MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 3 - DECEMBER 2013
ROUND 5 ALG 1: RATIO, PROPORTION OR VARIATION

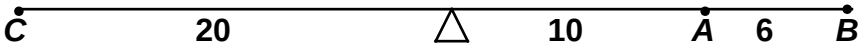
ANSWERS

A) _____ lbs

B) M (_____ , _____)

C) r = _____

A) Two children have weights of 60 lbs and 80 lbs. They sit on the right side of the seesaw at points A and B in the diagram below. A third child sits at point C and balances the seesaw. What is the maximum weight of the third child?



Note: The seesaw balances if the sum of the products of the weight and the corresponding distance from the pivot point on the right side is the equal to the product of the weight and distance from the pivot point on the left side.

B) y_1 varies directly as x, and y_2 varies inversely as x. Specifically,

$y_1 = f(x) = 3x + 8$ and . $y_2 = g(x) = \frac{3}{x}$

The graphs of $f(x)$ and $g(x)$ intersect in two points A and B.

Compute the coordinates of the midpoint M of $\overline{AB}$.

C) On a roundtrip training run between his home (H) and the beach (B), Rocky traveled over the same route both ways. Let R denote his rate when he ran from H to B. His average overall rate was only $\frac{3}{4}R$ because (due to cramps) he had to slow down returning from B to H.

In terms of R, compute r, his average rate on the return trip.