

Example

Alex is making a shelving unit to store their books. They make a design which requires the following pieces of wood.

Piece of wood	Length (metres)
A	1.85
B	1.85
C	1.20
D	1.20
E	0.85
F	0.85
G	0.75
H	0.55
I	0.55
J	0.35
K	0.35

Each piece has to be cut to the exact length for the unit to fit together.

The wood Alex is using comes in planks 2.4 metres long.

Task One

Kali, Alex's friend, writes down 10.35 divided by 2.4 equals 4.3125.

Kali tells Alex they will need four planks of wood.

Explain why Kali did this calculation.

Do you agree with Kali that 4 planks of wood will be needed?

Solution

Total length of pieces required is 10.35 metres

10.35 divided by 2.4 as each piece of wood is 2.4 metres long.

This gives an answer of 4.3125 indicating that four planks of wood will not be enough. More than four pieces are required. Five pieces may be enough, but we do not know until we have worked out what lengths can be cut from each piece of wood. Because of the lengths required it may be necessary to have more than five pieces.

Task Two

Show how Alex might cut each 2.4 metre length into the required lengths.

Solution

				Length remaining
Plank 1	A	H		0.0m
Plank 2	B	I		0.0m
Plank 3	C	D		0.0m
Plank 4	E	F	J K	0.0m
Plank 5	G			1.65m

Piece 1
A (1.85) and H (0.55)
Total 2.4 metres

Piece 2
B (1.85) and I (0.55)
Total 2.4 metres

Piece 3
C (1.2) and D (1.2)
Total 2.4 metres

Piece 4
E (0.85) and F (0.85) and J (0.35) and K (0.35)
Total 2.4 metres

Piece 5
5 G (0.75)
Total 0.75 metres

Comment upon your answer. In theory your solution is correct. Why might your solution not be suitable in practice?

As the lengths of wood have to be exact the solution will not work as the wood lost in the cutting of the wood has to be accounted for. If not, the shelves will be too short. To be sure that all the pieces can be cut to the exact length it would be sensible to ensure a little spare wood for each length of wood.

Task Three

Produce another solution which takes into account the additional information provided

Possible solution to ensure exact lengths can be cut allowing for 5mm lost to cutting.

Piece 1

A (1.85) and J (0.35)

total 2.2 metres

Piece 2

B (1.85) and K (0.35)

total 2.2 metres

Piece 3

C (1.2) and E (0.85)

total 2.05 metres

Piece 4

D (1.2) and F (0.85)

total 2.05 metres

Piece 5

G (0.75) and H (0.55) and I (0.55)

total 1.85 metres

	Length remaining			
Plank 1	A	J		0.2m
Plank 2	B	K		0.2m
Plank 3	C	E		0.35m
Plank 4	D	F		0.35m
Plank 5	G	H	I	0.55m