**1. What quantity of water should be added to the milk water mixture so that**

**the milk water ratio changes from 2:3 to 4:11. The quantity of milk in the**

**mixture is 40 litres?**

Ans: Step 1: Calculate the initial quantities of milk and water in the mixture.

In the initial mixture, the milk-water ratio is 2:3, which means for every 2 parts of milk, there are 3 parts of water.

So, we can calculate the initial quantity of water as follows:

Initial quantity of water = (3/2) \* quantity of milk

= (3/2) \* 40 liters

= 60 liters

Step 2: Calculate the final quantities of milk and water in the mixture.

In the final mixture, the milk-water ratio is 4:11, which means for every 4 parts of milk, there are 11 parts of water.

Let's assume the quantity of water to be added is 'x' liters.

So, the final quantity of milk will remain the same at 40 liters, and the final quantity of water will be (60 + x) liters.

Step 3: Set up a proportion based on the milk-water ratios.

We can set up the following proportion:

(Quantity of milk) / (Quantity of water) = (Final milk-water ratio)

40 / (60 + x) = 4 / 11

Step 4: Solve the proportion to find the value of 'x'.

Cross-multiplying, we get:

4 \* (60 + x) = 11 \* 40

240 + 4x = 440

4x = 440 - 240

4x = 200

x = 200 / 4

x = 50

Therefore, **50 liters of water** should be added to the milk-water mixture to change the milk-water ratio from 2:3 to 4:11, given that the initial quantity of milk is 40 liters.

**2. Linear equation 2x+3y=0 meets the x & y-axis at the point?**

Ans: To find the points where the linear equation 2x + 3y = 0 intersects the x and y-axis, we can substitute the respective axes values to determine the coordinates.

Intersecting the x-axis:

When the equation intersects the x-axis, the value of y is 0. We can substitute y = 0 into the equation and solve for x:

2x + 3(0) = 0

2x = 0

x = 0

Therefore, the equation intersects the x-axis at the point (0, 0).

Intersecting the y-axis:

When the equation intersects the y-axis, the value of x is 0. We can substitute x = 0 into the equation and solve for y:

2(0) + 3y = 0

3y = 0

y = 0

Therefore, the equation intersects the y-axis at the point (0, 0) as well.

In both cases, the equation 2x + 3y = 0 intersects the x-axis and the y-axis at the origin, which is the **point (0, 0).**

**3. a & b are positive integers such that a^2-b^=19. Find a & b?**

Ans: To find the values of positive integers a and b such that a^2 - b^2 = 19, we can start by examining the factors of 19. Since 19 is a prime number, its only factors are 1 and 19.

Let's consider the equation in the form of a difference of squares:

(a + b)(a - b) = 19

Since the factors of 19 are 1 and 19, we can set up two possible equations:

Equation 1:

a + b = 19

a - b = 1

Adding the two equations, we get:

2a = 20

a = 10

Substituting the value of a into one of the equations, we can solve for b:

10 - b = 1

b = 9

So, in this case, a = 10 and b = 9.

Equation 2:

a + b = 1

a - b = 19

Adding the two equations, we get:

2a = 20

a = 10

Substituting the value of a into one of the equations, we can solve for b:

10 - b = 19

b = -9

However, since we are looking for positive integers, this solution (a = 10, b = -9) does not satisfy the given conditions.

Therefore, the solution to the equation a^2 - b^2 = 19 with positive integers a and b is **a = 10 and b = 9.**

1. **Find a^+b^3+c^3+3abc , where a+b+c=5 & , a^2+b^2+c^2=10?**

Ans: First, let's consider the equation \(a^2+b^2+c^2=10\). By squaring the equation \(a+b+c=5\), we have:

\((a+b+c)^2 = 5^2\)

\(a^2 + b^2 + c^2 + 2ab + 2ac + 2bc = 25\)

We can substitute the value of \(a^2 + b^2 + c^2\) from the second equation into this expression:

\(10 + 2ab + 2ac + 2bc = 25\)

\(2ab + 2ac + 2bc = 15\)

\(ab + ac + bc = \frac{15}{2}\)

Now, we'll cube the equation \(a+b+c=5\):

\((a+b+c)^3 = 5^3\)

\(a^3 + b^3 + c^3 + 3a^2b + 3ab^2 + 3a^2c + 3ac^2 + 3b^2c + 3bc^2 + 6abc = 125\)

We can substitute the value of \(3a^2b + 3ab^2 + 3a^2c + 3ac^2 + 3b^2c + 3bc^2\) from the equation \(ab + ac + bc = \frac{15}{2}\):

\(a^3 + b^3 + c^3 + 3abc + 15(ab + ac + bc) = 125\)

Substituting the value of \(ab + ac + bc\) from the earlier equation, we get:

\(a^3 + b^3 + c^3 + 3abc + 15 \cdot \frac{15}{2} = 125\)

\(a^3 + b^3 + c^3 + 3abc + \frac{225}{2} = 125\)

\(a^3 + b^3 + c^3 + 3abc = 125 - \frac{225}{2}\)

\(a^3 + b^3 + c^3 + 3abc = \frac{250}{2} - \frac{225}{2}\)

\(a^3 + b^3 + c^3 + 3abc = \frac{25}{2}\)

**Therefore, \(a^3 + b^3 + c^3 + 3abc = \frac{25}{2}\).**

**5. Sum of two, two-digit numbers is a perfect square. The digits of the first**

**two-digit number are two consecutive positive integers; also, when the digits**

**of the first number are reversed, the second number is formed. Find these**

**numbers & the square root of their sum.**

Ans : Step 1: Identify the two consecutive positive integers.

Let's assume the two consecutive positive integers are x and (x+1).

Step 2: Construct the two-digit numbers.

The first two-digit number can be formed by combining the digits x and (x+1) in either order. So, we have two possibilities: 10x + (x+1) and 10(x+1) + x.

Step 3: Determine the second number.

According to the given information, when the digits of the first number are reversed, the second number is formed. Therefore, we need to consider the other possibility we haven't used yet.

The two-digit numbers are:

First number: 10x + (x+1)

Second number: 10(x+1) + x

Step 4: Find the sum of the two numbers.

Sum = (10x + (x+1)) + (10(x+1) + x)

= 10x + x + 1 + 10x + 10 + x

= 22x + 11

Step 5: Find the square root of the sum.

The square root of (22x + 11) will give us the square root of the sum of the two numbers.

Now, let's test different values of x to see if we can find a perfect square for the sum.

For x = 3:

Sum = 22(3) + 11 = 66 + 11 = 77

The square root of 77 is not an integer, so it is not a perfect square.

For x = 4:

Sum = 22(4) + 11 = 88 + 11 = 99

The square root of 99 is not an integer, so it is not a perfect square.

For x = 5:

Sum = 22(5) + 11 = 110 + 11 = 121

The square root of 121 is 11, which is an integer and a perfect square.

Therefore, **when x = 5,** the first two-digit number is 54 (formed by 10x + (x+1)), and the second two-digit number is 45 (formed by reversing the digits of the first number). The square root of their sum, which is 121, is **11.**