Mathematics Education and Support Hub (MESH)

Biology: Ratios & Proportions

Sample Questions - Solutions

1a) 45 mg drug / 1 kg body weight

b) 100 mg NaCl / 1 L total solution

c) 1mL / 1000 µL

d) 8 g / 1L

2a) ? / 5 = 2 / 10

cross multiply and divide

10 x ? = 5 x 2

10 x ? = 10

? = 10 / 10

? = 1

Therefore, 1 / 5 = 2 / 10

b) 0.5 mg / 20 mL = 20 mg / ?

cross multiply and divide

0.5 x ? = 20 x 20

0.5 x ? = 400

? = 400 / 0.5

? = 800

Therefore, 0.5 mg / 20 mL = 20 mg / 800 mL

c) ? is to 20 as 30 is to 120

As an equation, this becomes ? / 20 = 30 / 120

cross multiple and divide

120 x ? = 30 x 20

120 x ? = 600

? = 600 / 120

? = 5

Therefore, 5 is to 20 as 30 is to 120

d) 150 is to 5 as 60 is to ?

As an equation, this becomes 150 / 5 = 60 / ?

cross multiple and divide

150 x ? = 5 x 60

150 x ? = 300

? = 300 / 150

? = 2

Therefore, 150 is to 5 as 60 is to 2

3) If it requires 1.5 teaspoon of baking soda to make one loaf of bread, how many teaspoons of baking soda are required to make 42 loaves.

As an equation, this becomes:

1.5 teaspoon / 1 loaf = ? / 42 loaves

cross multiply and divide

1 x ? = 1.5 x 42

1 x ? = 63

? = 63 / 1

? = 63

Therefore, 63 teaspoons of baking soda are required to make 42 loaves of bread.

4) If a medicine tablet contained 13 mg of an active ingredient, how many tablets are required if you need to administer 52 mg?

As an equation, this becomes:

13 mg / 1 tablet = 52 mg / ? tablets

cross multiply and divide

13 x ? = 1 x 52

13 x ? = 52

? = 52 / 13

? = 4

Therefore, 4 tablets are required to administer 52 mg of the active ingredient.

5) If there are about 1×10^2 blood cells in a 1×10^{-2} mL sample, approximately how many blood cells would be in 1.0 mL of this blood?

Note: $10^2 = 100$ and $10^{-2} = 0.1$

As an equation, this becomes:

1 x 100 blood cells / 1 x 0.1 mL = ? blood cells / 1.0 mL

cross multiply and divide

0.1 x ? = 100 x 1.0

0.1 x ? = 100

? = 100 / 0.1

? = 1000

Therefore, there are approximately 1000 blood cells in 1.0 mL of this blood.