

Work problems (combined labor 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

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

Homework

1. A cat can eat the sausage in 10 minutes, a dog can eat it in 2.5 minutes. How fast will they eat the sausage together?



2. Evaluate. (Hint: both numbers should be written in the same fractional or decimal representation, depending on which one is most convenient for the problem.)

Examples:

$$1) 1\frac{4}{5} + 3.755 = 1\frac{8}{10} + 3.755 = 1.8 + 3.755 = 5.555$$

$$2) 42.14 \cdot 1\frac{3}{7} = \frac{4214}{100} \cdot \frac{10}{7} = \frac{602 \cdot 7 \cdot 10}{100 \cdot 7} = \frac{602}{10} = 60.2$$

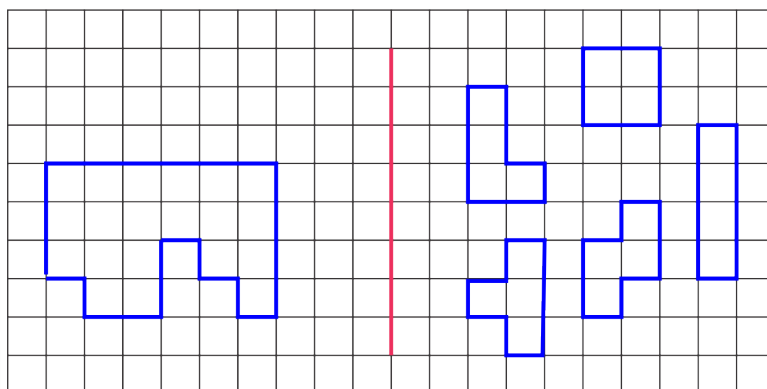
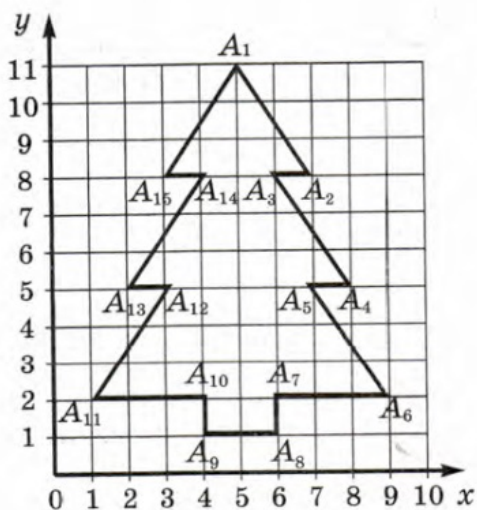
a. $7\frac{8}{10} - 2.5$

b. $0.7 \cdot \frac{1}{7}$

c. $\frac{1}{4} + 2.25$

d. $\frac{1}{8} \cdot 125$

3. Create the shape on the left using the 5 shapes on the right.



4. Write the coordinates of the points on the picture on the left:

Example: $A_1(5,11)$

5. Winnie the Pooh can eat 10 kg of honey in 4 hours, and Little Piglet can eat 10 kg of honey in 5 hours. How much honey can they eat together in 3 hours?
6. It takes Julia 45 minutes to drive from home to work, and she drives at a speed of 55 miles per hour. How far is her office from her home?
7. To bake 100 pancakes, Mom needs 30 minutes, while Dad needs 40 minutes. Son can eat 100 pancakes in an hour. Mom and Dad continuously make pancakes without stopping, while Son continuously eats them. After how much time from the beginning of this process will there be exactly 100 pancakes on the table?
8. Copy the figures to a graph paper (use a ruler and compass if necessary):

