

**Math Challenge 2009**  
**Pony Express**

1. A motorboat traveled 36 miles downstream (with the current) in 1.5 hours. The return trip upstream (against the current) covered the same distance, but took 2 hours. Determine the boat's speed in still water, and the speed of the current.

Boat's speed in still water / speed of current  
21 mph / 3 mph

2. Suppose the hypotenuse of a right triangle is one foot longer than the base and the perpendicular side is 9 feet long. How long is the base, and how long is the hypotenuse?

base = 40 ft    hyp = 41 ft.

3. The arithmetic mean (ordinary average) of a set of 50 numbers is 32. The arithmetic mean of a second set of 70 numbers is 53. Find the arithmetic mean of the numbers in the sets combined.

44.25 or  $44\frac{1}{4}$

4. Pipes A and B can fill a tank in two hours and three hours respectively. Pipe C can empty the tank in five hours. If all pipes are opened when the tank is empty, how long will it take to fill the tank?

$1\frac{1}{19}$  hours.

5. Twenty-four dogs are in a kennel. Twelve of the dogs are black, six of the dogs have short tails, and fifteen of the dogs have long hair. There is only one dog that is black with a short tail and long hair. Two of the dogs are black with short tails and do not have long hair. Two of the dogs have short tails and long hair but are not black. If all of the dogs in the kennel have at least one of the mentioned characteristics, how many dogs are black with long hair but do not have short tails?

3 dogs

6. A retired colonel lived a quarter of his life as a boy, one-fifth as a young man, one third as a man with responsibilities, and thirteen years on a pension. How old was he when he died?

60 yrs old.