PROPORTIONALITY

A DEFINITION

A.1 DETERMINING IF THE TABLE IS PROPORTIONAL

MCQ 1: Determine if the table is proportional

x	1	2	3
y	15	30	45

☐ Yes

☐ No

MCQ 2: Determine if the table is proportional

x	2	4	6
y	3	7	9

☐ Yes

☐ No

MCQ 3: Determine if the table is proportional

x	2	4	6
y	3	6	9

☐ Yes

☐ No

MCQ 4: Determine if the table is proportional

x	1	2	4
y	2	4	7

☐ Yes

☐ No

MCQ 5: Is this a proportional table for the price of oranges depending on the quantity?

Quantity (kg)	1	2	3
Price ($)	1.5	3	4.5

☐ Yes

☐ No

MCQ 6: Is this a proportional table for the height of children depending on their age?

Age (years)	3	6	9
Height (cm)	90	120	150

☐ Yes

☐ No

A.2 FINDING THE UNIT RATE IN WORD PROBLEMS

Ex 7: If 2 kilograms of apples cost 5 dollars, what is the cost per kilogram?

☐ dollars per kilogram

Ex 8: If a recipe requires 4 cups of flour to make 8 cupcakes, how many cups of flour are needed per cupcake?

☐ cups of flour per cupcake

Ex 9: If a car travels 150 kilometers in 3 hours, what is the average speed of the car in kilometers per hour?

☐ kilometers per hour

Ex 10: If a factory produces 200 widgets in 4 hours, what is the production rate in widgets per hour?

☐ widgets per hour

A.3 FINDING THE COEFFICIENT OF PROPORTIONALITY IN PROPORTIONAL TABLE

Ex 11: In this proportional table,

x	1	2	3
y	15	30	45

calculate the coefficient of proportionality.

☐

Ex 12: In this proportional table,

x	2	4	6
y	3	6	9

calculate the coefficient of proportionality.

☐

Ex 13: John is making a large batch of his special lemonade. The table below shows the number of cups of lemon juice (x) needed for a certain number of liters of lemonade (y).

Cups of lemon juice (x)	2	4	6
Liters of lemonade (y)	3	6	9

Calculate the coefficient of proportionality.

☐

Ex 14: Emma is mixing ingredients for a special type of concrete. The table below shows the number of kilograms of cement (x) needed for a certain number of kilograms of concrete mix (y).

Kilograms of cement (x)	1	2	3
Kilograms of concrete mix (y)	200	400	600

Calculate the coefficient of proportionality.

☐

Ex 15: Mark is preparing a solution for an experiment. The table below shows the number of milliliters of chemical A (x) needed for a certain number of milliliters of the solution (y).

Milliliters of chemical A (x)	4	8	12
Milliliters of solution (y)	6	12	18

Calculate the coefficient of proportionality.

[ ]

B LINEARITY

B.1 CALCULATING TOTALS USING RATES

Ex 16: The price of gasoline is \$1.9 per liter. I fill up 30 liters.
What is the total cost of the fill-up?

[ ] dollars

Ex 17: At the market, apples cost \$2.5 per kilogram. I buy 12 kilograms of apples.
What is the total cost of the apples?

[ ] dollars

Ex 18: A particular plant grows at a constant rate of 2.5 centimeters per day.
Using this growth rate, how tall will the plant be after 12 days?

[ ] centimeters

Ex 19: A car rental company charges a constant rate of 0.75 dollars per kilometer driven.
If a customer drives the rental car for 120 kilometers, how much will the rental cost?

[ ] dollars

B.2 CALCULATING QUANTITIES USING RATES

Ex 20: The price of gasoline is \$1.9 per liter. I spend \$57 to fill up my tank.
How many liters of gasoline did I purchase?

[ ] liters

Ex 21: At the market, apples cost \$2.5 per kilogram. I spend \$30 on apples.
How many kilograms of apples did I buy?

[ ] kilograms

Ex 22: At a print shop, it costs \$0.15 to print one page. I spend \$30 on printing.
How many pages did I print?

[ ] pages

Ex 23: A plant grows at a constant rate of 2.5 centimeters per day. It reaches a height of 30 centimeters.
How many days did it take for the plant to reach this height?

[ ] days

C METHODS FOR CALCULATING A FOURTH PROPORTIONAL

C.1 SOLVING PROPORTIONAL RELATIONSHIPS IN REAL-WORLD CONTEXTS

Ex 24: For her birthday, Su invites her friends to the cinema. She was supposed to pay 28 dollars for 4 tickets. Eventually, Su's parents decide to join and offer to pay.
Knowing that the price is proportional to the number of tickets, how much will Su's parents pay for 6 tickets ?

[ ] dollars

Ex 25: For a school trip, the teacher buys 15 bus tickets for \$90. Later, the principal joins and offers to pay for additional tickets.
Knowing that the price is proportional to the number of tickets, how much will the principal pay for 8 tickets?

[ ] dollars

Ex 26: In a factory, the amount of fruit juice produced is proportional to the amount of fruit used. The factory uses 10 kilograms of fruit to produce 25 liters of juice.
Knowing that the juice production is proportional to the amount of fruit, how many liters of juice will the factory produce with 14 kilograms of fruit?

[ ] liters

Ex 27: In a car's fuel consumption, the amount of gasoline used is proportional to the number of kilometers driven. The car uses 8.5 liters of gasoline to drive 100 kilometers.
Knowing that fuel consumption is proportional to the distance, how much gasoline will the car use to drive 175 kilometers?

[ ] liters

C.2 FINDING MISSING VALUES IN PROPORTIONAL TABLE

Ex 28: In a classroom, the number of notebooks each student gets is proportional to the number of students.
Find the missing values in the table of notebooks distribution.

Number of students	5	15	
Number of notebooks		30	50

Ex 29: In an apartment building, the maintenance fees paid are proportional to the floor area of the property for each owner.
Find the missing values in the table of fees for some owners.

Floor area in m^2	3	10	
Fees ($)		130	195

Ex 30: In a factory, the amount of fruit juice produced is proportional to the amount of fruits used.
Find the missing values in the table of juice production for some batches.

Amount of fruits (kg)	5	20	
Amount of juice (liters)		60	90

Ex 31: In a bakery, the amount of dough needed is proportional to the number of loaves of bread produced.
Find the missing values in the table of dough requirements for some batches.

Number of loaves	4	12	
Amount of dough (kg)		6	10