

Problems marked with * are more difficult.

An **improper fraction** is a **fraction** in which the numerator (top number) is greater than or equal to the denominator (bottom number). Fraction $\frac{32}{9}$ is improper.

How to convert an improper fraction into a mixed fraction?

To convert the improper fraction $\frac{32}{9}$ to a mixed number:

1. Divide the numerator by the denominator.
2. Find the whole number. The whole number is the number of times the denominator divides into the numerator.

$$\frac{32}{9} = 3 \text{ with remainder } 5$$

3. Make the remainder the new numerator.

Because the remainder (the leftover value) of dividing 32 by 9 is 5, so 5 is the new numerator. The denominator is still 9. So, the mixed fraction is: $3\frac{5}{9}$

A **Mixed Fraction** is a whole number and a proper **fraction** combined.

Fraction $7\frac{8}{15}$ is mixed.

How to convert mixed fraction to an improper fraction?

To convert the following mixed number $3\frac{5}{9}$ to an improper fraction:

1. Multiply the denominator (the bottom number in the fraction) and the whole number $9 \times 3 = 27$
2. Add the answer from Step 1 to the numerator (the top number in the fraction) $27 + 5 = 32$

3. Write answer from Step 2 over the denominator $\frac{32}{9}$

1. Compare fractions without calculations

a. $\frac{9}{25} \square \frac{8}{25}$

c. $\frac{111}{53} \square \frac{79}{84}$

b. $\frac{5}{19} \square \frac{5}{12}$

d. $\frac{44}{45} \square \frac{45}{46}$

2. Cut each square on a picture below (trace with colored pencils instead of cutting) into 4 equal parts so that each part gets one "X".

	X	X	
	X	X	

X			
	X		
		X	
			X

		X	
X	X	X	

3. If it is 7am now, what time of the day will it be in ...

(a) ... 27 hours?

(b) ... 127 hours?

(c) ... 11043 hours?

4. S₁₆ is set of multiples of 16 less than 100. S₁₂ is a set of multiples of 12 less than 100. Write a set definition using curly brackets {}, Draw Venn diagram for S₁₂ and S₁₆.

5. Do not list the multiples, just find how many.
- How many multiples of 2 between 2 and 34 including 2 and 34?
 - How many multiples of 2 between 2 and 34 excluding 2 and 34?
 - How many non- multiples of 2 between 1 and 39 including 1 and 39?
 - How many multiples of 3 between 3 and 333 including 3 and 333?
 - How many multiples of 3 between 3 and 333 excluding 3 and 333?
6. *There are 4 children in the family. They are 5, 8, 13, and 15 years old and their names are Julia, Peter, Mary and Ellen. What are their ages if one of the girls goes to kindergarten, Julia is older than Peter, and sum of ages of Julia and Mary is divisible by 3?

7. Make regular fractions from irregular:

(a) $\frac{29}{13}$

(b) $\frac{17}{5}$

(c) $\frac{49}{8}$

(d) $\frac{13}{3}$

8. Make irregular fractions from regular:

(a) $1\frac{1}{13}$

(b) $3\frac{3}{5}$

(c) $11\frac{5}{8}$

(d) $4\frac{2}{3}$

9. Compute and give the answer as a regular fraction:

a) $\frac{1}{5} + \frac{3}{4} =$

d) $\frac{1}{5} + \frac{1}{3} =$

b) $\frac{2}{3} - \frac{1}{4} =$

e) $\frac{4}{9} + \frac{1}{6} =$

c) $1\frac{1}{3} - \frac{1}{2} =$

f) $\frac{33}{11} + \frac{15}{7} =$

10. The perimeter of a rectangle is 66cm. The length of one of its sides is $\frac{3}{11}$ of the perimeter. Find the area of this rectangle. (The perimeter of any polygon is the sum of the lengths of all the sides.)

11.*The picture shows two meshed gears, one with 24 teeth, the other with 36 teeth (thus, when you rotate the smaller gear by one tooth, i.e. by $\frac{1}{24}$ of a rotation, the larger is also rotated by one tooth, i.e. by $\frac{1}{36}$ of a rotation). How many times do you need to turn the smaller gear before the letters on both gears are again in upright position? What if the larger gear had 40 teeth, not 36? [Hint: *In order for the letters to appear in upright position, the gears must make a full rotation, or several full rotations.*]

