



UNITED NATIONS COLLEGE IED
PREPARATORY WORKSHOP FOR COMPETENCIES TEST
FIRST TERM
MATH 9th



This workshop must be copied and solved in the mathematics notebook, as a requirement to take the competency test.

Delivery date: April 2nd, 2024

1. A rectangular plot of land has an area less than 72 m^2 . If the width measures 8 meters, what are the possible values that the length can measure in meters? and What is the largest integer that can measure the length in meters?

2. If the area of a right triangle is less than 160 m^2 and the base measures 20 meters, what values can the height take?

3. The expression $x = 200 + 5t$ represents the distance in meters traveled by a car that makes a linear movement in t seconds. How much minimum time must elapse for the mobile phone to travel a distance of no less than 500 m?

4. A truck weighs 890 kg. The difference between the weight of the empty truck and the weight of the load it carries must be at least 410 kg. If the truck must carry 4 equal boxes, how much can each weigh at most? one, so I can transport them in the truck?

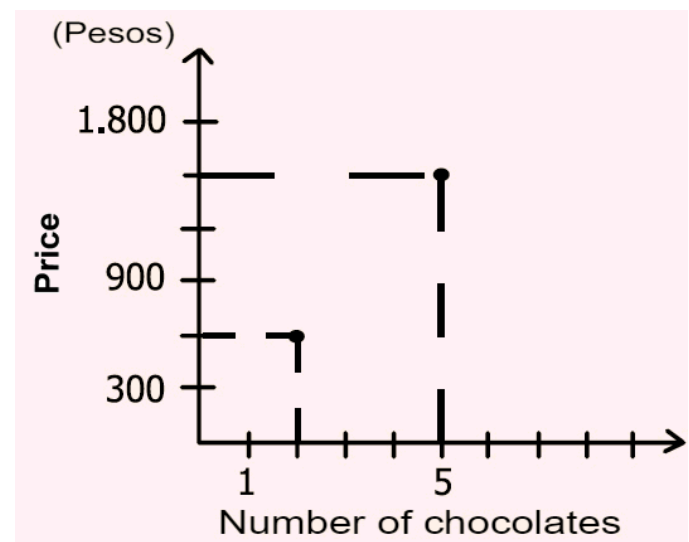
5. Mike Powell holds the world long jump record with 8.95 meters, which he achieved at the World Athletics Championships in Tokyo in 1991. The previous world record was held by Bob Beamon, with 8.9 meters. What distances can an athlete achieve that does not exceed the current world record and is greater than or equal to the previous one? Express it in interval notation.

6. Triple the number of bacteria decreases by 6 each time the antibiotic is administered. If the resulting number of bacteria is less than 27, what values can correspond to the initial number of bacteria?

7. In the Las Ferias neighborhood they want to build a park on a rectangular plot of land. To enclose the park they have a maximum of 120 meters of mesh. If the length of the land is 50 meters, what should be the maximum width to reach the mesh available to enclose the park?

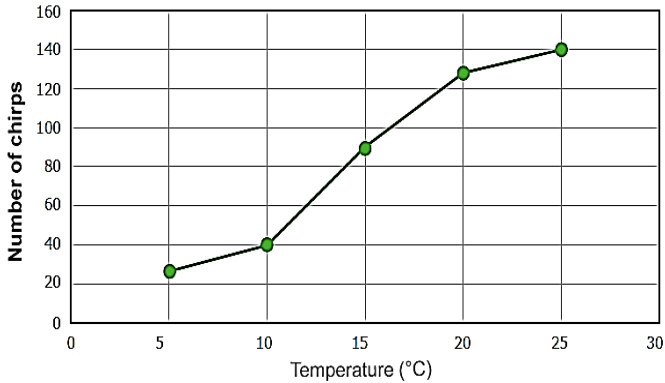
8. The monthly salary that a salesperson receives for their work is distributed as follows: They are paid \$650,000 basic salary (fixed) plus a commission of 8% for the sales they make. What should be the minimum sales you must make to obtain a monthly income greater than \$900,000?

9. In a store each chocolate bar has the same price. The following graph relates the number of chocolates and the corresponding price.



What is the largest amount of chocolates that can be bought with 2,000 pesos?

10. In Biology class the teacher explained to her students that the number of chirps emitted by crickets depends on the temperature of the environment in which they live. The graph shows the relationship that the teacher explained in four time intervals.



In what temperature range does the number of chirps increase the fastest?

ANSWER QUESTIONS 11 TO 13 ACCORDING TO THE FOLLOWING INFORMATION

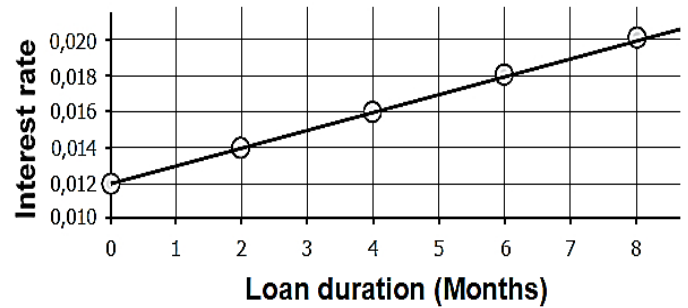
Esteban has an ornamental plant store and is offering discounts depending on the number of items the customer purchases. The discounts are shown on the graph.



11. What is the lowest percentage discount that Esteban offers in his store?
12. According to the graph, is it correct that the more items you buy, the greater the discount? Explain your answer.

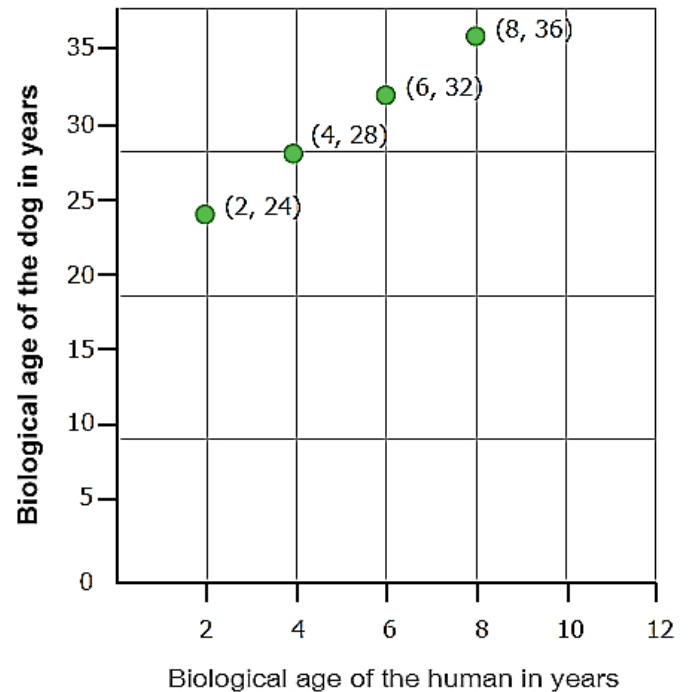
13. What happens if they buy 4 or more items?

14. The following graph shows the interest rate offered by a financial institution, according to the term requested in a loan.



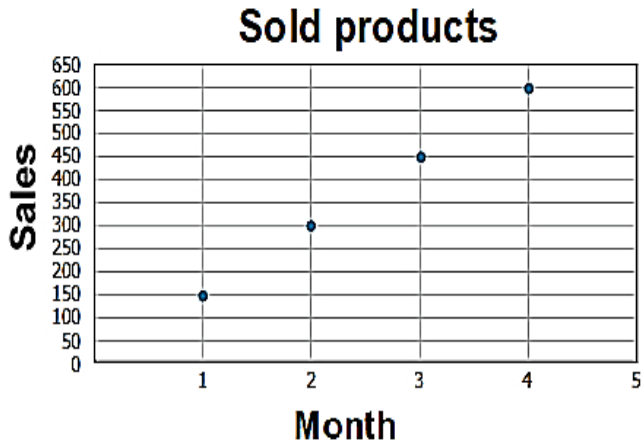
If the behavior is maintained in the graph, what would be the interest rate offered by the entity for a 12-month loan? Explain your answer.

15. The following graph shows the relationship between the biological age of a human and the biological age of a breed of dog, starting from the second year of the human's biological age.



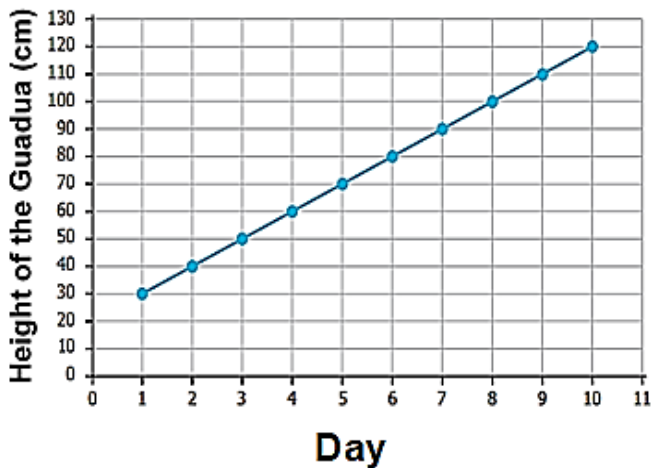
Explain: What is the relationship between the biological age of the human and that of the dog, starting from the second year, according to the graph?

16. The graph shows the sales in a supermarket of a product during the last four months.



How have sales of the product performed over the past four months?

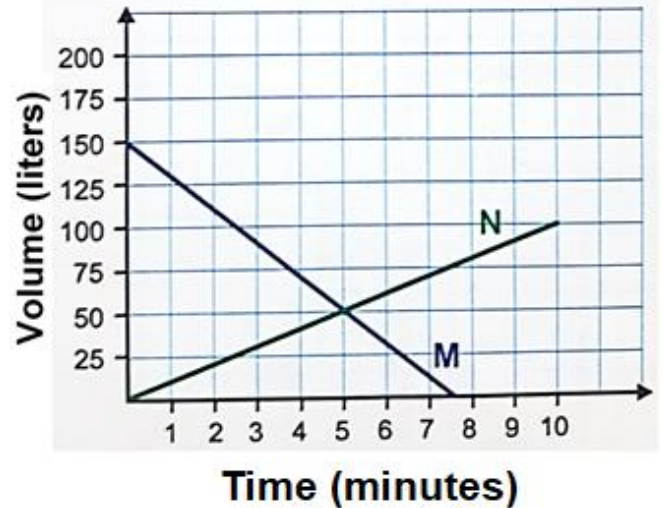
17. Guadua is one of the fastest growing plants. To identify how fast a guadua grows, an agronomist measured it for several days. He observed that on day 1 it measured 30 cm and that the height of the bamboo can be represented by the function $y = 10x + 20$. The image shows the graph of the height for the first 10 days.



What does the number 10 that appears in the algebraic representation of the function representing the height of the bamboo mean?

ANSWER QUESTIONS 18 TO 21 ACCORDING TO THE FOLLOWING INFORMATION

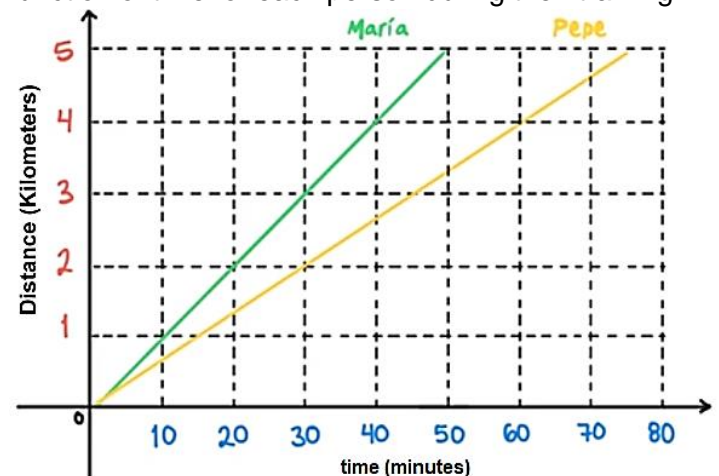
Two water tanks, M and N, with a maximum capacity of 150 liters each, are related as follows: As M empties, N fills. (Look at the image)



18. At what point do the two tanks have the same amount of water?
19. How long did it take tank N to fill 100 liters?
20. How long did it take tank M to empty?
21. If the same behavior continues, how long will it take for the N tank to fill completely?

ANSWER QUESTIONS 22 TO 25 ACCORDING TO THE FOLLOWING INFORMATION

María and Pepe are training for a marathon. The following graph shows the distance traveled as a function of time for each person during their training.



22. Which of the two recovered the greatest distance in their training?

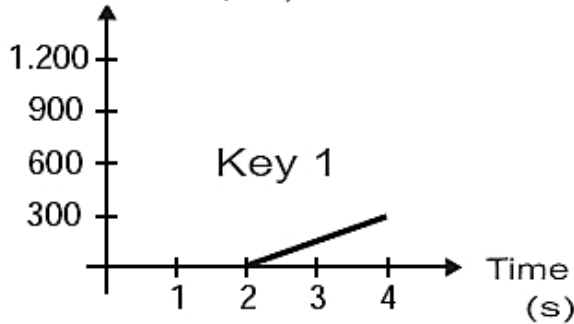
23. Who ran the fastest?

24. After 30 minutes, who has traveled the greatest distance?

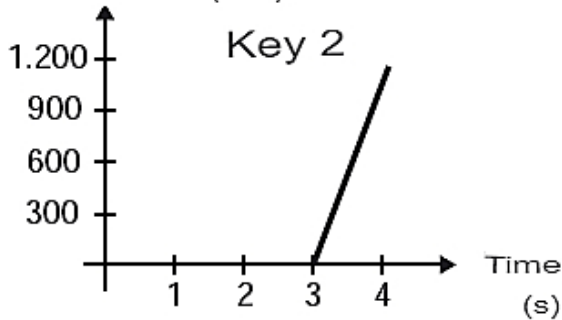
25. How long does it take Pepe to travel 4 kilometers?

26. A bottling machine fills water bottles, of the same capacity, with four different spigots. The following graphs represent the amount of water (in ml) that each of the faucets pours in a certain time (in s).

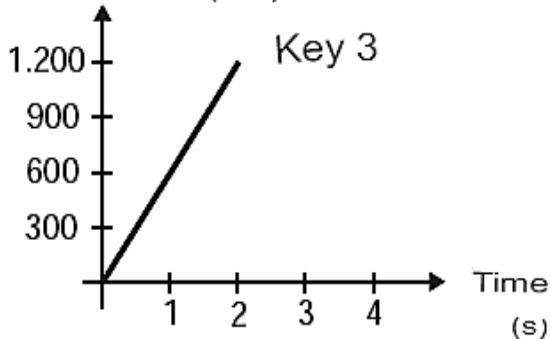
Amount of water (mL)



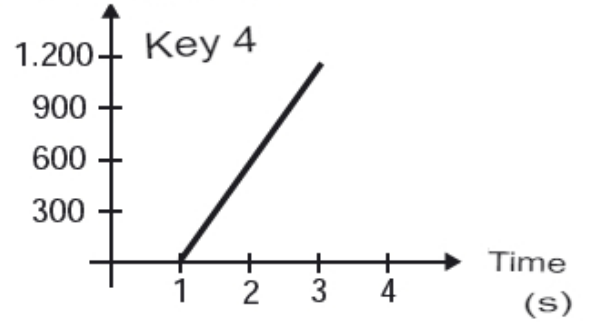
Amount of water (mL)



Amount of water (mL)



Amount of water (mL)



Which of the keys takes the most time to fill a bottle?

27. Students at a school collected information corresponding to the age of a group of inhabitants. The table shows some of the age percentiles of the respondents.

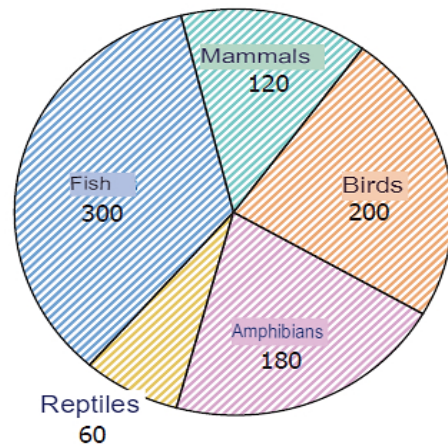
Percentile	10	20	25	35	45	50	60	70	75	85	95	100
Age	12	15	23	27	28	30	33	36	44	49	50	51

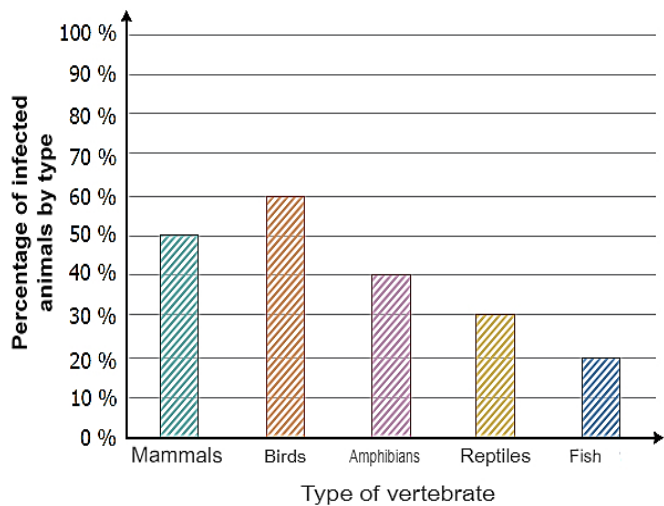
For example, the 60th percentile reflects that 60% of respondents are under 33 years old.

According to the table, what values correspond to Quartiles 1, 2 and 3?

28. A study was carried out on 860 vertebrate animals, of 5 different types, to find out how many had been infected by a disease. The pie chart shows the number of animals by type. The bar graph shows the percentage of animals with the disease, by type of vertebrate.

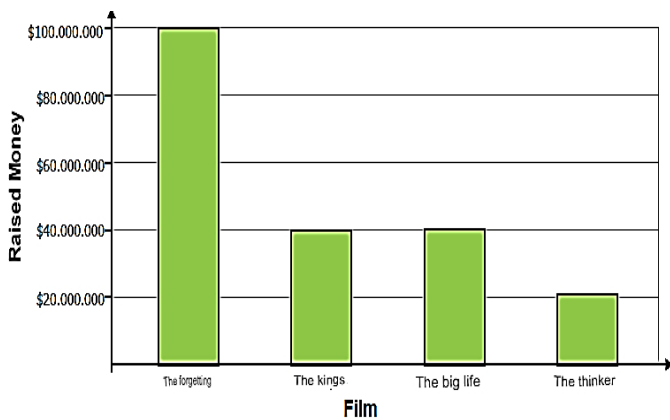
Number of animals by type





Based on the information given, represent in a table the number of animals with the infected, by type of vertebrate.

29. The figure shows the money raised by 4 films in a cinema.



What was the average money raised per film?

30. In Biology class the teacher took the weight of the 20 students in the course and recorded the information in two tables. Table 1 corresponds to the weight of boys and Table 2 to the weight of girls.

Number of boys	Weight in Kilograms
2	27
1	28
1	23,5
3	22,5
3	22

Table 1

Number of girls	Weight in Kilograms
1	27
4	26
1	23,5
2	22,5
2	21

Table 2

What is the weight in kilograms that has the highest frequency in the entire group of 20 students?