



UNITED NATIONS COLLEGE I.E.D.  
PREPARATORY WORKSHOP  
III TRIMESTER - 2024  
MATHEMATICS 8°

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

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**DELIVERY DATE: November 12**

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1. Factor the following polynomial by identifying the common factor:  $3x^2+6x^3$
2. What is a common factor in terms of polynomials?
3. How do we identify the common factor in a polynomial?
4. What is the process for factoring a polynomial using the common factor?
5. What happens to terms that are not part of the common factor during factorization?
6. What is the use of common factor factorization in simplifying algebraic expressions?
  
7. Factor the following polynomial using the square difference factorization method:  $24x^2 - 9y^2$
8. What conditions must be met in a polynomial to apply the square difference method?
9. What is the formula used to factor the difference of squares?
10. What is the importance of square difference factorization in simplifying algebraic expressions and solving mathematical problems?
11. **Cost of services:** An electrician charges a flat fee of \$20 to travel to the site and \$10 for each hour of work.  
What is the total cost if you work 5 hours?  
**Equation:**  $y=10x+20$   
y is the total cost, x is the hours worked.
  
12. **Constant speed:** A car travels at a constant speed of 80 km/h. If you have already traveled 50 km, how many kilometers will you have traveled after 3 hours?  
**Equation:**  $y=80x+50$   
y is the distance traveled, x is the time in hours.
  
13. **Depreciation of a car:** A new car costs \$20,000 and loses \$1,500 in value each year. What will it be worth in 4 years?  
**Equation:**  $y=-1500x+20000$

y is the value of the car, x is the number of years.

**14. Growth of a plant:** A plant grows at a rate of 2 cm per week and is already 15 cm long. What will be the height of the plant after 8 weeks?

**Equation:**  $y=2x+15$

y is the height of the plant, x is the number of weeks.

**15. Temperature as a function of time:** The temperature of a city increases at a rate of 2°C per hour from an initial value of 10°C. What will the temperature be after 6 hours?

**Equation:**  $y=2x+10$

y is the temperature, x is the time in hours.

**16. Value of a savings account:** A person deposits \$1,000 in a savings account and each month the bank adds \$50 in interest. How much money will you have in the account after 12 months?

**Equation:**  $y=50x+1000$

y is the value of the account, x is the number of months.

**17. Descent of a mountain:** A person begins to descend a mountain from a height of 1,500 meters and descends at a rate of 100 meters per hour. At what height will he be after 4 hours?

**Equation:**  $y=-100x+1500$

y is the height, x is the number of hours.

**18. Daily production:** A factory produces 30 units of a product per hour and already has 200 units in inventory. How many units will they have after 5 hours of production?

**Equation:**  $y=30x+200$

y is the total number of units, x is the time in hours.

**19. Converting degrees Fahrenheit to Celsius:** The formula for converting degrees Fahrenheit to Celsius is  $C = \frac{5}{9}(F - 32)$ . What is the temperature in Celsius when the temperature in Fahrenheit is  $95^{\circ}\text{F}$ ?

**Equation:**  $y = \frac{5}{9}(x - 32)$

y is the temperature in Celsius, x is the temperature in Fahrenheit.

**20. Cost of a taxi:** A taxi service charges \$3 to get into the taxi plus \$2 for every kilometer traveled. What is the total cost of a 10-kilometer trip?

**Equation:**  $y = 2x + 3$

y is the total cost, x is the distance in kilometers.

**21. Cost of taxi service in Bogota:** In Bogota, the minimum fare for a taxi is \$5,000 pesos and \$1,000 is charged for each kilometer traveled. If a person takes a taxi and travels 8 kilometers, what will be the total cost of the trip?

**Equation:**  $y = 1000x + 5000$

y is the total cost of the trip, x is the distance traveled in kilometers.

**22. Price per square meter of housing:** The price per square meter in an area of Bogotá is \$3,500,000. If a person wants to buy a 70 square meter apartment, what will be the total cost of the property?

**Equation:**  $y = 3500000x$

y is the total cost of housing, x is the number of square meters.

**23. Water consumption in a household:** The Bogotá aqueduct company charges a flat fee of \$10,000 per month for the service, plus \$1,200 for each cubic meter of water consumed. If a family consumes 15 cubic meters of water in a month, how much will they have to pay?

**Equation:**  $y = 1200x + 10000$

Y is the total cost of the water service, x is the water consumption in cubic meters.

**24. Value of public transportation in TransMilenio:** The value of a ticket in TransMilenio is \$2,950 pesos. If a person makes 20 trips in the system during a month, how much will they have spent in total?

**Equation:**  $y=2950x$

y is the total expenditure on transport, x is the number of trips made.

**25. Cost of parking in a shopping center:** In a shopping center in Bogotá, the cost of parking is \$4,000 for the first hour and \$1,000 for each additional hour. If a person parks their car for 5 hours, how much will they have to pay?

**Equation:**  $y=1000(x-1)+4000$

y is the total cost of parking, x is the number of hours.

**In exercises 26 to 30, write down the inequality that represents the situation and solve it:**

**26. Minimum voting age:** In Colombia, the minimum voting age is 18 years old. If a person is asked to determine if they are eligible to vote, what is the condition that their age must meet?

**27. Maximum capacity of an elevator:** An elevator in an office building has a maximum capacity of 600 kg. If the combined weight of the people going up should not exceed this amount, what is the condition for the elevator to operate without overloading it?

**28. Maximum Budget for Purchases:** John has a maximum budget of \$150,000 to buy clothes. If you want to spend less than that amount, what's the inequality that describes how much you can spend?

**29. Allowable temperature in a laboratory:** In a chemical laboratory, the temperature must be kept below 25°C to avoid damage to experiments. What is the inequality that describes the appropriate temperature?

**30. Minimum number of hours of study:** To pass a course, a student needs to study at least 10 hours a week. What is the inequality that describes the time you should spend studying?