____ _____

D. $\frac{1}{4}$, 0.4, 40% _____ _____ _____

Fill in the table:

Percent	Fraction	Decimal
5%		
8%		
	$\frac{1}{10}$	
		0.12
		0.15
	$\frac{9}{50}$	
20%		
	$\frac{1}{4}$	
		0.3
		0.4
50%		
55%		
	$\frac{3}{5}$	
		0.72
		0.75
	$\frac{39}{50}$	
85%		
	$\frac{9}{10}$	