



# APRENDER SEMPRE

## 1ª SÉRIE ENSINO MÉDIO

### MATEMÁTICA

Dear student and caregiver,

To prevent the dissemination of the new coronavirus, and to preserve everyone's health, school activities were paralyzed to reduce the circulation of people. In order not to interrupt your school studies even during the period of suspension of classes, the State Secretary of Education has prepared some materials to support you at this moment.

This material is divided in two parts: one on Portuguese Language and the other one in Mathematics. Here you will find activities to enhance your knowledge. Also, two inserts are included: one with information about COVID-19 and the other one with guidelines and suggestions for you to organize a study routine and continue learning, even without going to school!

When you return to school, you must hand over the activities to your teacher. That way you can have feedback on what you managed to advance and be supported to learn even more!

Good luck with your studies!



Nome da Escola: \_\_\_\_\_

Nome do Aluno: \_\_\_\_\_

Data: \_\_/\_\_/2020

Ano/Turma 1ª Série EM \_\_\_\_\_

## Sequence 1

### Skill 01 – Recognizing different representations of a rational number.

1. Note that rational numbers can be written in different ways. Complete the following table with these different representations.

Decimal Form	Percentage Form	Fractional Form
0,25	25%	$\frac{25}{100}$
	43%	
0,12		
	90%	$\frac{25}{100}$
	125%	

The students from 1st year of High School at a public school of the Rede Estadual de São Paulo were surveyed to find out how many students use social networks every day. Of the 40 students surveyed, 25 said they use social networks daily.

a. Write down the number of students using social networks in relation to the total number of students researched, in fractional form.

\_\_\_\_\_

b. Now write the number found in previous question (a) in decimal form.

\_\_\_\_\_

c. According to this survey. What is the percentage of students who use social networks daily?

\_\_\_\_\_

2. We will turn the fractions into decimal numbers. For this, we will use the division between the numerators and denominators.

a. Convert the number  $\frac{3}{4}$  to the decimal form.

---

b. Convert the number  $\frac{1}{3}$  to the decimal form.

---

c. Convert the number  $\frac{5}{6}$  to the decimal form.

---

3. From these divisions, we realize that there are three kinds of decimal numbers. The exact decimal numbers, the simple periodic tithes, and the compound periodic tithes.

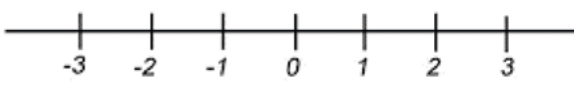
Fill out the table with some finite rational numbers that we use in our daily lives.


4. At Manoel's school, students are participating in one-week review activities involving fractions. Many students have participated. Take a look at some of the questions that were presented to the students and solve them yourself.

**In a numbered line, we can locate the real numbers. Among them, rational numbers in fractional form and their decimal representation.**

a. Manoel accepted the challenge and placed the numbers below in the numbered line. You can do the same thing. Place the fractions in the numbered line below.

$$\frac{1}{2} \quad \frac{2}{4} \quad \frac{7}{2} \quad \frac{6}{2}$$





- b.** Now, find all the rational numbers described below in the numbered line.

$$-\frac{1}{2} \quad -2,5 \quad -2 \quad \frac{2}{3} \quad \frac{1}{5} \quad \frac{6}{3}$$



- 5.** Manoel won a chocolate bar. Since he was with two other friends, he divided it into three pieces and gave two parts to his friends. What fraction represents the part each friend received?

---

- a.** What fraction represents the part received by Manoel's friends?

---

- 6.** Still, on the issues presented in the school activity, Manoel had to solve the following situation: a boy has 5 T-shirts, all of them with the same size, but of three different colors. He has two blue T-shirts, two white T-shirts, and one black T-shirt.

- a.** Which fraction corresponds to the number of white T-shirts over the total number of T-shirts?

---

- b.** Which fraction corresponds to the number of blue T-shirts over the total number of T-shirts?

---

- c.** Which fraction corresponds to the number of black T-shirts over the total number of T-shirts?

---

- 7.** Ten little balls of the same size and weight were deposited in an urn, being them: 3 red balls and 7 green balls.

- a.** When you remove a ball, which fraction represents the chance to take out a red ball?

---

- b.** And which fraction represents the chance to take out a green ball?

---

- c.** Can you find the percentage of the previous cases? If so, write down the answer.

---

**8.** Among the proposed issues, Manoel noted that one of them was associated with a juice recipe. He wondered the relationship between this recipe with the mathematical content studied. With his teachers' help, Manoel realized the meaning of the measurement presented in the question about the fraction. Therefore, answer:

**a.** An orange juice recipe requires 2 measures of juice concentrate and 1 measure of water. Which fraction represents the total amount of water in relation to the whole juice?

---

**9.** In another question, Manoel read: "Divide six slices of pizza in three persons. Which fraction of pizza does each person receive?". Find the result as Manoel did.

---

**10.** A little bag had 20 candies that should be distributed among 4 friends. Which fraction does this division represent?

---

**11.** After solving some questions, Manoel noticed that 50 students participated in the activity. Among these ones,  $\frac{1}{5}$  did not achieved satisfactory results.

**a.** How many students had unsatisfactory results?

---

**b.** How many students obtained satisfactory results?

---

## Sequence 2

### Skill16 – Solve problems involving percentages.

**1.** Carlos ate 20% of the 10 candies he had. How many candies did he eat? And how many candies were left?

---



---



**2.** In my city, a survey was carried out about the modes of transportation students use to get to school. 2 000 students answered the survey. 42% answered that they go by bus, 25% answered that they go by car with their parents, and the rest goes on walking since they live near the school. Calculate:

**a.** The percentage of students walking to school.

---

**b.** The number of students walking to school.

---

**c.** The number of students going by bus to school.

---

**d.** The number of students who drive with their parents to school.

---

**3.** When buying a product that costs R\$ 1.500,00, I got a 12% discount.

**a.** What is the value of the discount I got?

---

**b.** How much did I pay for the product I bought?

---

**4.** As the weekend approaches, Augusto takes some of his time to help his colleagues who have some difficulties in math. All his friends belong to the same high school class in the state of São Paulo. Realizing that his friends needed to solve situations that involved the calculation of percentage, Augusto decided to create some questions related to the routine of the group of friends.

**a.** In Augusto's class there are 40 students. If 35% of the students are men, how many women study in that class?

---

**b.** Joaquim, one of Augusto's friends, he loves to practice sports. On weekends, he always rides his bike through the neighborhood with his brother, João. After saving money for a while, Joaquim bought a new bike that cost R\$ 1.200,00. If the payment is in cash, he would get a 15% discount on the total price of the bike, how much would the final price be, if Joaquim buys the product paying with cash?

**c.** Another payment option would be to pay for the bicycle after 90 days with a 25% surcharge on the initial price. Under this condition, what would be the price of the bicycle?

---

**d.** Considering the two payment options, which situation is more advantageous, if Joaquim has the total amount of money to buy the bike? Explain your answer.

---



---



---

**e.** What is the difference, in reais, between the amount paid in cash and the amount to be paid after 90 days?

---

**5.** Antonella, who also participates in the study group of Augusto, said that she bought a pair of pants because they were on sale. When asked about the original price, the girl realized that she didn't think about this amount before, but she remembers that the pants had a 15% discount and she paid R\$ 102,00. Augusto asked his friend to use the amount she paid to calculate the price of the product without a discount. Find this value yourself too.

---



---



---



---

**a.** Antonella's father works at a children's charity. Last month 72 children were placed for adoption, which represents 60% of the total of children in the adoption queue. Help Antonella to find the total of children who are still waiting to be adopted.

---



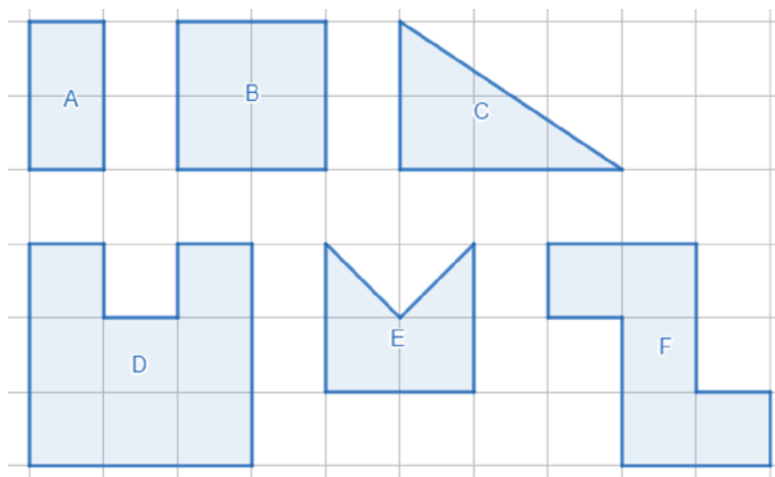
---



## Sequence 3

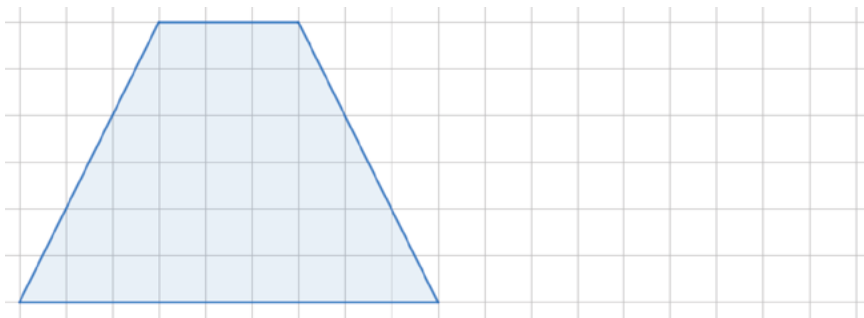
### Skill 24 – Identify similar figures through the recognition of proportionality relationships.

1. Make an enlargement of each flat figure below by folding its dimensions with the help of squared paper (Annex 1).



Fonte: Equipe Pedagógica

2. The figure in the following grid pattern represents a trapezoid. Consider the 1 cm x 1 cm squares.



Fonte: Equipe Pedagógica

Using the free space in the grid above, reduce to 3 cm the base and to 2 cm the height of the given figure and answer the following questions:

- a. What is the size of the trapezoid's base?

---

- b. What is the height of the trapezoid?

---



c. Fill in the following table:

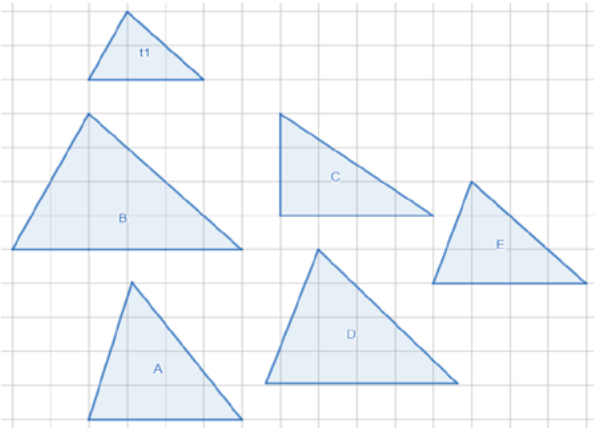
Original Trapezoid		Reduced Trapezoid		$\frac{\text{Original base}}{\text{Reduced base}}$	$\frac{\text{Original height}}{\text{Reduced height}}$
Base	Height	Base	Height		

- d. We can conclude that:
- ( ) The trapezoid has been reduced by half.
- ( ) The trapezoid has been reduced 3 times.

e. How many times has the trapezoid been reducedby?

\_\_\_\_\_

3. Which triangle(s) are extensions of triangle t1?

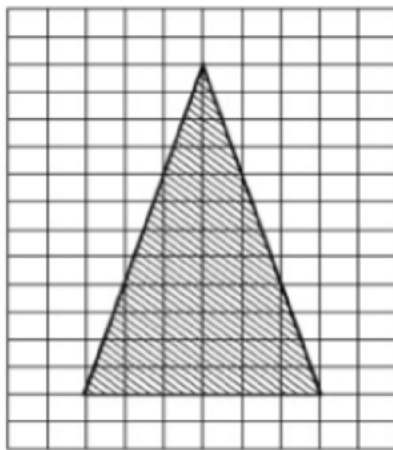


Fonte: Equipe Pedagógica

\_\_\_\_\_



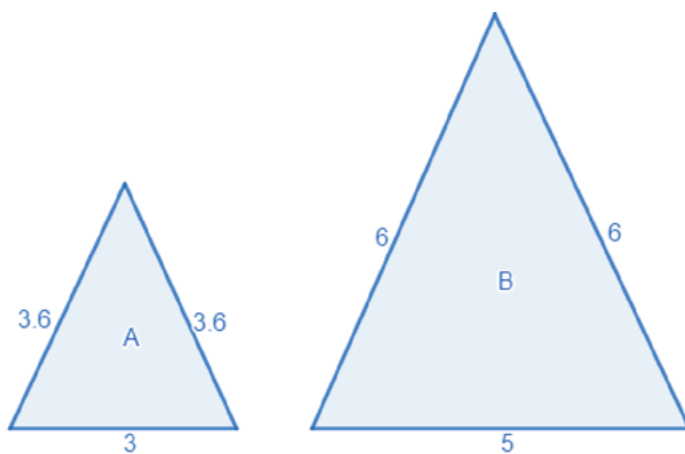
4. (Prova Brasil) A figura a seguir mostra o projeto original da árvore de natal da cidade em que Roberto mora.



Fonte: Equipe Pedagógica

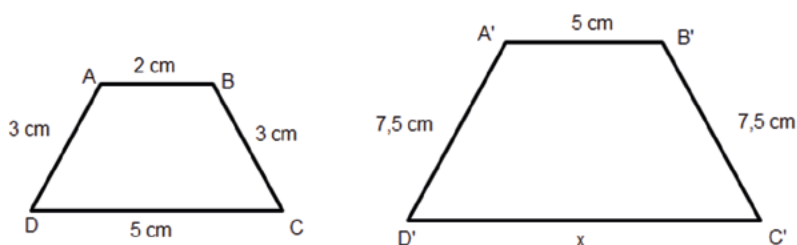
Como consideraram a árvore muito grande, fizeram um novo projeto, de modo que suas dimensões se tornassem duas vezes menores que as do projeto original. Para o novo projeto, as dimensões foram:

- a. Multiplicadas por 2.
  - b. Divididas por 2.
  - c. Subtraídas duas unidades.
  - d. Adicionada de duas unidades.
5. The triangle (B) has been enlarged in relation to triangle (A), as shown in the following figure. What number represents this enlargement?



Fonte: Equipe Pedagógica

6. Note the ABCD and A'B'C'D' trapezoids below.



Fonte: equipe pedagógica

- a. Looking at trapezoid A'B'C'D' in relation to trapezoids ABCD, was there an extension or reduction?

---

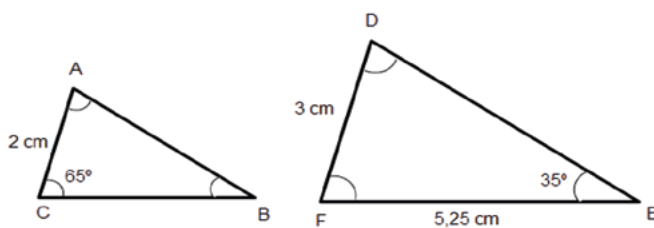
- b. What is the proportion coefficient, that is, what number represents this increase?

---

- c. Knowing that trapezoids are similar, find the value of side x in cm.

---

7. The DEF triangle is an enlargement of the ABC triangle. Considering this information, observe the following triangles and find:



Fonte: equipe pedagógica

- a. The measurement of angle  $\hat{B}$ .

---

- b. The measurement of angle  $\hat{F}$ .

---



- c. The measurement of angle  $\hat{A}$ .

---

- d. The measurement of angle  $\hat{D}$ .

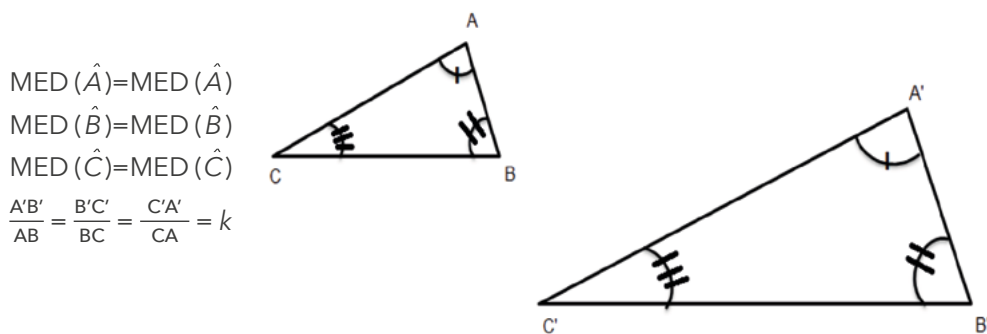
---

- e. The measurement of segment  $\overline{BC}$ .

---

Two triangles are similar when they satisfy the following conditions at the same time: the corresponding angles are congruent and the corresponding sides are proportional.

To find the ratio of similarity, you must divide the measurement from the corresponding sides. Observe.



$$\text{MED}(\hat{A}) = \text{MED}(\hat{A}')$$

$$\text{MED}(\hat{B}) = \text{MED}(\hat{B}')$$

$$\text{MED}(\hat{C}) = \text{MED}(\hat{C}')$$

$$\frac{A'B'}{AB} = \frac{B'C'}{BC} = \frac{C'A'}{CA} = k$$

Fonte: Equipe Pedagógica

**We call k of the similarity ratio.**

8. Return to the triangles of the previous question (7) and answer:

- a. What is the similarity ratio between the figures?

---

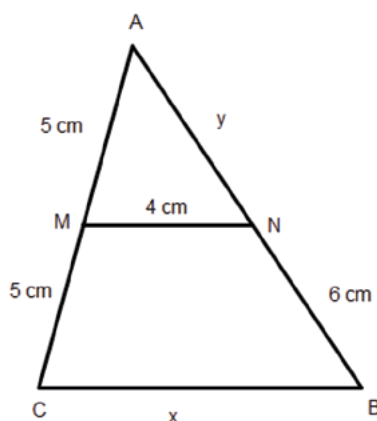
- b. If the segment  $\overline{AB}$  measures 3,7cm, how would you calculate the segment  $\overline{DE}$ ? How much does the segment  $\overline{DE}$  measure?

---



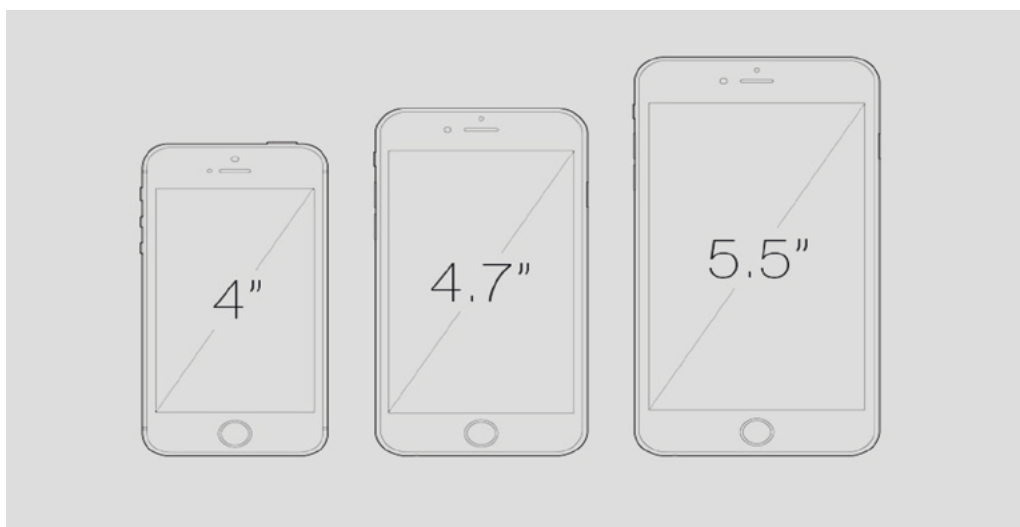
---

9. Considering that the  $\triangle ABC \sim \triangle AMN$ , find the value of measures  $x$  and  $y$ , in cm.



Fonte: equipe pedagógica

10. Cell phone screens are measured diagonally, in inches. Observe the picture and answer the questions:



Fonte: Olhar digital.

- a. When the value of an inch of a mobile phone increases, its dimensions (base x height) also increase?

---



---



---



**b.** What is the number that represents the increase in inches of the diagonal of the second cell phone in relation to the first one?

---



---



---

**c.** What is the number that represents the reduction in inches of the diagonal of the second cell phone in relation to the third one?

---



---



---

**d.** Can we say that the cell phones presented in the figure are similar?

---

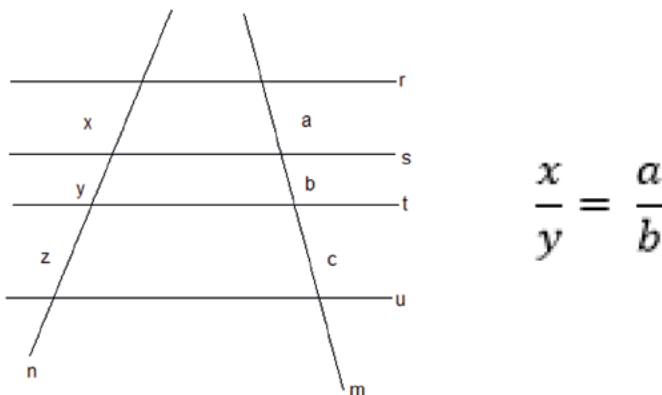


---

# 11. Theorem of Tales:

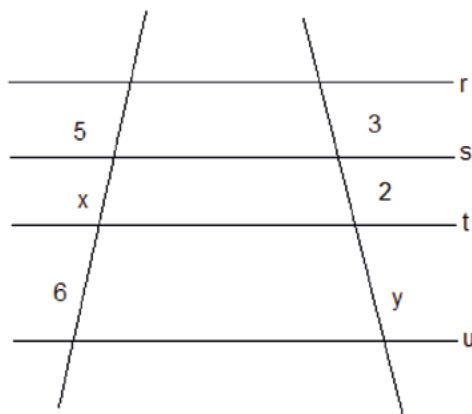
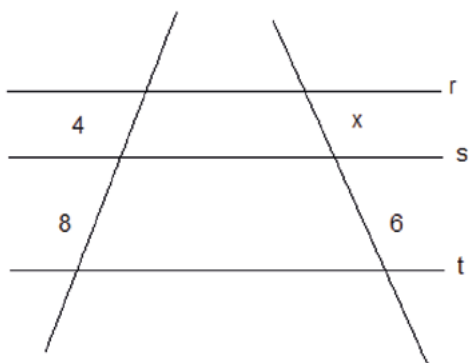
If two lines are transversal to a bundle of parallel lines, then the ratio between any two segments of one of them is equal to the ratio between the corresponding segments of the other.

Observe the relationship established:

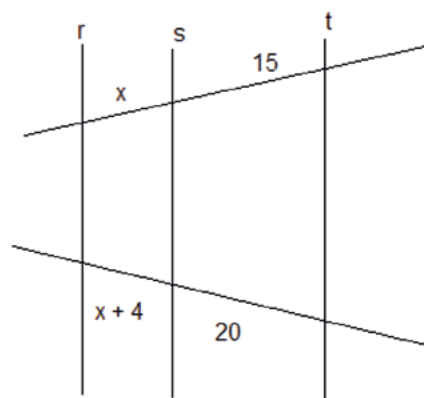
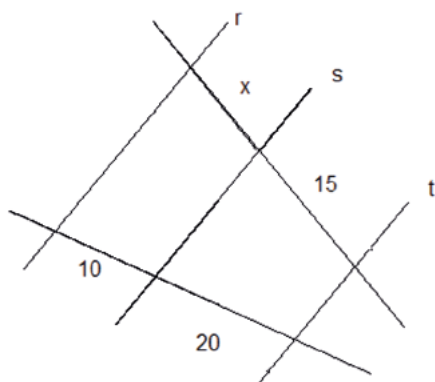


Based on the statement of the Theorem of Tales, resolve the following questions:

- a. Determine the value of  $x$  and  $y$  in each case, knowing that the lines  $r$ ,  $s$ ,  $t$  and  $u$  are parallel.



Fonte: equipe pedagógica



Fonte: equipe pedagógica



## Annex 1:

