



Problem of the Week

Problem B and Solution

Doggy Drinking

Problem

When a dog takes a drink, he laps up water by pushing his tongue into the water and then pulling it back with some water sticking to it. Some dogs are better at this than others. Chase is a messy drinker, and usually leaves a large puddle on the floor.

- (a) Chase has a mass of 40 kg. Each day he needs to drink 50 mL of water for each kg of body mass. How many litres of water should Chase drink per day?
- (b) If 70% of Chase's body mass is made up of water, how much of Chase's mass is NOT water?
- (c) For every 3.5 mL of water Chase laps up with his tongue, 1.5 mL ends up on the floor. If Chase takes a lap every 5 seconds for one minute, how much water does he successfully drink?
- (d) After an hour, you measure the water on the floor and find that Chase has spilled 45 mL. How much water did he successfully drink?
- (e) How many laps per day will it take Chase to drink the water he needs in one day?

Solution

- (a) Chase should drink $50 \times 40 = 2000$ mL, or 2 L of water per day.
- (b) The percentage of Chase's body mass that is NOT water is $100\% - 70\% = 30\%$. Thus, the amount of Chase's mass that is NOT water is 30% of 40 kg, or $0.3 \times 40 = 12$ kg.
- (c) Since there are 60 seconds in one minute, Chase takes $60 \div 5 = 12$ laps in total. From each lap, he drinks only $3.5 - 1.5 = 2.0$ mL. Thus, in 12 laps he successfully drinks a total of $12 \times 2.0 = 24$ mL of water.
- (d) The 45 mL of water Chase spilled indicates he took $45 \div 1.5 = 30$ laps. Since he drinks 2 mL with each lap, he successfully drank $2 \times 30 = 60$ mL.
- (e) From part (a), Chase needs to drink 2000 mL of water per day. He drinks 2 mL with each lap, so he will need to take $2000 \div 2 = 1000$ laps each day.