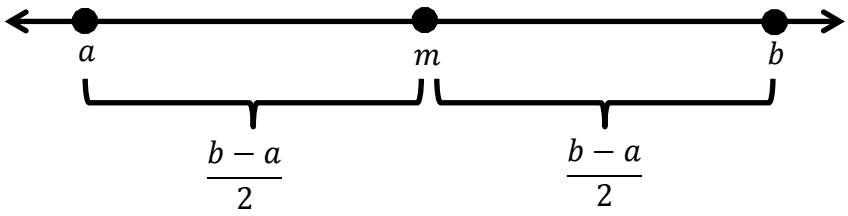
Jin

Weekly Problem 29- 2012

The problem asks us to calculate the **midpoint** of 1/8 and 1/4. We can better understand how this is calculated by considering a number line showing two real numbers: a and b where $a < b$ shown below. We will designate m as the point midway between a and b, namely the midpoint of a and b.



Intuitively, the midpoint of a and b has to be located at a certain point on the number line such that the distance from point a to point m is equal to the distance from point m to point b and such that these distances are exactly half the distance from a to b. Mathematically we know that the distance from point a to point b is given by $b - a$. Since we know that the distances from a to m and m to b are both half of the distance from a to b, we can express them the following way: $\frac{b-a}{2}$, labeled above.

We can get to point m by one of two different ways: we can either start from point a and move a distance $\frac{b-a}{2}$ to the right or we can start from point b and move a distance $\frac{b-a}{2}$ to the left. The first alternative mathematically translates to:

$$a + \frac{b-a}{2} = \frac{2a+b-a}{2} = \frac{a+b}{2}$$

The second alternative translates to:

$$b - \frac{b-a}{2} = \frac{2b-b+a}{2} = \frac{a+b}{2}$$

So we see that the midpoint m can be expressed as: $m = \frac{a+b}{2}$. In the context of this problem, point a is equal to 1/8 and point b is equal to 1/4.

So the final answer is: $\boldsymbol{\frac{\frac{1}{8}+\frac{1}{4}}{2} = \frac{\frac{3}{8}}{2} = \frac{3}{16}}$.