

Math 4d. Classwork 13.



Work problems (combine labor problems).

Now let's solve some more problems.

Mary can eat her birthday cake in 10 minutes. Peter can eat the same cake in 15 minutes, how fast they will eat the same cake together?



These kinds of problems are related to the amount of work done per unit of time; we can call it “rate”. To solve the problem, we have to find out what part of the cake Mary will eat in 1 minute. If she can eat the whole cake in 10 minutes, she only eats $\frac{1}{10}$ of the cake in one minute.

Peter will eat $\frac{1}{15}$ of the cake in 1 minute. If they will start eating the cake simultaneously, each minute

$$\frac{1}{10} + \frac{1}{15} = \frac{3}{30} + \frac{2}{30} = \frac{5}{30} = \frac{1}{6}$$

will be eaten. We don't know, how many minutes are needed, but the rate with which the cake will be disappearing $\frac{1}{6}$ per minute:

$$x(\text{minutes}) \cdot \frac{1}{6} (\text{part of the cake}) = 1(\text{whole cake})$$

So, they will need exactly

$$x = 1(\text{whole cake}) : \frac{1}{6} (\text{parts}) = 1 \cdot 6 = 6 \text{ minutes}$$

Exercises:

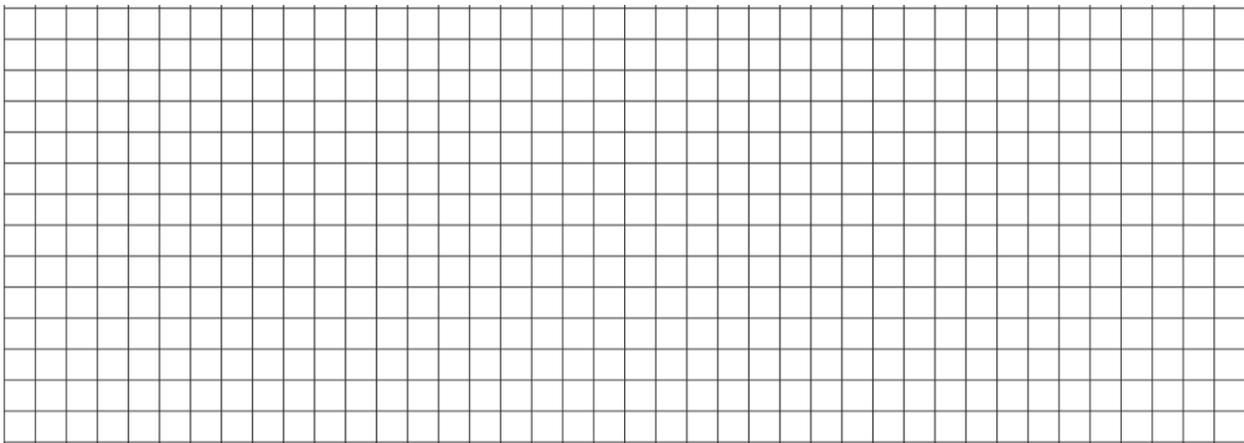
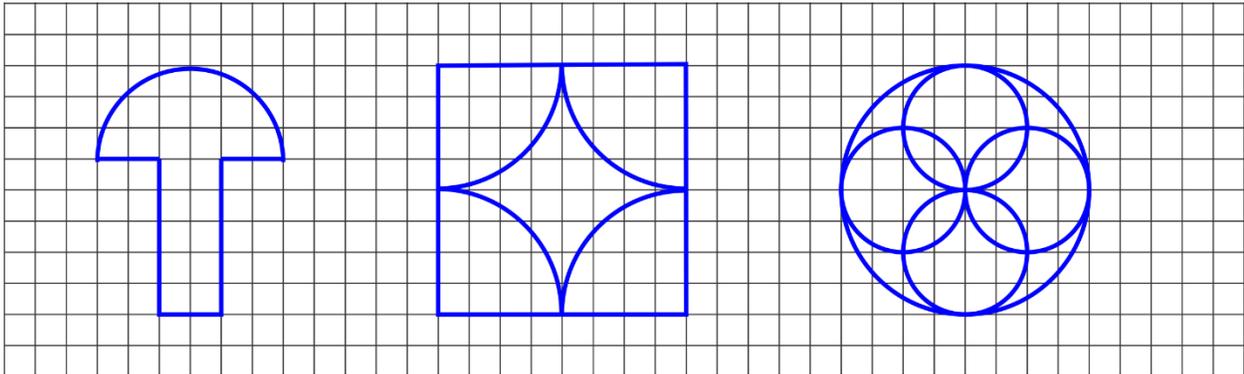
1. Mary, Peter, and Julia are going to do the spring clean up in their garden. Mary can do the job in 4 hours, Peter can do the full clean up in 3 hours, Julia need 6 hours to do the job. How fast they will do it together?
2. A swimming pool can be filled by pump A in 3 hours and by pump B in 6 hours, each pump working on its own. At 9 am pump A is started. At what time will the swimming pool be filled if pump B is started at 10 am?

3. The pool can be filled in 12 hours and emptied in 18 hours. Once, while the pool is being filled, the drain is accidentally left open. How long will it take to fill the pool from empty to full pool if both filling and draining pipe are opened?
4. The older brother can clean up the room in 2 hours, the younger brother can completely ruin it in 3 hours. In how many hours will the room be cleaned if they are locked together in the messy room? (it's a math problem, the answer "they will play games" will not be accepted!)
5. Three little pigs, Peter, Patty and Penny, decided to build a big house for all three of them. Peter and Patty can do it in 6 days, Patty and Penny can built the house in 8 days, and Penny and Peter can do the work in 12 days. How many days will take for them to build the house together?
6. Fill the table:

a	1	3	4	6	7	8	9	15
b	0	4	5	6	9	10	11	29
2a+2b								
2(a+b)								

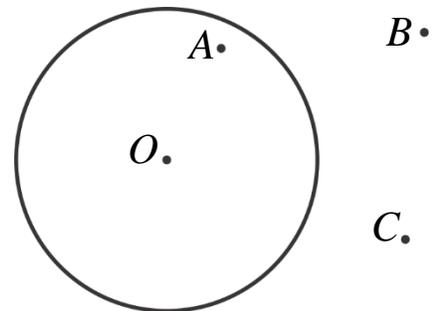
7. 60 kids took part in the swimming meets. There were three times as many girls as boys. How many boys and how many girls competed? Write an equation and solve it.
8. Solve the equations:
 - a. $13\frac{2}{9} - \left(x + 2\frac{5}{9}\right) = 7\frac{5}{9}$;
 - b. $\left(y - 4\frac{8}{11}\right) + 1\frac{9}{11} = 7\frac{3}{11}$
9. Will the sum $28+31+61+92+120$ be divisible by 3?

10. Copy the figures to a graph paper:



11. How many common points does a circle centered at point O and

- straight line (AO), straight line (AC), straight line (CB) have?
- segment [AO], segment [AC], segment [CB] have?
- ray [AO), ray [BA), ray [AB), ray [CB)



12. Construct a triangle with sides equal to given segments

