RATIOS

A DEFINITION

A.1 EXPRESSING RATIOS IN DIFFERENT FORMS

Ex 1: The ratio 3 to 2 is $\square:\square$.

Ex 2: The ratio 5 to 4 is $\square:\square$.

Ex 3: The ratio 7 to 3 is $\square:\square$.

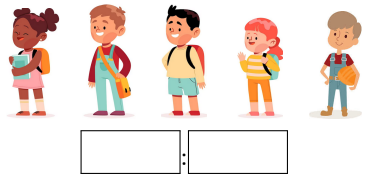
Ex 4: The ratio 8 to 5 is $\square:\square$.

Ex 5: The ratio 10 to 6 is $\square:\square$.

B PART-PART AND PART-WHOLE RATIOS

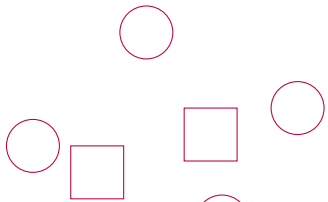
B.1 FINDING RATIOS IN PART-PART

Ex 6: What is the ratio of girls to boys?



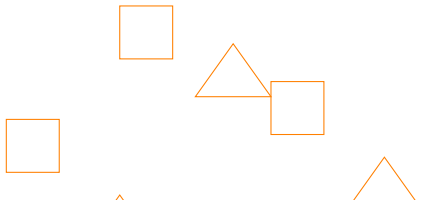
$\square:\square$

Ex 7: What is the ratio of circles to rectangles?



$\square:\square$

Ex 8: What is the ratio of squares to triangles?



$\square:\square$

Ex 9: What is the ratio of oranges to lemons?

$\frac{\square}{\square}$

Ex 10: What is the ratio of girls to boys?

$\frac{\square}{\square}$

B.2 FINDING RATIOS IN PART-WHOLE

Ex 11: What is the ratio of girls to kids?

$\square:\square$

Ex 12: What is the ratio of boys to kids?

$\square:\square$

Ex 13: Louis loves to play sports. In all, he has earned 5 swimming medals, 3 running medals, 6 cycling medals, and 2 triathlon medals.
What is the ratio of Louis's swimming medals to all of his medals?

$\square:\square$

Ex 14: Anna loves to read books. In all, she has read 12 mystery novels, 8 science fiction novels, 5 fantasy novels, and 3 historical novels.
What is the ratio of Anna's mystery novels to all of her books?

$\square:\square$

Ex 15: The table shows the number of different types of birds that are swimming at a lake.

Bird	Number
Seagulls	1
Ducks	9
Geese	7
Swans	2

What is the ratio of swans to total birds?

$\square:\square$

Ex 16: The table shows the number of different types of fruits in a basket.

Fruit	Number
Apples	3
Oranges	5
Bananas	4
Grapes	6

What is the ratio of apples to total fruits?

$\square : \square$

Ex 17: The table shows the number of different types of vehicles in a parking lot.

Vehicle	Number
Cars	10
Bicycles	6
Motorcycles	4
Trucks	2

What is the ratio of trucks to total vehicles?

$\square : \square$

C EQUAL RATIOS

C.1 MULTIPLYING THE RATIOS

Ex 18: Multiply the ratio by 2:

$3 : 5 = \square : \square$

Ex 19: Multiply the ratio by 3:

$4 : 7 = \square : \square$

Ex 20: Multiply the ratio by 4:

$5 : 3 = \square : \square$

Ex 21: Multiply the ratio by 5:

$2 : 5 = \square : \square$

C.2 FINDING THE MISSING VALUE

Ex 22:

$1 : 2 = 2 : \square$

Ex 23:

$2 : 3 = \square : 6$

Ex 24:

$3 : 5 = 9 : \square$

Ex 25:

$4 : 7 = \square : 14$

Ex 26:

$2 : 3 = 8 : \square$

Ex 27:

$3 : 2 = \square : 20$

C.3 SIMPLIFYING RATIOS

Ex 28:

$2 : 4 = 1 : \square$

Ex 29:

$4 : 6 = 2 : \square$

Ex 30:

$5 : 10 = 1 : \square$

Ex 31:

$14 : 7 = \square : 1$

Ex 32:

$15 : 9 = \square : 3$

Ex 33:

$18 : 12 = \square : 2$

C.4 FINDING EQUAL RATIO

MCQ 34: Select one ratio that is equal 1 : 2.

- ☐ 1 : 3
- ☐ 2 : 4
- ☐ 4 : 2
- ☐ 3 : 4

MCQ 35: Select one ratio that is equal to 3 : 2.

- ☐ 2 : 3
- ☐ 4 : 3
- ☐ 3 : 4
- ☐ 6 : 4

MCQ 36: Select one ratio that is equal to 4 : 3.

- ☐ 3 : 4
- ☐ 9 : 6
- ☐ 12 : 9
- ☐ 4 : 9

MCQ 37: Select one ratio that is equal to 3 : 4.

- ☐ 75 : 100
- ☐ 4 : 3
- ☐ 9 : 12
- ☐ 30 : 50

D PROPORTION

D.1 IDENTIFYING THE PROPORTION

MCQ 38: Two vinaigrettes are being prepared:

- Vinaigrette A is made with 20 mL of oil and 30 mL of vinegar.
- Vinaigrette B is made with 10 mL of oil and 15 mL of vinegar.

Will these two vinaigrettes taste the same?

☐ Yes

☐ No

MCQ 39: On the cement package, it is indicated: 2 kilos of cement for 3 liters of water.
A worker prepares a mixture with 4 kilos of cement and 6 liters of water.
Did he follow the recommended proportions?

☐ Yes

☐ No

MCQ 40: In architecture, the golden ratio is often used to create aesthetically pleasing designs. The golden ratio is approximately 1 : 1.618.
An architect designs a rectangle with a length of 3.236 m and a width of 2 m.
Did the architect use the golden ratio in his design (you can use a calculator)?

☐ Yes

☐ No

MCQ 41: In a cake recipe, the ratio of flour to sugar is 3 : 2.
If a baker uses 9 cups of flour, how many cups of sugar should they use to keep the recipe's proportions?

☐ 4 cups

☐ 5 cups

☐ 6 cups

☐ 7 cups

D.2 FINDING A QUANTITY

Ex 42: In the class, there are 20 girls for 10 boys.
For each boy, there are ☐ girls.

Ex 43: To make orange juice, you need 2 oranges and 1 lemon. Su has 14 oranges. How many lemons does she need?

☐ lemons.

Ex 44: In a library, there are 30 fiction books for 15 non-fiction books.
For each non-fiction book, there are ☐ fiction books.

E UNITARY METHOD

E.1 BRINGING TO THE UNIT

Ex 45: A satellite makes 4 orbits around the Earth in 24 hours. How many hours does it take to complete one orbit?

☐ hours

Ex 46: A car travels 500 kilometers in 5 hours. How many kilometers does it travel in 1 hour?

☐ kilometers

Ex 47: A factory produces 720 widgets in 8 hours. How many widgets does it produce in 1 hour?

☐ widgets

Ex 48: A baker uses 2 kilograms of flour to make 4 loaves of bread. How many kilograms of flour does it take to make 1 loaf of bread?

☐ kilograms

E.2 CALCULATING FROM THE UNIT

Ex 49: To make 1 chocolate cake, 4 eggs are needed. How many eggs are needed to make 2 cakes?

☐ eggs

Ex 50: The price of 1 kilogram of apples is $2.5. What is the price for 3 kilograms of apples?

$ ☐

Ex 51: To build 1 bookshelf, 10 wooden planks are needed. How many wooden planks are needed to build 3 bookshelves?

☐ wooden planks

Ex 52: To paint 1 m^2, 0.2 liters of paint are needed. How many liters of paint are needed to paint 3 m^2?

☐ liters of paint

E.3 CONVERTING TO AND FROM THE UNIT

Ex 53: To make a special juice mix, you need 5 apples for every 15 oranges. How many oranges do you need if you have 3 apples?

☐ oranges

Ex 54: A baker uses 2 kilograms of flour to make 4 loaves of bread. How many kilograms of flour does it take to make 3 loaf of bread?

☐ kilograms

Ex 55: An artist mixes 3 liters of red paint with 6 liters of blue paint to create a purple shade. How many liters of red paint are needed to mix with 9 liters of blue paint to maintain the same shade of purple?

$\square$ liters

Ex 56: To make a magic potion, you need 10 drops of dragon's blood for every 5 drops of phoenix tears. How many drops of phoenix tears do you need if you have 4 drops of dragon's blood?

$\square$ drops of phoenix tears

E.4 SOLVING NUMERATOR

Ex 57:

$$\frac{6}{2} = \frac{x}{3}$$

$x = \square$

Ex 58:

$$\frac{8}{4} = \frac{x}{5}$$

$x = \square$

Ex 59:

$$\frac{3}{2} = \frac{x}{5}$$

$x = \square$

Ex 60:

$$\frac{5}{4} = \frac{x}{3}$$

$x = \square$

E.5 SOLVING DENOMINATOR

Ex 61:

$$\frac{5}{10} = \frac{2}{x}$$

$x = \square$

Ex 62:

$$\frac{3}{6} = \frac{2}{x}$$

$x = \square$

Ex 63:

$$\frac{4}{5} = \frac{3}{x}$$

$x = \square$

Ex 64:

$$\frac{5}{2} = \frac{3}{x}$$

$x = \square$

F CROSS-MULTIPLICATION METHOD

F.1 FINDING A QUANTITY

Ex 65: 5 apples cost 10 dollars.
Find the cost of 8 apples.

$\square$ dollars

Ex 66: 6 oranges cost 12 dollars.
Find the cost of 9 oranges.

$\square$ dollars

Ex 67: 6 oranges cost 12 dollars.
Find the cost of 9 oranges.

$\square$ dollars

Ex 68: A recipe requires 200 grams of flour to make 8 cookies. How much flour is needed to make 12 cookies (you can use a calculator)?

$\square$ grams

Ex 69: To make a certain shade of paint, you need 1.5 liters of blue paint for every 3 liters of base paint.
How much blue paint is needed if you have 4.5 liters of base paint (you can use a calculator)?

$\square$ liters