



APRENDER SEMPRE

3^a 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 3ª Série EM

Sequence 1

2 MATEMÁTICA

Skill17 - Identify the position of real numbers in the numbered line.

Do you remember the definitions of the number sets? Let's remember!

There are, within the real numbers, the following number sets: Natural (N), Integers (Z), Rational (Q), and Irrational (I). Each set has its characteristics.

The set of **natural numbers** is formed by the integer and positive numbers. As an example, we have: 0, 1,2,3,4,5,...

The integer set is formed by positive and negative numbers. We have as examples: -3, -2,-1,0,1,2,3... The **set of rational numbers** is formed by numbers that can be written in the form of fraction,

positive and negative. These numbers can also have finite decimal or infinite and periodic decimal representation. Some examples are: -10; -3,174; $\frac{1}{3}$; 2,004; 3,3333; $\frac{10}{2}$.

The set of **irrational numbers** is composed of decimal numbers that cannot be the result of dividing two integer numbers. Well-known examples are the numbers π (pi), $\sqrt{2} e \sqrt{3}$.

1. Represent the natural numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 in the numbered line.

2. Represent integer numbers -4, -3, -2, -1, 0, 1, 2, 3, 4, 5 in the numbered line.

0

3. Now represent the rational numbers -3; -2.5; 1; 3; $\frac{3}{2}$; 3.5 in the numbered line.

-4,5 -4 -3,5 -2 -1 0 0,5

4. Do you remember the irrational numbers quoted in the text above? We are talking about three numbers that are good examples of irrational numbers: π (pi), $\sqrt{2} e \sqrt{3}$.

Look for the decimal number that corresponds approximately to each imaginary number and point it in the numbered line.



5. Looking at the numbers marked on the numbered line, complete the table by placing each letter in its respective set.



Natural Numbers	Integer Numbers	Rational Numbers

Challenge

6. (Enem 2017) Nesse modelo de termômetro, os filetes na cor preta registram as temperaturas mínima e máxima do dia anterior, e os filetes na cor cinza registram a temperatura ambiente atual, ou seja, no momento da leitura do termômetro.

Por isso, eles têm duas colunas. Na esquerda, os números estão em ordem crescente, de cima para baixo, de - 30° C até 50° C. Na coluna da direita, os números estão ordenados de forma crescente, de baixo para cima, de - 30° C até 50° C. A leitura é feita da seguinte maneira.

- A temperatura mínima é indicada pelo nível inferior do filete preto na coluna esquerda.
- A temperatura máxima é indicada pelo nível inferior do filete preto da coluna da direita.
- A temperatura atual é indicada pelo nível superior dos filetes cinza nas duas colunas.

Disponível em: www.if.ufrgs.br. Acesso em: 28 ago. 2014 (adaptado).

Qual é a temperatura máxima registrada nesse termômetro?



a. 5° C **b.** 7° C **c.** 13° C **d.** 15° C **e.** 19° C

Sequence 2

4 | MATEMÁTICA

Skill 09 - Identify the graphs of 1st and 2nd degree functions, knowing their coefficients.

1. Observe the chart below and complete the table with data from the Cartesian plan.



Fonte: Equipe Pedagógica

2. A taxi driver charges the value of his ride as follows: R\$ 2.50 as a fixed value, plus R\$ 0.75 per kilometer driven.

a. Write the function for the ride.

b. If a passenger requests a 14 km trip, what would the ride price be?

c. This passenger decided to stop at a friend's house, and the route changed. When he arrived at his final destination, he paid R\$ 14.12. How many kilometers did he drive?

To solve the problem in question 3, read the following statement. A 1st-degree polynomial function is increasing when growing the values assigned to the domain, the codomain values get bigger; otherwise, the function is decreasing.

3. Observe the table below, analyze the data and answer the questions.

x	- 9	-6	- 3	0	3
Y	4	3	2	1	0

- a. Is this function crescent or decrescent? Explain.
- **b.** Which function describes this situation?

4. Looking at the graph below, write a text including the main characteristics of this function regarding the behavior of the line and the dots where the line touches the x and y-axis.



5. Write a text describing the characteristics of the graph presented below, considering the same characteristics of the preceding question.



6. Check the coordinate points: A (3, 3); B (-3, 3); C (-3, -1); D (3, -1) **using the grid sheet in the annex.** Link the ABCD points. What figure did you reach to by connecting the ABCD dots?

7. Now, let's use the table below to plot the coordinates in the Cartesian plane. Use the grid sheet to produce your graph.

AXIS X	-3	-2	-1	0	1	2	3
AXIS Υ	9	4	1	0	-1	-4	-9

After locating the ordered pairs, observe the curve's shape.

a. Do you know that curve? What is its name?

8. Now, let's complete the picture and then plot the coordinates on the Cartesian plane. From the given domain (values for x), find the image set (values for y) of the 2nd degree polynomial function.

 $f(x) = x^2 + 2x + 3$

AXIS X	-3	-2	-1	0	1
AXIS Y					

a. Looking at the graph, answer: is this function crescent or decrescent?

b. What is the coordinate of the point that intersects (touches) the ordinate axis (y-axis)? Is there any relationship between this point and the coefficients' function?

c. We know that the radix of the function or zeros are the points that intersect (cut or touch) the x-axis (axis of abscissas). From this information, observe the graph constructed and tell which are the roots of the given equation.

9. Solve the function and fill in the chart. For each value of x (domain), find the value of y (image).

$f(x) = -x^2 + 4x + 5$

AXIS X	-1	0	1	2	3	4	5
AXIS Y							

10. Does the function given in the previous exercise have a downward or upward concavity? Explain your answer.

a. Which are the radices of the function? (Values of x when y equals zero)

b. Which coordinate of the point intersects (touches) the y-axis?

11. (UF. OURO PRETO - Adaptado) Em relação ao gráfico da função $f(x) = -x^2 + 4x - 3$, pode-se afirmar:

- a. É uma parábola de concavidade voltada para cima.
- b. Seu vértice é o ponto (-2, -1).
- c. Passa pelo eixo das abscissas (eixo x) em (-3, 0) e (3, 0).
- d. O seu eixo de simetria é o eixo das ordenadas (eixo y).
- e. Passa pelo eixo das ordenadas (eixo y) em (0, 3).

Sequence 3

Skill 10 - Recognize the exponential function and its properties relatives to growth or to decrease.

1. A substance has a half-life of 2 hours. If a person takes 50 mg of this substance, how much remains in his or her body after 12 hours?

a. Organize the data in a table

Quantity of the Substance	Time passed in hours	Reduction factor	Description
50 mg	0	0,5	Initial state
	2	0,5	After the 1st interval
	4	0,5	After the 2nd interval
	6	0,5	After the 3rd interval
	8	0,5	After the 4th interval
	10	0,5	After the 5th interval
	12	0,5	After the 6th interval
m = 50. $(\frac{1}{2})^{\frac{n}{2}}$	Ν		After the Nth interval

b. Can we say that the problem situation is a function? If it is, of which type? Is it a crescent or decrescent model creasing?

2. Bacteria can grow on food, where its population is measured by the area they occupy. Let us consider that a certain culture of bacteria doubles every hour. If initially there were 10 bacteria, then do what is required:

a. Organize the data in a table, to identify the number of bacteria in function of the time.

Time in hours	Form of a power of two	Quantity of bacteria
0	$10.2^{\circ} = 10 \times 1$	10
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

b. How many bacteria will there exist after x hours? Express this amount also in the form of a power of two.

c. Graphically represent the problem situation on the attached millimeter sheet at the end of the notebook.

d. What function can shape the problem situation? Is it an crescent or a decrescent model?

3. Observe the graph of the function $f(x)=3^x$.



Fonte: Equipe Pedagógica

Now, look at the graph of the functions $g(x)=3^{(x+1)}$, $h(x)=3^{(x+2)}$.



Graph of the Function g(h) and h(x)

Fonte: Equipe Pedagógica

a. Looking at the graphs, which features from functions g(x) and h(x) can you notice about the graph of the function f(x)?

Let us now analyze the graph of the functions $i(x)=2\cdot 3^{(x+1)}$ and $j(x)=2\cdot 3^{(x+2)}$.



Graph of the Function i(x) and j(x)

b. Which characteristics can you notice by looking at the graph of functions i(x) and j(x)?

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4. Now, analyze the graph of the functions: $f(x) = (\frac{1}{2})^x$, $g(x) = (\frac{1}{2})^{(x-1)}$, $h(x) = (\frac{1}{2})^{(x-2)}$.



Graph of the Function f(x), g(x) and h(x)

Fonte: Equipe Pedagógica

a. Write a text with the main characteristics you found when analyzing the curves in the graph above.

Annex

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Annex

