



# MATHS

What's it all for?

WHAT DOES  
MATHS HELP  
US WITH IN  
EVERYDAY  
LIFE?



# THE NUMBER $\pi$

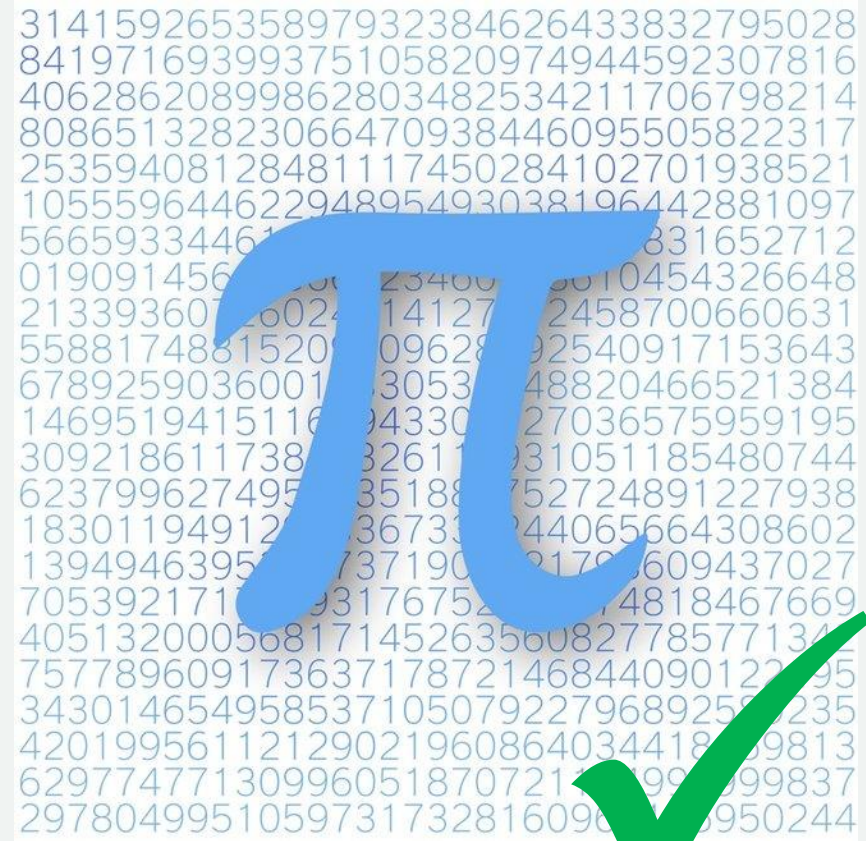
What was significant about  
March 14<sup>th</sup> ?

Specifically at 1.59 am?

# INTERNATIONAL PI DAY!



Did you know...!



That's right! It's the maths one!

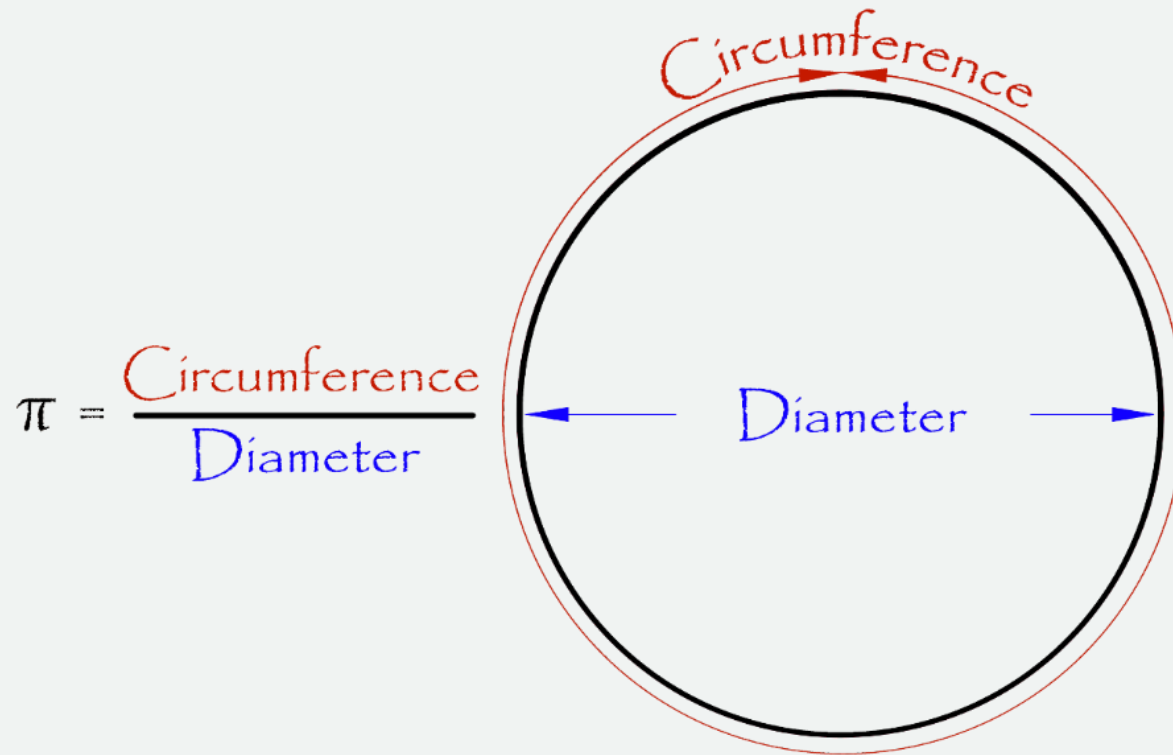
# WHAT IS PI?

- ~~• A sweet or savoury filled pastry case~~

*Nope, sorry, it's still  
the maths one!*

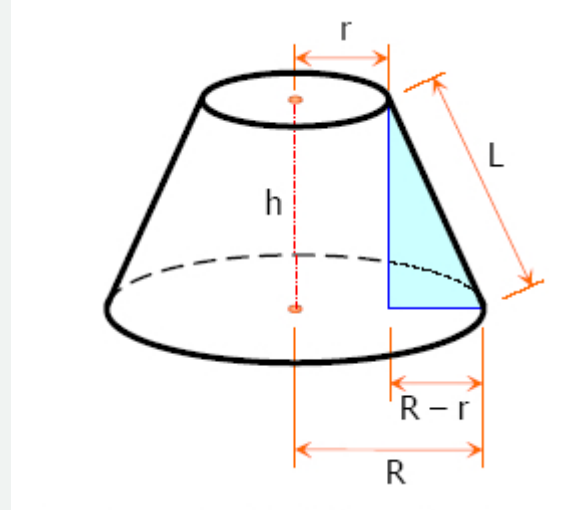
# WHAT IS PI?

- The ratio of a circle's diameter to its circumference



# WHY DO WE NEED PI?

- To calculate circular shapes:





# WHY DO WE NEED PI?

- Global positioning (GPS)
- Aircraft design
- Electronics
- Values seen in nature
- Principles in physics

## HOW MUCH PI DO YOU KNOW?

- It is an infinitely long number, and the best attempts to discover digits have, so far, worked it out to over 22.4 trillion decimal places!
- How many decimal places can you recite it to?

# PI – challenge!

▶ 3.14159 26535 89793 23846 26433 83279 50288 41971  
69399 37510 58209 74944 59230 78164 06286 20899  
86280 34825 34211 70679 82148 08651 32823 06647  
09384 46095 50582 23172 53594 08128 48111 74502  
84102 70193 85211 05559 64462 29489 54930 38196  
44288 10975 66593 34461 28475 64823 37867 83165  
27120 19091 45648 56692 34603 48610 45432 66482  
13393 60726 02491 41273 72458 70066...

# WHO DISCOVERED PI?

- The Ancient Egyptians are thought (by some) to have estimated it to  $\frac{22}{7}$
- Hindu scripture from around 400 BC estimates it at 3.139
- Archimedes in around 250BC used polygons to estimate circles
- Around 1AD Chinese had also calculated pi to a good accuracy
- Then eventually, in around 1400 AD, a method was discovered to find more and more decimal places.
- Later computers would carry out the task...

# THE EARLIEST MENTION OF PI IN THE BIBLE

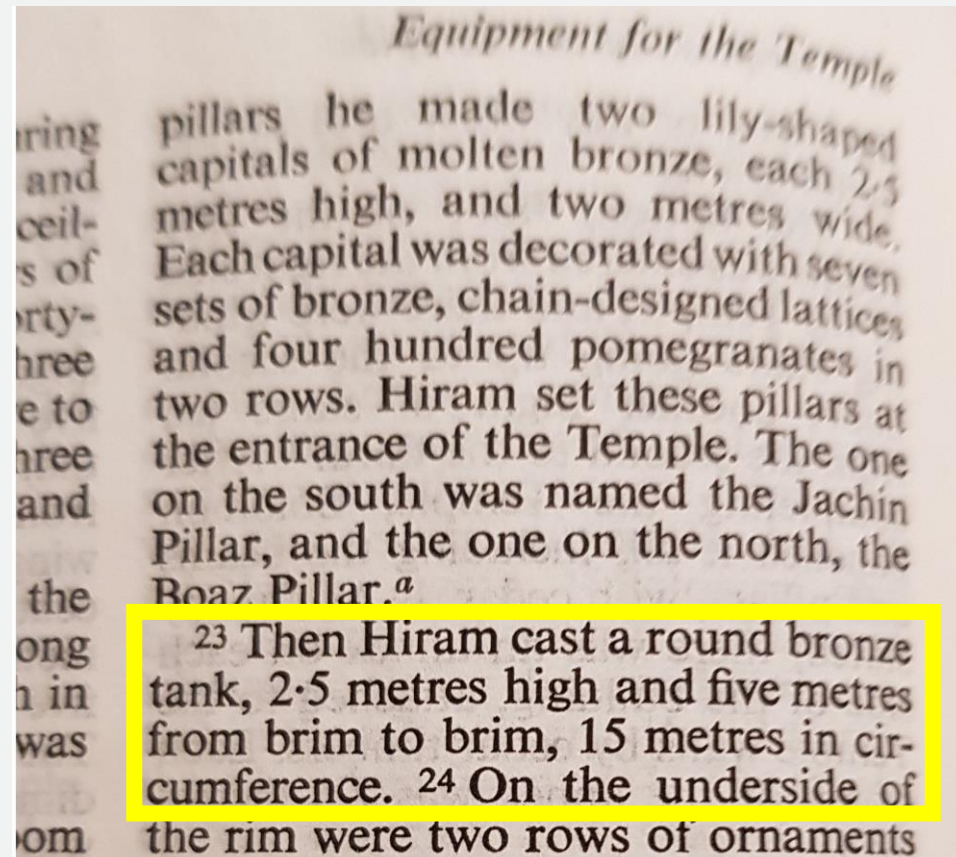
- 1 Kings: 23

- A value of 3...

5 metres brim to brim

x 3

= 15





**Mathematician**

**Teacher**

**Economist**

**Research  
scientist**

**Accountant**

**Actuary  
(risk management)**

**Software  
developer and  
computer  
programmer**

**Engineer**

WHAT  
JOBS  
COULD  
YOU DO  
WITH  
MATHS?

(from Indeed.com)

## Jobs directly related maths:

Acoustic consultant  
Actuarial analyst  
Actuary  
Astronomer  
Chartered accountant  
Chartered certified accountant  
Data analyst  
Data scientist  
Investment analyst  
Research scientist (maths)  
Secondary school teacher  
Software engineer  
Sound engineer  
Statistician

## Jobs where maths is very useful:

Academic researcher  
CAD technician  
Financial manager  
Financial trader  
Game designer  
Insurance underwriter  
Machine learning engineer  
Management consultant  
Meteorologist  
Operational researcher  
Private tutor  
Quantity surveyor  
Radiation protection practitioner  
Software tester

# ENGINEERING...



What do you do  
in engineering?

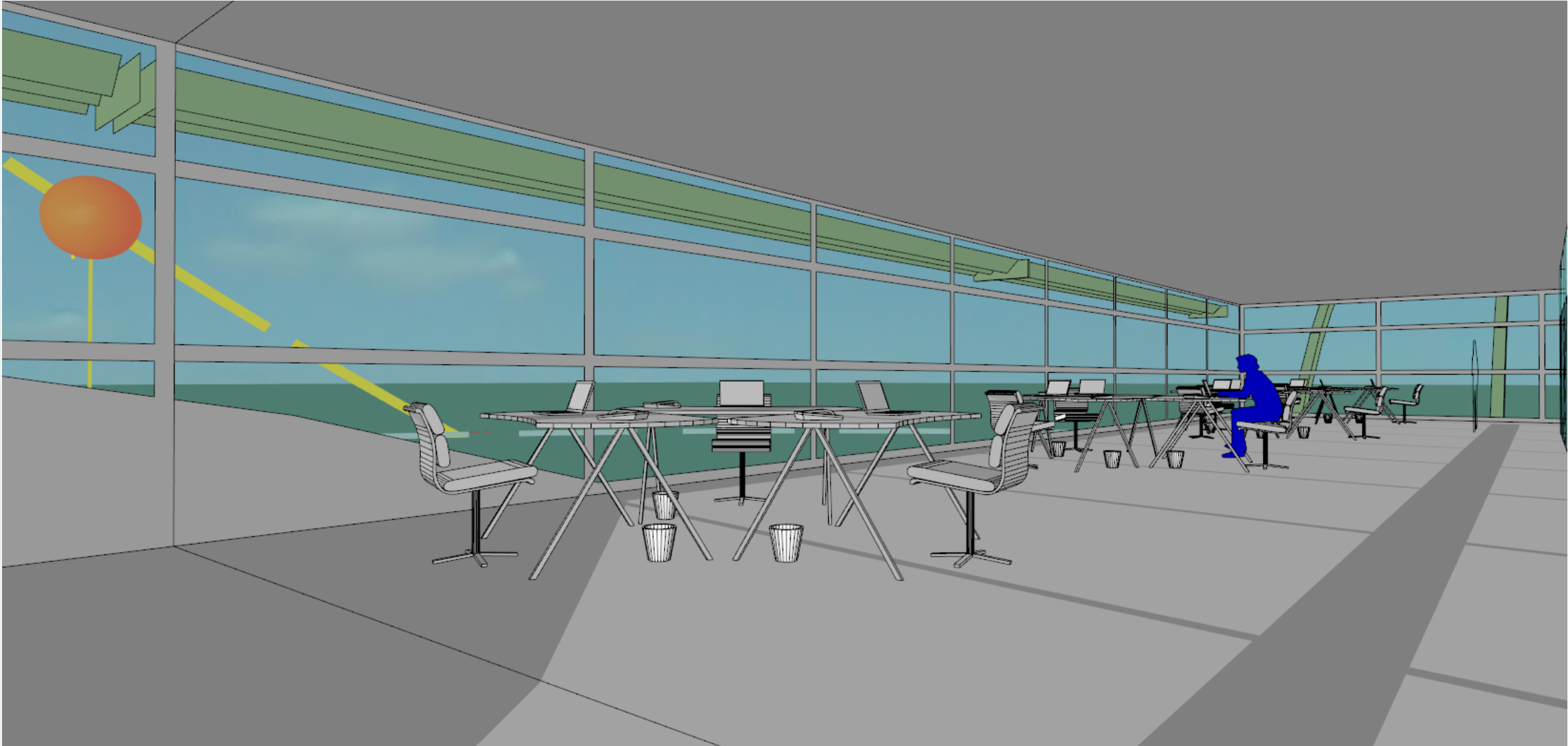


# ENGINEERING IN BUILT ENVIRONMENT

Images from IESVE.COM

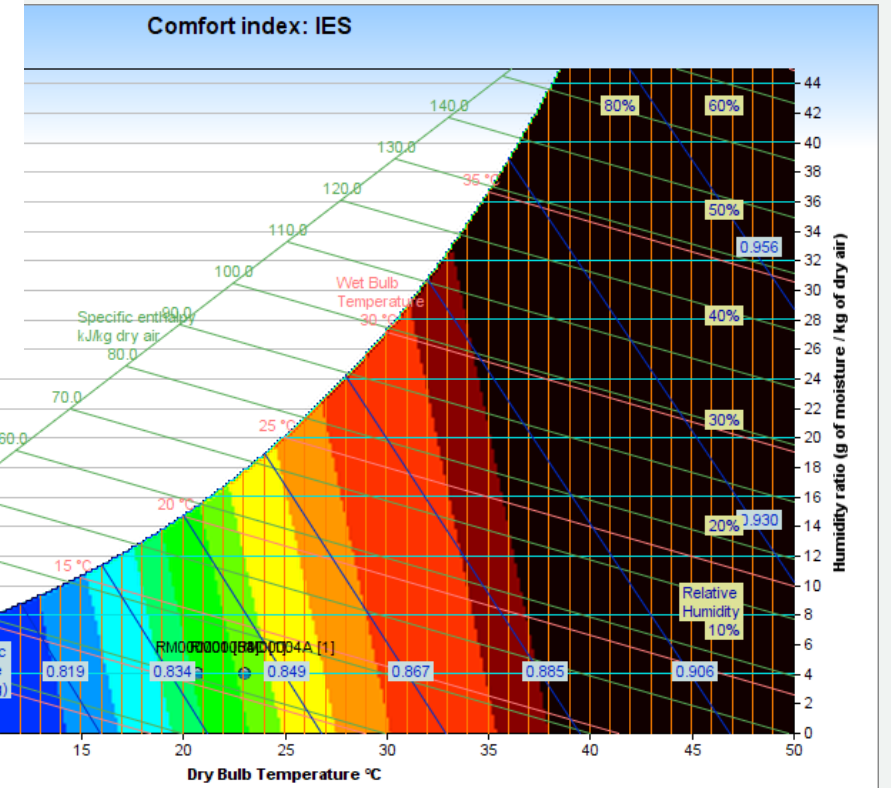


# ARCHITECTURAL ENGINEERING

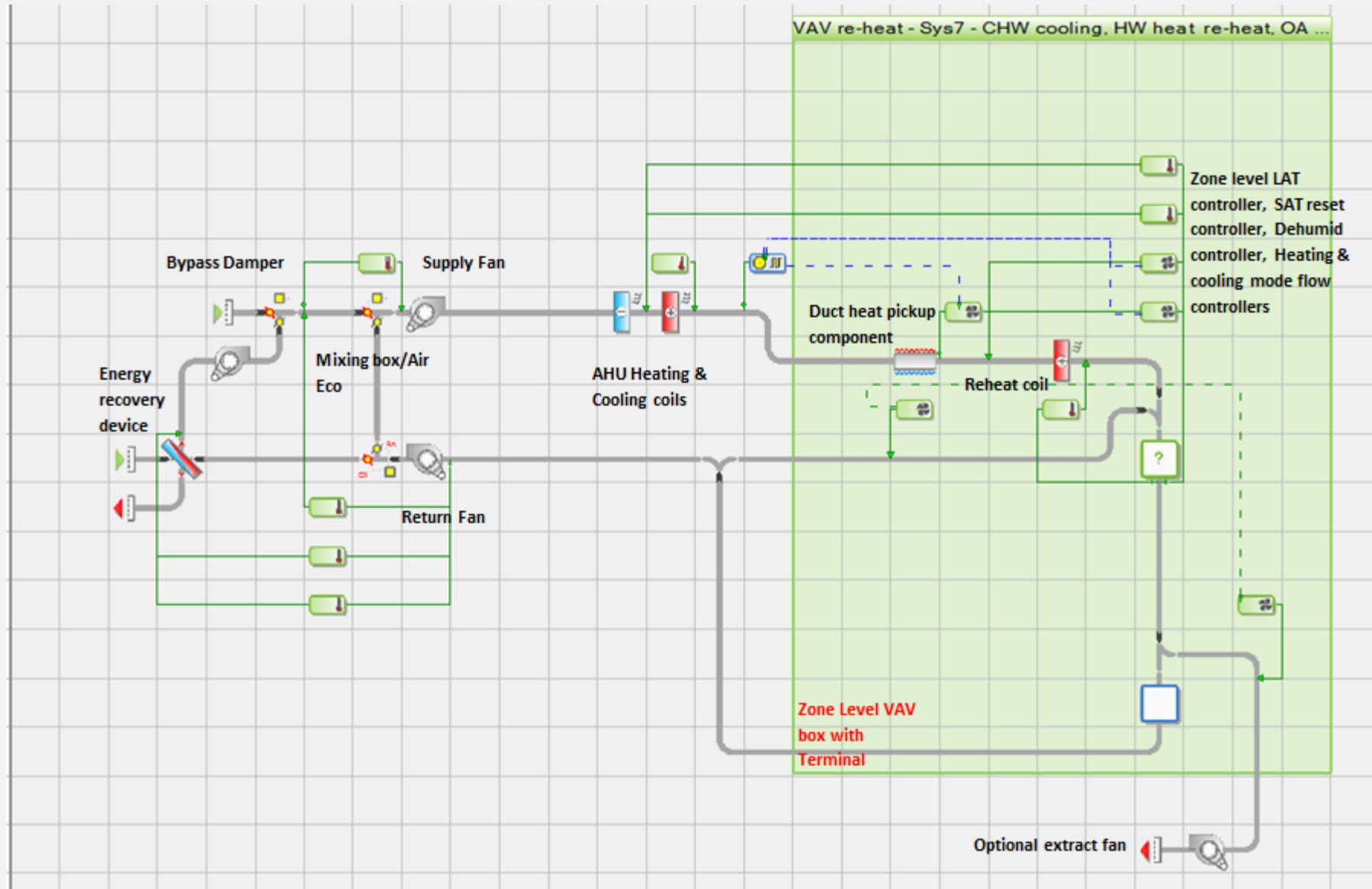


# MECHANICAL ENGINEERING

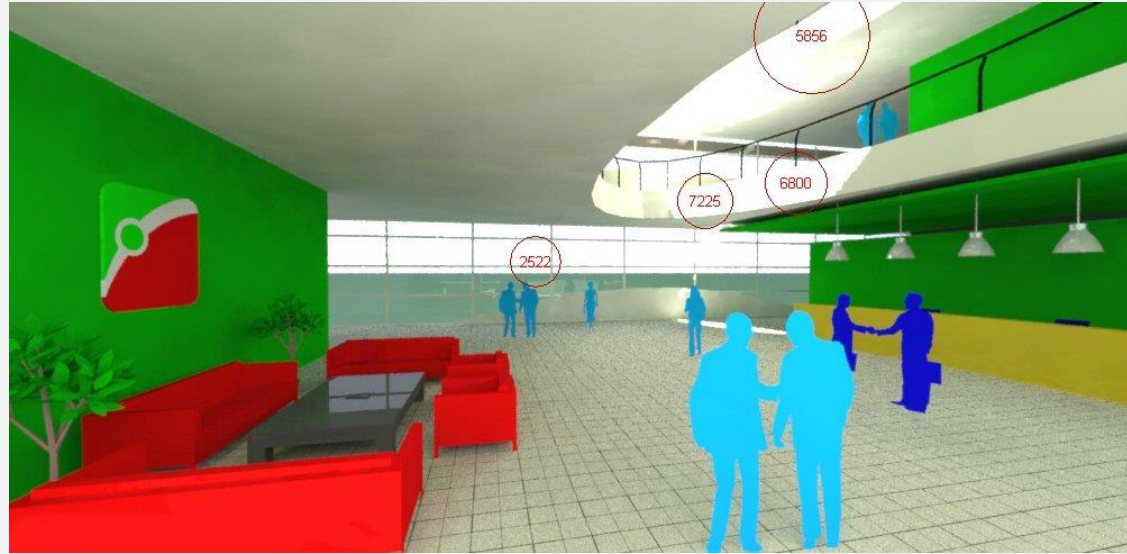
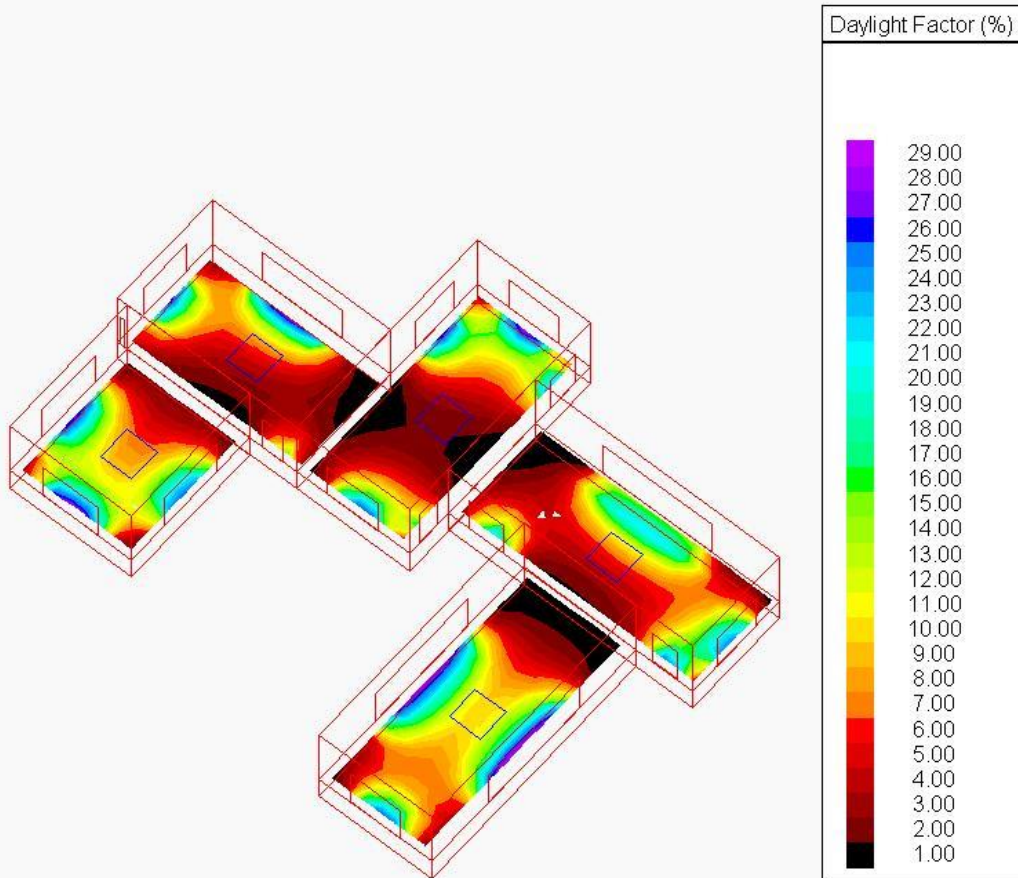
Heating plant sensible load



# MECHANICAL ENGINEERING

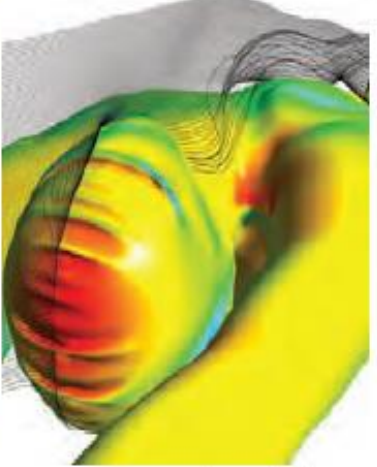
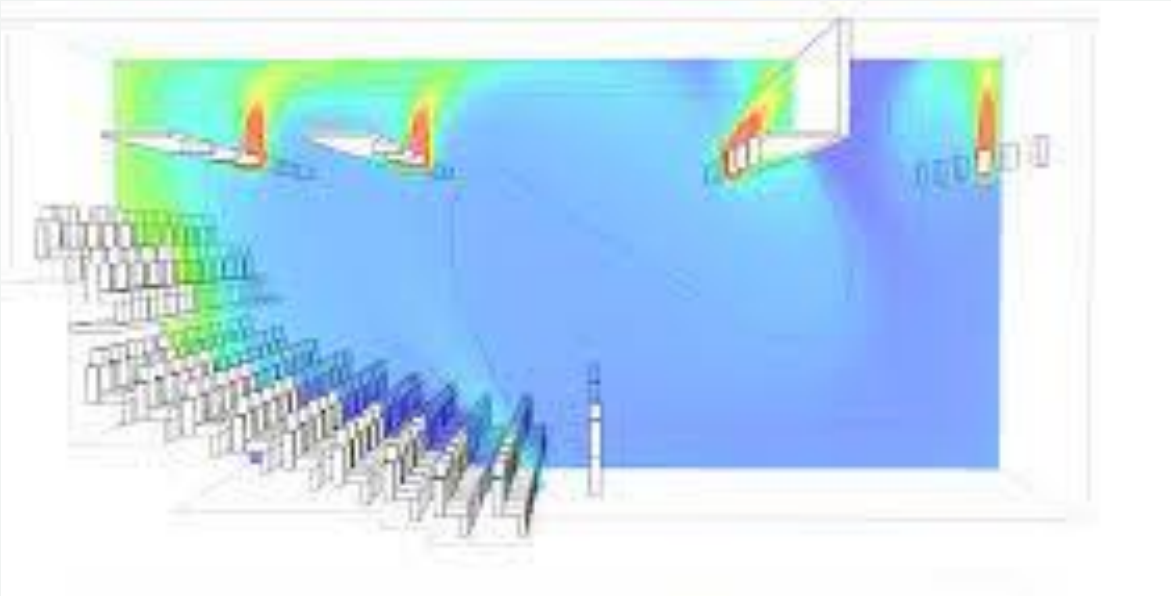
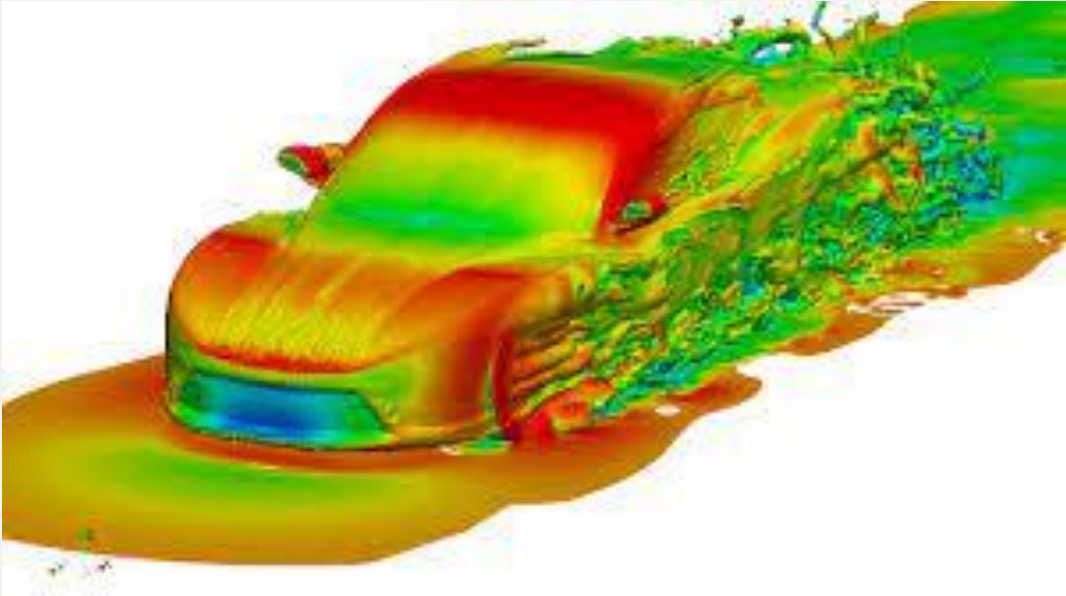


# ARCHITECTURAL ENGINEERING



Rendering links to many other careers in Design

# COMPUTATIONAL FLUID DYNAMICS



Images courtesy Speedo Inc.

# WHY IS NUMERACY IMPORTANT?

- **"Good numeracy is the best protection against unemployment, low wages and poor health."**
- **Andreas Schleicher OECD**
- We use maths in every aspect of our lives at work and in practical everyday activities at home and beyond. We use maths when we go shopping or plan a holiday, decide on a mortgage or decorate a room. Good numeracy is essential to us as parents helping our children learn, as patients understanding health information, as citizens making sense of statistics and economic news. Decisions in life are so often based on numerical information; to make the best choices, we need to be numerate.



$$a^2 + b^2 = c^2$$

What if we change  
the 2 to 3?

Are there any  
solutions?



It may look  
simple...

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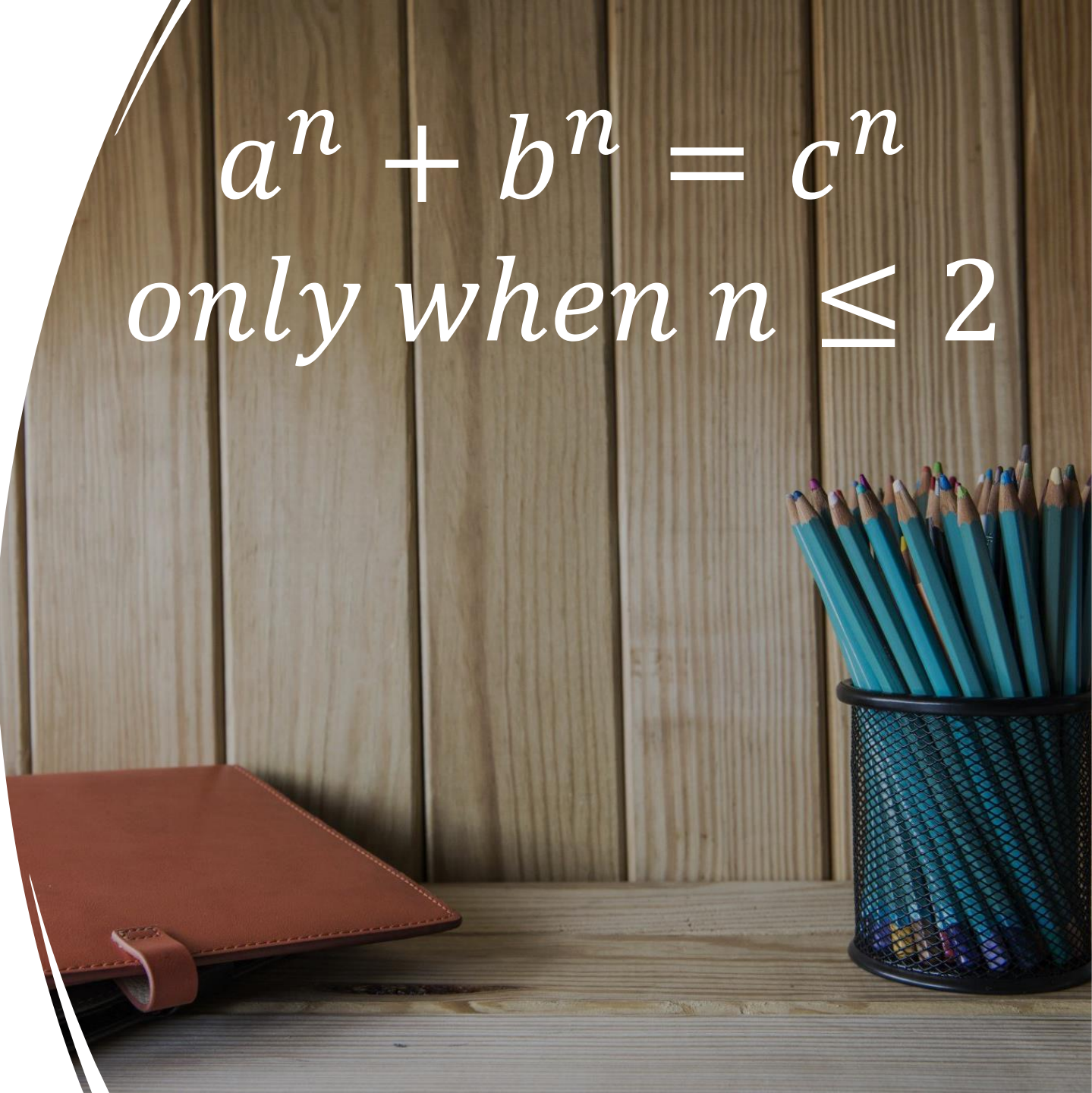
It took mathematicians a long time to work this out, despite it looking like a simple problem.

The solution involved new branches of mathematics being created to establish whether **elliptical equations** can be presented as **modular forms**.

The Taniyama–Shimura–Weil conjecture was subsequently proved and so determined whether this was a true statement!


$$a^n + b^n = c^n$$

*only when  $n \leq 2$*



Who would  
like  
\$1,000,000?





Spot the pattern  
for a chance to  
win...  
(You'll need  
some very good  
maths skills!)