

Answer on Question # 42016 – Physics – Other

1. plz tell how to find a/b on solving this equation:

$$(a+b)^2/ab = 4.5.$$

Solution.

Let open the brackets.

$$\frac{a^2 + 2ab + b^2}{ab} = 4.5, \quad \frac{a}{b} + 2 + \frac{b}{a} = 4.5, \quad \frac{a}{b} + \frac{b}{a} = \frac{5}{2}.$$

Let denote $\frac{a}{b} = x$. The equation takes the form

$$x + \frac{1}{x} = \frac{5}{2}, \quad \frac{x^2 + 1}{x} = \frac{5}{2}, \quad 2x^2 + 2 = 5x, \quad 2x^2 - 5x + 2 = 0.$$

This is a quadratic equation. The discriminant is $D = (-5)^2 - 4 \cdot 2 \cdot 2 = 25 - 16 = 9$.

So, the roots are $x_1 = \frac{5-3}{2 \cdot 2} = \frac{1}{2}$, $x_2 = \frac{5+3}{2 \cdot 2} = 2$.

Let go back to the initial variables. So, $\frac{a}{b} = \frac{1}{2}$ or $\frac{a}{b} = 2$.

Answer: $\frac{a}{b} = \frac{1}{2}$ or $\frac{a}{b} = 2$.