Aptitude Assignment 3

1. Write two quadratic equations such that the sum of roots equals twice the product of roots?

To form two quadratic equations with the sum of roots equal to twice the product of roots, let's consider the roots as 'a' and 'b'. The sum of roots is given by (a + b), and the product of roots is given by (a * b).

Equation 1:
The sum of roots is twice the product of roots:
(a + b) = 2(a * b)

Equation 2:
To form a quadratic equation, we can use the fact that the sum and product of roots are related to the coefficients of the quadratic equation. The quadratic equation is typically represented as:
x^2 - (sum of roots)x + (product of roots) = 0

Substituting the values from Equation 1 into Equation 2, we have:
x^2 - 2(a * b)x + (a * b) = 0

Therefore, the two quadratic equations with the sum of roots equal to twice the product of roots are:
Equation 1: (a + b) = 2(a * b)
Equation 2: x^2 - 2(a * b)x + (a * b) = 0

Please note that 'a' and 'b' are the variables representing the roots of the quadratic equations, and you can substitute any values for 'a' and 'b' to obtain specific equations.

2. 2x+3y=12 has (2,3) as its solution or not?

To determine if (2, 3) is a solution to the equation 2x + 3y = 12, we can substitute the values of x and y into the equation and check if the equation holds true.

Let's substitute x = 2 and y = 3 into the equation:
2(2) + 3(3) = 4 + 9 = 13

The left side of the equation evaluates to 13, not 12. Therefore, (2, 3) is not a solution to the equation 2x + 3y = 12.

3. Find possible coordinates of (x,y) such that point (1,1), (2,2) & (x,y) are collinear?

For three points to be collinear, the slope between any two pairs of points should be equal. Let's calculate the slope between (1, 1) and (2, 2) to find the common slope:

Slope = (y2 - y1) / (x2 - x1)
= (2 - 1) / (2 - 1)
= 1 / 1
= 1

Now, we can use this common slope to find the possible coordinates (x, y) such that (1, 1), (2, 2), and (x, y) are collinear.

Let's consider the slope between (2, 2) and (x, y):

Slope = (y - 2) / (x - 2)

Since the slope between (2, 2) and (x, y) should be equal to 1, we can set up the equation:

(y - 2) / (x - 2) = 1

Cross-multiplying:

y - 2 = x - 2

Simplifying the equation:

y = x

Therefore, the possible coordinates (x, y) such that (1, 1), (2, 2), and (x, y) are collinear are any points where the y-coordinate is equal to the x-coordinate. For example, (3, 3), (4, 4), (-2, -2), (0, 0), etc.

4. Find out all possible values of a & b for which the ratio of a^3+b^3 to a^3-b^3 is 1:1
a,b are real numbers.

To find the possible values of 'a' and 'b' for which the ratio of $a^3 + b^3$ to $a^3 - b^3$ is 1:1, we can set up the equation and solve for 'a' and 'b'.

The given ratio is:

$(a^3 + b^3) / (a^3 - b^3) = 1/1$

We can simplify this equation by multiplying both sides by $(a^3 - b^3)$ to eliminate the denominator:

$(a^3 + b^3) = (a^3 - b^3)$

Expanding the cubes on both sides:

$a^3 + b^3 = a^3 - b^3$

The cube terms cancel out, leaving us with:

$b^3 = -b^3$

This equation implies that b^3 must equal zero, as the only real number that satisfies $b^3 = -b^3$ is $b = 0$.

Substituting $b = 0$ into the equation $a^3 + b^3 = a^3 - b^3$, we get:

$a^3 = a^3$

This equation is satisfied for any real value of 'a'.

Therefore, the possible values for 'a' are all real numbers, and 'b' must be zero ($b = 0$) for the given ratio of $a^3 + b^3$ to $a^3 - b^3$ to be 1:1.

5. The triangle area formed by the lines y=x, y-axis and y=3 line will be?

To find the area of the triangle formed by the lines $y = x$, the y-axis, and $y = 3$, we can calculate the base and height of the triangle and use the formula for the area of a triangle.

The base of the triangle is the distance between the y-axis and the point where the line $y = 3$ intersects with the line $y = x$. To find this point, we set $y = 3$ equal to $y = x$ and solve for x:

$x = 3$

So, the base of the triangle is 3 units.

The height of the triangle is the distance between the point where the line $y = 3$ intersects with the line $y = x$ and the point where the line $y = x$ intersects with the y-axis. To find this point, we set $x = 0$ in the equation $y = x$:

$y = 0$

So, the height of the triangle is 0 units.

Now, we can calculate the area of the triangle using the formula:

Area = (base * height) / 2

Plugging in the values, we get:

Area = (3 * 0) / 2
= 0

Therefore, the area of the triangle formed by the lines $y = x$, y-axis, and $y = 3$ is 0 square units.