HEDLAND SENIOR HIGH SCHOOL

MATHEMATICS DEPARTMENT

Course: Essential Maths
Task 3

Practical Application – Charlie Splinter

Student Name _____

Teacher Name: _____

Structure of this Task

Section	Number of questions available	Number of questions to be answered	Working time (minutes)	Weighting	Marks available
Calculator Allowed	10	10	3 hours class time and homework. Due Thursday 28th May	7.5%	50
			Mark		/ 50

Conditions:
- All working out and solutions need to be provided on lined A4 paper, graph paper will be supplied.

- Show all working out clearly as marks are awarded for reasoning. **For questions worth more than two marks valid working or justification is required to receive full marks.**

- Senior assessment policy applies.

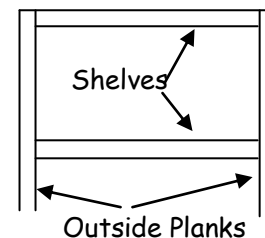# Mathematics Essential inv 2 Unit 1 Cabinet Making Business Project

Total   50

Charlie Splinter runs a one person Cabinet Making Business. During quiet times when she is not building custom-made kitchens or furniture to order, she manufactures, among other things, pine bookcases.

50 marks

These bookshelves are 1830mm high, 920mm wide and 303mm deep. The last 3mm of the depth is the 3 ply (a particular thickness of plywood) covering the back of each bookcase – known as a unit. The plywood is 1830mm x 920mm x 3mm.

The shelves – there are five plus a "top" shelf – are wedged between the two outside planks ie.
20mm thick timber is used for the shelves and the outside planks.

The distance from the top of the bookcase (the top shelf) to the top of the first shelf is 330mm.
The distance from the top of the first shelf to the top of the second shelf is 330mm.
From the top of the second shelf to the top of the third   shelf is 330mm.
From the top of the third   shelf to the top of the fourth shelf is 410mm.
From the top of the fourth shelf to the top of the fifth   shelf is 410mm.
From the top of the fifth   shelf to the top of the floor   shelf is 20mm.

1.   a) Draw a scale diagram front view of the bookcase, use scale 1:10.
         b) Draw a diagram showing each shape of wood to be used, giving the
         dimensions and how many of each are necessary.   (13 Marks)

2.   Calculate a) the total length of pine planking 300mm wide used per unit
                 (ie per bookcase.)
                 b) the area of 3 ply used per unit.   (6 Marks)

         The making of each unit involves the cutting of the dressed timber, glueing
         the pine pieces together, screwing them together, tacking the back (the 3
         ply) onto the unit and then spray painting 3 coats of clear satin finish
         (paint) to finish it.

3.　　　　Draw a flow chart of the process.　　　　　　　　　(3 Marks)

Charlie buys pine boards in 3 metre lengths. These lengths are 300mm wide and 20mm thick so she merely needs to cut necessary lengths. Each 3m length costs $42.90.

4.　　　　Calculate a) How many 3m lengths are needed to make three units.
　　　　　　　　　　b) The total wastage on these lengths.
　　　　　　　　　　c) The cost of the pine for one unit.　　　　　(7 Marks)

Charlie is able to buy the 3 ply already cut to size – 1830mm x 920mm x 3mm – for $11.45 each.

When painting the units, she uses 250ml paint @ $30/L and 250ml of thinners @ $17/L per unit.

Each unit uses 200ml of wood glue which cost $15/L. 24 woodscrews are needed per unit. They cost $4.50 for 100. 24 tacks are used @ $12 per 1000.

5.　　　　Find the total cost of materials – including the wood – for one unit. Note: to allow for wastage for the tacks, round to the nearest 5 cents. (5 Marks)

Charlie can mark out and cut up sufficient pine for three units in one hour. It takes her one hour to glue and screw the pine in place on one unit and 10 minutes to tack the backboard on. Spraying 4 units non – stop (allowing other 3 to dry as she sprays another coat per unit) with 3 coats of paint takes 3 hours.

6.　　　　What is the total time taken to build one unit?　　　　(4 Marks)

She charges $50/hr for labour. This covers the overheads incurred in running the business.

7.　　　　How much is the labour cost per unit?　　　　　　　(2 Marks)

Charlie then adds 15% markup for profit after adding the cost of the labour to the cost of the materials.

8.　　　　How much does she charge for each bookcase (round up to the nearest dollar?)　　　　　　　　　　　　　　　　　　　(3 Marks)

A large furniture store (George's Emporium) finds it sells a lot of these

bookcases and so it places an order for 40 to be delivered within 12 working days.

Charlie usually works from 7.30am to 4.00pm Monday to Friday with a 25 minute break at 9.30am, a 45 minute lunch break at 11.15am and a 20 minute tea break at 1.30pm.

9.   Can Charlie complete the bookcases within the time without working overtime? If not, how many hours overtime will she have to work?

(5 Marks)

10.   After deducting the cost of materials and labour, how much profit will Charlie make on the order?   (2 Marks)

<u>Total</u>   <u>(50 Marks)</u>