LENGTH, AREA, VOLUME

- PERIMETER IS THE TOTAL LENGTH OF THE OUTER SIDES OF THE SHAPE.
- AREA THE AMOUNT OF FLAT SPACE [2D] THAT THE SHAPE TAKES UP
- VOLUME THE AMOUNT OF SPACE [3D] THE OBJECT TAKES UP.

READ THE QUESTION CAREFULLY. MAKE SURE YOU'RE DOING THE RIGHT ONE.

FORMULAS / TABLES BOOK

- FOR THE VAST MAJORITY OF QUESTIONS, YOU WILL BE ASKED ABOUT A SHAPE WHICH IS IN THE TABLES BOOK.
  1. LOOK UP THE FORMULA
  2. WRITE IT DOWN
  3. FILL IN THE BITS THAT YOU KNOW.
- SOMETIMES A QUESTION NEEDS YOU TO "WORK BACKWARDS". FOR EXAMPLE, THEY MIGHT TELL YOU THE VOLUME OF A CONE AND THE RADIUS, AND ASK YOU TO CALCULATE THE HEIGHT.
- USE THE SAME METHOD AS ABOVE - THEN SOLVE YOUR EQUATION.

YOU NEED TO KNOW (NOT IN TABLES BOOK)

RECTANGLE / SQUARE :

AREA = LENGTH × WIDTH

PERIMETER = ADD UP ALL THE SIDES.

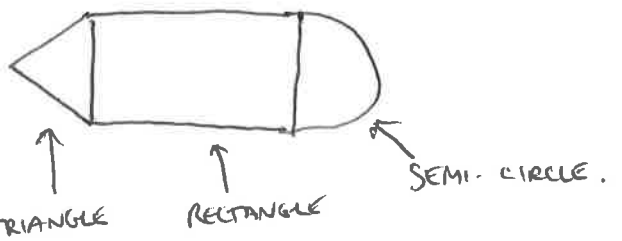
CUBE / RECTANGULAR SOLID (CUBOID) :

VOLUME = L × B × H

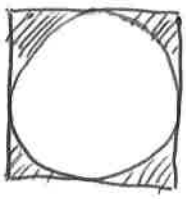
Length × Breadth (WIDTH) × Height

- IF THEY GIVE YOU A COMPLICATED-LOOKING SHAPE, BREAK IT UP INTO PARTS WHICH WE DO RECOGNISE :

eg



- THEY OFTEN ASK FOR THE AREA OF "PART" OF THE SHAPE (THE SHADED PART) eg



(1) CALCULATE THE TOTAL AREA [SQUARE]

(2) CALCULATE THE NON-SHADED AREA [CIRCLE]

(3) SUBTRACT

CIRCULAR SHAPES

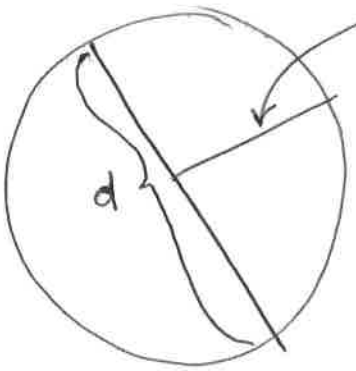
- MOST OF THE FORMULAS HAVE THE SYMBOL π (PI) IN THEM.

PI : $\pi = \frac{\text{CIRCUMFERENCE}}{\text{DIAMETER}}$

- "IN TERMS OF π" – THIS MEANS YOUR ANSWER WILL CONTAIN π eg 11π

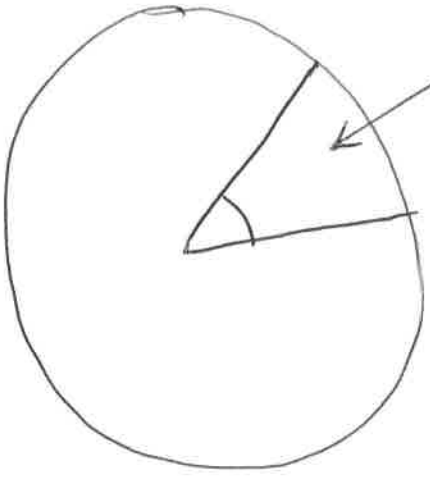
↓

DO THIS AS NORMAL, BUT DON'T SUBSTITUTE ANYTHING INTO YOUR FORMULA FOR π



d = DIAMETER

A SECTOR [LIKE A PIZZA SLICE]



WORD PROBLEMS

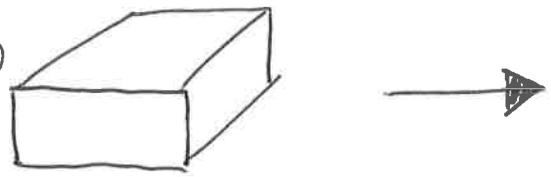
- READ THE PROBLEM CAREFULLY. (HIGHLIGHT IMPORTANT WORDS)
- IF THERE ISN'T ALREADY A PICTURE, DRAW IT.
- MARK ON THE DIAGRAM THE "THING" YOU'RE TRYING TO CALCULATE
- IF NECESSARY, BREAK UP THE SHAPE INTO SMALLER SHAPES.
- DO YOUR CALCULATIONS
- CHECK THAT YOUR ANSWER MAKES SENSE.

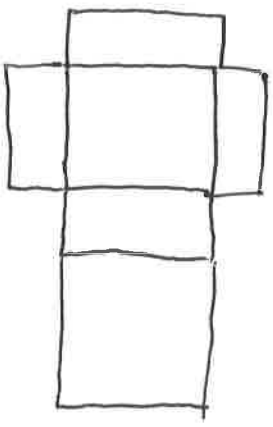
NETS

3D → 2D
OR
2D → 3D.

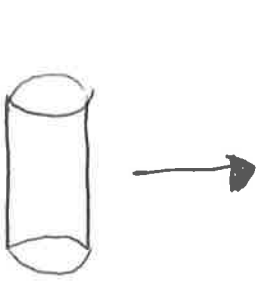
WE CAN CUT ALONG THE SIDES OF A 3D SHAPE - NOT ALL THE WAY, BECAUSE WE WANT IT TO STAY JOINED UP - THIS MAKES A "NET" OF THE 3D SHAPE. IT CAN THEN BE EASIER TO CALCULATE THINGS LIKE "SURFACE AREA"

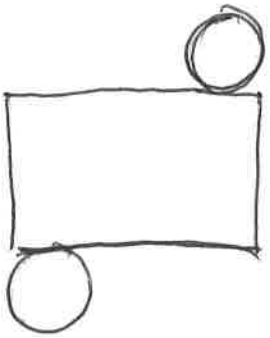
eg ①





②

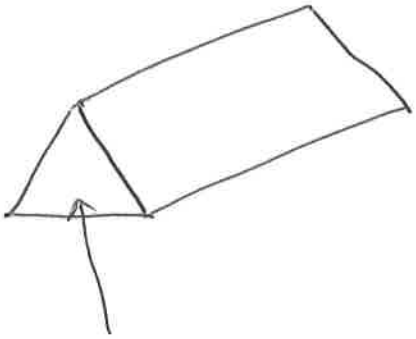




PRISMS

3D SHAPE WITH THE SAME "SHAPE" ALL THE WAY ALONG.

eg



eg A TOBLERONE BOX

THE BIT AT THE FRONT IS CALLED THE "CROSS-SECTION" (IF YOU CUT "ACROSS" IT, IT WILL BE THE SAME ALL THE WAY ALONG)

VOLUME OF A PRISM

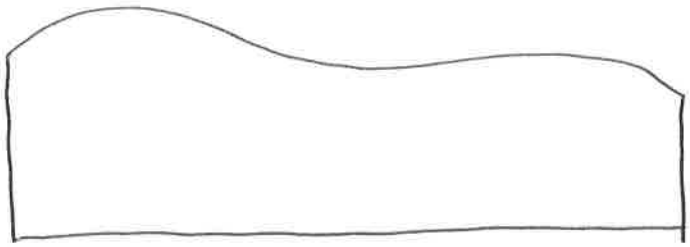
= AREA OF CROSS-SECTION × LENGTH

THIS IS NOT IN THE FORMULAS / TABLES BOOK. (WELL IT IS, BUT IT LOOKS COMPLICATED THERE)

- SO, WORK OUT AREA OF THE "FRONT"
- MULTIPLY THIS BY THE LENGTH

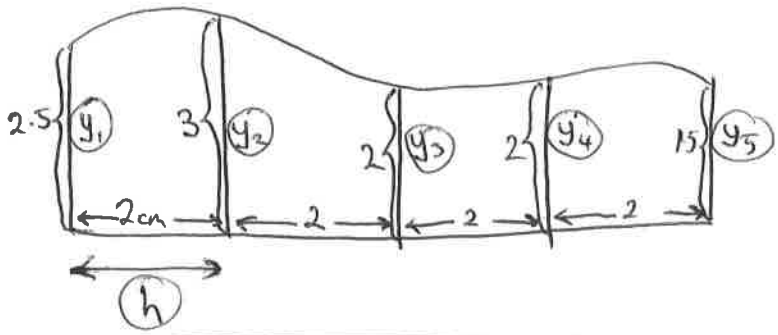
TRAPEZOIDAL RULE [FOR IRREGULAR SHAPES]

eg



STEP 1 SPLIT THE SHAPE INTO STRIPS OF EQUAL LENGTH/WIDTH

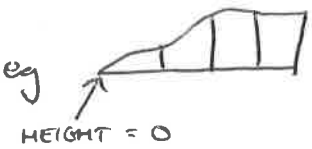
[FOR SOME REASON, WE USE THE LETTER h]



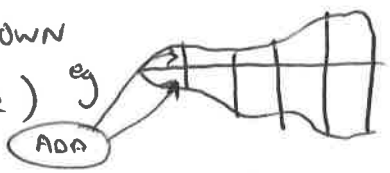
STEP 2 MEASURE EACH "HEIGHT" - [WE USE THE LETTER y]

BE CAREFUL. 2 PROBLEMS

① • HEIGHT COULD BE ZERO. eg



② HEIGHT COULD BE UP + DOWN (ADD TWO HEIGHTS TOGETHER) eg



STEP 3 FORMULA : $\frac{h}{2}\left[y_1 + y_n + 2\left(y_2 + y_3 + \cdots y_{n-1}\right)\right]$

• SUBSTITUTE THE VALUES FROM YOUR PICTURE

↑ THAT'S HOW IT LOOKS IN THE TABLES BOOK.

$$\text{AREA} = \frac{\text{WIDTH}}{2}\left[\text{FIRST} + \text{LAST} + 2(\text{OTHERS})\right]$$

← THIS IS EASIER