

Math Magic: Exploring Our Super-Machine

Issue #11: Math Models in Biology

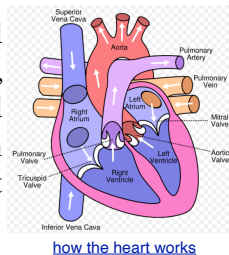
(grades 7-12)

[An Index of All Math Magic Activities](#)

THE NUMBER OF HEART BEATS IN AN HOUR, A DAY, A YEAR, AND A LIFETIME

(Use a calculator and show what you entered or input)

The size of a large fist and weighing 1/2 to 3/4 of a pound, one of the most enduring and efficient machines is the human heart. On average the human heart beats 70 times a minute.



USEFUL FACTS TO KNOW:

- there are 60 minutes in an hour
- there are 24 hours in a day
- there are 365.25 days in a year¹
- there are four quarts in a gallon

ANSWERS TO COMPUTE USING THE ABOVE:

1. Heart beats per hour is _____ x _____ = _____
2. Heart beats per day is _____ x _____ = _____
3. Heart beats Per year is _____ x _____ = _____
4. Give the *word name* for this number.

5. Heart beats/life is _____ x _____ = _____
_____ ² Give the *word name* for this number below.

HOW MUCH BLOOD THE HEART PUMPS PER HOUR, PER DAY, PER YEAR, PER LIFE

(Use a calculator and show input and estimation on back.)

Each heart beat pumps out *about 5.7 cc (5.7 cubic centimeters is about 6 sugar cubes)* of blood per second. This is about 6 quarts each minute. In the

¹ It takes the earth 365.25 days to go around the sun, but we round down to 365 and catch up on leap year

² NOTE: some calculators cannot fit this answer but show it with a decimal and an E. The E stands exponent of 8 so move the decimal point to the right 8 places. See [scientific notation](#) for a better explanation on Kahn Academy.

United States, the average life expectancy of persons living in California is about 81 years. **(Red text = corrections were made.)**

ANSWERS TO COMPUTE USING THE ABOVE:

(Use a calculator and show what you entered or input)

6. How many gallons does the heart pump a minute?
_____ ÷ _____ = _____ gal/min.
7. How many gallons per hour? _____ x _____ = _____ gal/hr
8. How many gallons per day? _____ x _____ = _____ gal/day/ Now write its *word name*

9. How many gallons per year? _____ x _____ = _____
Now write its *word name*
b e l o w

10. How many gallons per life? _____ x _____ = _____ gal/life and write its *word name* below.

BUILDING A MODEL TO SEE HOW MUCH BLOOD THE HEART PUMPS OVER 80+ YRS

According to several online sources, there are 660, 430 gallons in an olympic sized swimming pool.

From your answer above and this new information, what part of or how many olympic-sized swimming pools would be filled by the pumping of a heart over 81 years? *(This will truly amaze you as it did me.)*

_____ ≈ _____ pool(s) filled. [ANSWERS](#)