Grade 6 to 7

Examples, Online Video

and

Extra Practice Links

Summer Use

Fractions

Adding and Subtracting Fractions and Mixed Numbers

The denominators must be the same.

1. If the denominators **are** the same. Add or subtract the numerators but KEEP the denominator the same. Then reduce

$\frac{7}{8}+\frac{5}{8}=\frac{7+5}{8}=\frac{12}{8}=\frac{3(4)}{2(4)}=\frac{3}{2}$

Videos:

Adding fractions with like denominators—https://youtu.be/EJjnEau6aeI

Adding nixed numbers with like denominators—https://youtu.be/pxX07gUbIQQ

Subtracting fractions with like denominators—https://youtu.be/UbUdyE1_b9g

Subtracting mixed numbers with like denominators— https://youtu.be/zm3TXDZrifU

Extra Practice: Click the links for the extra Practice

Adding fractions with like denominators

Subtracting fractions with like denominators

Adding and subtracting mixed numbers with like denominators

2. If the denominators are not the same. Find a common denominator by multiplying one or more of the fractions by a number that makes both denominators the same. Start with the larger number and multiply it by 2 check to see if it is divisible by the other number. If the answer is no then, keep multiplying by 3, 4, 5, and so on until the answer is yes.

$\frac{4}{5} - \frac{3}{4}$

$\frac{4}{5} - \frac{3}{4} = \frac{4(?)}{5(?)} - \frac{3(?)}{4(?)} = \frac{4(4)}{5(4)} - \frac{3(5)}{4(5)}$
$= \frac{16}{20} - \frac{15}{20} = \frac{16-15}{20} = \boxed{\frac{1}{20}}$

Common multiple: use the larger number and multiply until you can divide the smaller number evenly (no decimal)

$5 \times 2 = 10$ $10 \div 4 = 2.5$ No
$5 \times 3 = 15$ $15 \div 4 = 3.75$ No
$5 \times 4 = 20$ $20 \div 4 = 5$ Yes Use the fact that the denominator must be 20.

For the first fraction: what number do I have to multiply 5 by to get 20? Answer: 4. Then multiply $\frac{4}{5}$ by $\frac{4}{4}$.
For the second fraction: What number do I have to multiply 4 to get 20? Answer: 5 Then multiply $\frac{3}{4}$ by $\frac{5}{5}$.

Videos:

Adding fractions with unlike denominators

Subtracting fractions with unlike denominators

Adding mixed fractions with unlike denominators

Subtract mixed fractions with unlike denominators

Adding mixed fractions with unlike denominators with regrouping

Subtracting mixed fractions with unlike denominators with regrouping

Extra Practice

Adding fractions with unlike denominators

Subtracting fractions with unlike denominators

Adding and subtracting mixed fractions with unlike denominators

Adding and subtracting mixed fractions with unlike denominators with regrouping

Multiplying Fractions: Multiply the numerators together, multiply the denominators together and then simplify

$\frac{2}{3}\times\frac{5}{8}=\frac{2\times5}{3\times8}=\frac{10}{24}=\frac{(2)(5)}{(2)(12)}=\frac{5}{12}$

Multiplying Mixed Numbers: Convert the mixed number to an improper fraction, then follow the steps above for multiplication of fractions.

Convert the following mixed number to an improper fraction: $1\frac{5}{6}$

$1\frac{5}{6}=1+\frac{5}{6}=\frac{6}{6}+\frac{5}{6}=\frac{6+5}{6}=\frac{11}{6}$

$2\frac{1}{2}=2+\frac{1}{2}=\frac{4}{2}+\frac{1}{2}=\frac{5}{2}$

Multiply Mixed Numbers: $1\frac{5}{6}\times2\frac{1}{2}$

$$1\frac{5}{6}\times2\frac{1}{2}=\left(\frac{11}{6}\right)\times\left(\frac{5}{2}\right)=\frac{11\times5}{6\times2}=\frac{55}{12}=4\frac{7}{12}$$

Videos:

Multiplying fractions

Converting mixed numbers to improper fractions

Converting improper fractions to mixed numbers

Multiplying mixed numbers

Extra Practice:

Multiplying fractions

Rewriting mixed numbers and improper fractions

Multiplying mixed numbers

Dividing Fractions: Flip the second fraction (take the reciprocal) and then multiply the two fractions together. Then simplify. (You can change into a mixed number if necessary).

$\frac{2}{5}\div\frac{7}{3}$

$=\frac{2}{5}\times\frac{3}{7}$ (took the reciprocal of the second fraction)

$=\frac{2\times3}{5\times7}=\frac{6}{35}$ (performed multiplication and then simplified)

Video—Dividing fractions

Extra Practice—Dividing fractions

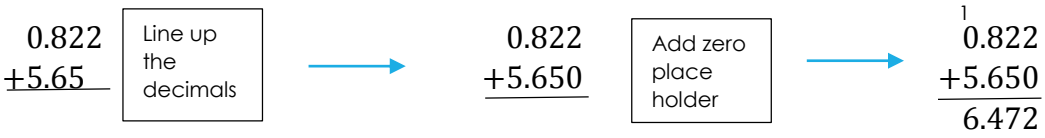
(Note if you are dividing mixed numbers see the video/practice for converting mixed numbers to improper fractions above.)

Decimals:

Adding decimals

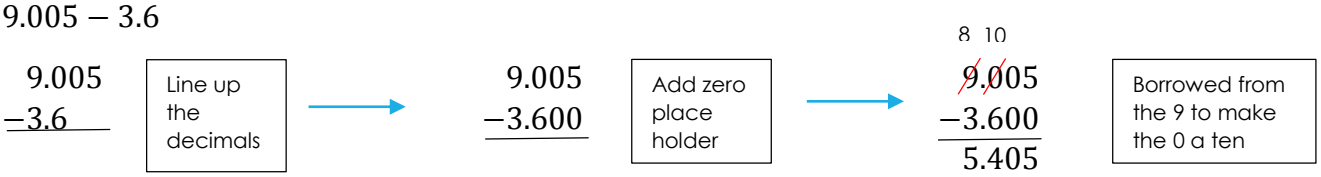
Line up the decimals, add a zero place holder for anything that doesn't match up. Then add/carry to find your answer.

$0.822 + 5.65$



Subtracting decimals

$9.005 - 3.6$



Videos:

Adding decimals

Subtracting decimals

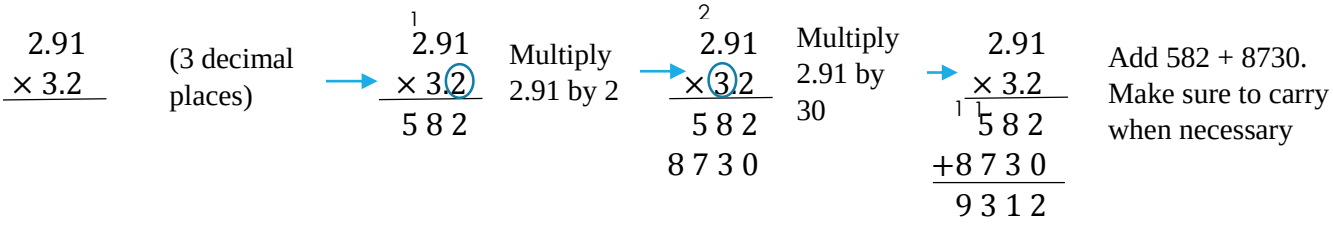
Extra Practice:

Adding decimals

Subtracting decimals

Multiplying decimals: Count the total number of decimals, multiply the numbers like there are no decimals in the problem, and then move the decimal to the left at the end of the problem the total number of decimals from the beginning.

Multiply 2.91×3.2



9312 → 9.312 (moved the decimal places to the left three places because of the original problem)

Videos:

Introduction to multiplying decimals

Multiplying decimals: place value

Multiplying challenging decimals

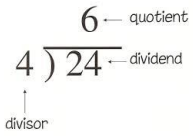
Extra Practice:

Multiplying decimals 1-follows the Introduction to multiplying decimals video

Multiplying decimals 2-follows the Multiplying decimals: place value video

Multiplying decimals 3-follows the Multiplying challenging decimals video

Dividing Decimals: Move the decimal to the right in the divisor, move the decimal in the dividend the same number of place. Place the decimal place in the correct position in the quotient. (Very important to be neat and organized with the division.)



$6.3 \div 0.25$

$0.25\overline{)6.3}$ → $25\overline{)630.0}$

Moved the decimal place two places and added the decimal at the end. You can add as many zeros at the end of a decimal

→ $25\overline{)630.0}$ (2)

There are 2 25's in 63

$25\overline{)630.0}$ (2)

-50

13

Multiply, subtract and bring down the next number

$25\overline{)630.0}$ (2)

-50

130

There are 5 25's in 130 →

$25\overline{)630.0}$ (25)

-50

130

-125

$5\ 0$

Multiply, subtract and bring down again if there is a remainder, keep adding zeros if needed. →

$25\overline{)630.0}$ (25.2)

-50

130

-125

$5\ 0$

$-5\ 0$

0

Videos:

Long division with decimals

Divide whole numbers to get a decimal

Dividing a decimal by a whole number

Dividing decimals

Dividing decimals completely (example above)

Extra Practice

Dividing decimals: hundredths

Dividing whole number to get a decimal

Dividing decimals: ten thousandths (more challenging)

Least Common Multiple (LCM): Want the smallest number that is divisible by both of the numbers given. There are two ways to compute. Option 1: List out the multiples of each number and find the one that is the smallest. Option 2: Use prime factorization and then combine the prime factorization using multiplication

Find the LCM of 12 and 18 (Also written lcm (12,18))

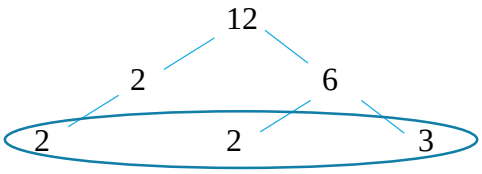
Option 1: List out the multiples. Multiply each number by 1, then 2, then 3, etc until the numbers match. (can be very tedious for big numbers)

$\times 1,\ \times 2,\ \times 3,\ \times 4,\ \times 5,\ \times 6,\ etc$

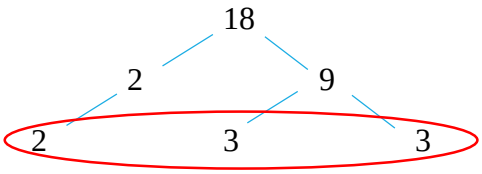
12: 12, 24, 36, 48, 60, 72, ...

18: 18, 36, 54, 72, 90, 108, ...

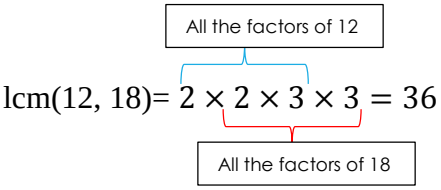
Option 2: Find the Prime Factorization of each of the numbers and compare the lists.



$12 = 2 \times 2 \times 3$



$18 = 2 \times 3 \times 3$



To check that the LCM is correct, divide the final number by the two original numbers. This should have the "bare number of factors in the answer set" so that both numbers are divisible.

Videos:

Least common multiple

Least common multiple: repeating factors

Least common multiple of three numbers

Extra Practice: Least common multiple

Greatest Common Factor: Find the biggest number that will divide into the given 2 numbers. Find all combinations of the factors, numbers that when multiplied together will give you the starting number. Then find the numbers that are common between both of your starting numbers. Finally find the number that is the largest of the common numbers. (In the videos the gcd, greatest common divisor, and the gcf are the same thing)

Find the gcf$(24, 36)$—find the greatest common factor of 24 and 36

24: 1, 2, 3, 4, 6, 8, 12, 24

36: 1, 2, 3, 4, 6, 9, 12, 18, 36

List all of the factors of both numbers →

24: 1, 2, 3, 4, 6, 8, 12, 24

36: 1, 2, 3, 4, 6, 9, 12, 18, 36

Circle all of the common factors between 24 and 36

The largest number that is circled in both is 12. So the answer to the gcf$(24, 36) = 12$

Videos:

Greatest common factor examples

Greatest common factor explained

Extra Practice: Greatest common factor

The Distributive Property: Multiply the number or algebraic expression on the outside of a set of parentheses to everything on the inside of the parentheses. $a(b+c) = ab + ac$

Simplify the following using the distributive property: $3(5+6)$

$$3(5+6) = 3\times 5 + 3\times 6 = 15 + 18 = 33$$

Distributive Property

Can also be used with variables:

$$\frac{1}{3}(3x - 9y + 6) = \left(\frac{1}{3}\times 3x\right) - \left(\frac{1}{3}\times 9y\right) + \left(\frac{1}{3}\times 6\right) = x - 3y + 2$$

Distributive Property

Factor using the distributive property:

$$20 + 25 = 5\times 4 + 5\times 5 = 5(4+5)$$

Find the greatest common factor of each number and rewrite the number

Rewrite the problem with the greatest common factor outside of the parentheses

Videos:

Distributive property over addition

Distributive property over subtraction

Factor with the distributive Property

Extra Practice:

Factor with the distributive property

Distributive property with variables

Practice with Powers and Exponents:

Intro to exponents: (from the tutorial from Khan Academy)

Here is what and exponent and a base look like:

$$3^2$$

The small number written above and to the right of a number is called an exponent. The number underneath the exponent is called the base. In this example, the base is 3 and the exponent is 2.

Here is another example where the base is 7 and the exponent is 5.

$$7^5$$

An exponent tells us to multiply the base by itself that number of times. In our example, 3^2 tells us to multiply the base of 3 by itself 2 times

$3^2 = 3 \times 3 = 9$

Another example is,

$7^5 = 7 \times 7 \times 7 \times 7 \times 7 = 16807$

Another example or situation is to have a zero in the Exponent. When you take any power and have a zero for an exponent the answer is 1.

$7^0 = 1, 8^0 = 1, 13^0 = 1, \ldots$

But

$7^0 \cdot 4^2 = 7^0 \times 4^2 = 1 \times 16 = 16$ Notice that only the $7^0 = 1$

Videos:

Intro to exponents

The zeroth power

Extra Practice:

Squaring Numbers

Intro to exponents

Solving One-Step Equations Using the Properties of Equality: Whatever operation you use on one side of an equal sign use on the other. The focus is to get the variable by itself, so ask yourself "what operation do I need to use to remove the number from the side with the variable".

Addition

$x - 2 = 6$

Needs to be moved to get the variable by itself

$x - 2 + 2 = 6 + 2$

Added 2 to both sides
$x - 2 + 2 = x$

$x = 8$

Simplified

Check your work

$8 - 2 = 6$ Substitute into the original problem
$6 = 6$

Subtraction

$x + 4 = 10$

Needs to be moved to get the variable by itself

$x + 4 - 4 = 10 - 4$

Subtracted 4 to both sides
$x + 4 - 4 = x$

$x = 6$

Multiplication

$\frac{x}{3} = 5$

Needs to be moved to get the variable by itself

$3\left(\frac{x}{3}\right) = 3(5)$

Because x is being divided by 3 to remove the three you must multiply by 3

$x = 15$

Division

$3x = 12$

Needs to be moved to get the variable by itself

$\frac{3x}{3} = \frac{12}{3}$

Because x is being multiplied by 3 to remove the three you must divide by 3

$x = 4$

Videos:

[One-step addition and subtraction equations]

[One-step subtraction equations]

Videos (continued)

One step addition and subtraction equations: fractions and decimals

One-step division equations

One-step multiplication equations

Extra Practice:

One-step addition and subtraction equations

One-step multiplication and division equations

Order of Operations: PEMDAS—Parenthesis, Exponents, Multiplication, Division (from left to right), Addition/Subtraction (from left to right).

Solve the following using order of operations. $2 - 3(4 + 6) \div 2^2$

$2 + 6(6 - 4) \div 2^2$

$= 2 + 6(2) \div 2^2$ (Parenthesis--$6 - 4 = 2$)

$= 2 + 6(2) \div 4$ (Exponents--$2^2 = 4$)

$= 2 + 12 \div 4$ (Mult/Div, Mult is on the left so $6(2) = 12$)

$= 2 + 3$ (Mult/Div, Div is next $12 \div 4 = 3$)

$= 5$ (Add/Sub $2 + 3 = 5$)

Videos:

Intro to order of operations

Order of operations examples: exponents

Oder of operations example (only positive numbers)

Order of operations PEMDAS

Order of operations with negative numbers and exponents

Extra Practice:

Order of operations

Order of operations challenge