1. Definitions: make sure you know the terms for radius, diameter, area, volume, rim speed ect.
2. How much will it cost to put hardwood flooring in a room that is 12ft x 16’-8” when the flooring cost $4.50/sqft?



1. + =
2. ÷ =
3. ÷ =
4. Convert 625mm to m
5. Convert 55cm to m
6. Divide $275.00 between two people at a ratio of 3:4
7. What is the optimum rim speed for most woodworking cutterheads?
8. What is the diameter of a pulley if it revolves at 345 rpm if it is driven by a 5” pulley running at 1,035 rpm?
9. If a motor (3600 rpm) with a 6” pulley drives an arbor at 7200 rpm. What is the diameter of the driven pulley?
10. What is the rim speed of a 3” cutterhead running at 9000 rpm?
11. What length of bandsaw blade is needed if the 2 wheel bandsaw has 18” dia. Wheels and a center to center measurement of 52”?
12. What length of sanding belt is needed if the edge sander has a 8” dia. Driving wheel and 3” dia. Idle wheel, the center to center measurement is 72”?
13. What is the length of a rafter if the width of a building is 28ft and the height of the roof is 14’?
14. How many sheets of 12mm thick sheets are in a lift that is 3.12m high?
15. If 1 inch = 25.4mm, what does 15.875mm equal?
16. Calculate the total glue requirements for a veneered panel run for the following:

Quantity: 38 pcs of 5 ply panels finished size: 24” x 24”

Glue ratio: 2:1 (resin: water) Coverage: 20 g /sqft

Waste: 10%

Calculate:

1. total sqft to cover
2. Total grams of glue with waste
3. Total grams of resin
4. Total grams of water
5. Calculate the board footage for the following:

241 boards 42” x 6-1/2” x 4/4

1. Calculate the cost of the following:

25 – 3ply panels (consisting of)

1. Core 11/16” pb 20” x 18” 20% waste $0.45/sf
2. Face veneer 20” x 18” 100%waste $0.85/sf
3. Back veneer 20” x 18” 100%waste $0.35/sf
4. Headers 26” x 2-1/2” 60% waste $2.85/bf

**Answer Key**

1. See Power points for Definitions.
2. 12’ x 16.67’ (8”/12=.67) = 200.04 x $4.50 = **$900.18**
3. ½ + 15/32 = (find the common denominator) 16/32 + 15/32 = **31/32**
4. 2/3 ÷ ¾ = (reciprocal then multiply) 2/3 x 4/3 = **8/9**
5. ¾ ÷ 1/5 = (reciprocal then multiply) ¾ x 5/1 = 15/4 = (reduce) **3-3/4**
6. 625 mm to m (1000mm in 1 m) = 625÷ 1000 = **.625 m**
7. 55 cm to m (100cm in 1 m) = 55 ÷ 100 = **.55 m**
8. $275 at a ratio 3:4. Add the total # of parts (3+4=7), divide the $275 by the total # of parts to get 1 part = $275 ÷ 7 = $39.2857 per part. Now multiply 1 part against the ratio values. **3 parts x $39.2857 per part = $117.86,** **4 parts x $39.2857 per part = $157.14**
9. **14,000 lfm**
10. Pulley ratio = drive/driven, 1035/345 = 3. Since the arbor is slowing down, the driven pulley is (pulley ratio) 3 x’s larger than the drive. **3x 5” = 15” pulley on the arbor.**
11. Pulley ratio = drive/driven, 3600÷7200 = 0.5. Since the arbor is speeding up, the driven pulley is smaller than the drive by a factor of 0.5. **Therefore 0.5 (pulley factor) x 6” drive pulley = 3” driven pulley.**
12. Rim speed = x rpm

= x 9000

= **7068.5834715 rpm**

1. Bandsaw blade length = (xd) + (2 x center to center)

= ( x 18) + (2 x 52)

= (56.55) + (104)

= **160.5486678”**

1. Sanding belt length = () +( ) + (2 x cntr to cntr)

= () + ( ) + (2 x 72)

= (12.56637061) + (4.71238898) + (144)

= **161.2787596”**

1. 

Total width of building is 28’ – divide in half to form 2 right angle triangles

Total Width

28’

Half width

14’

Height

Rafter length?

C²= A² + B²

C² = (14²) + (14²)

C² = (196) + (196)

C² = 392

C = square root of 392

**C = 19.79898987’**

1. 3.12m = convert to mm (x 1000) = 3120mm

3120mm ÷ 12mm = **260 sheets**

1. 1” = 25.4mm (15.875mm ÷ 25.4mm = 0.625”) =5/8”
2. 38 pcs – 5 ply panels, finished size (24” x 24”) rough size (25” x 25”)

Glue ratio 2:1 (resin: water), covrage 20g/ sqft, waste 10%

1. Find the sqft of 1 glue line

25” ÷ 12 = 2.083333333’ (change to decimal feet)

2.083333333’ x 2.083333333’ = **4.340277778 sqft for 1 glue line**

1. Find the total sqft for all glue lines in 1 panel.

4.340277778 sqft x 4 glue lines per panel = **17.36111111 sqft**

1. Find the total sqft of glue lines for all panels

17.36111111 sqft x 38 panels = **659.7222222 sqft**

1. Find the amount of glue required in grams

659.7222222sqft x 20g/sqft (coverage) = **13194.44444g**

1. Add the waste

13194.44444g + 10% = **14513.88889g**

1. Divide by the total number of parts (2+1 = 3) to find the weight of 1 part.

14513.88889g ÷ 3 = **4837.962963g per part**

1. Now multiply the single part weight times the number of parts per ingredient

**Resin** = 2 parts x 4837.962963g/part = **9675.925926g**

**Water** = 1 part x 4837.962963g/part = **4837.962963g**

1. Bdft of 1 board =

Bdft of 1 board =

Bdft of 1 board = 1.895833333

Since there are 241 boards - 1.895833333 x 241 = **456.8958333 bdft**

1. 25 – 3 ply panels
2. Core 20” x 18”

Convert to decimal foot - 1.6666667’ x 1.5’ = 2.5 sqft

Add waste – 2.5 sqft + 20% = 3 sqft

Add cost of material – 3 sqft x $0.45/ sqft = **$1.35**

1. Face veneer 20” x 18”

Convert to decimal foot - 1.6666667’ x 1.5’ = 2.5 sqft

Add waste – 2.5 sqft + 100% = 5 sqft

Add cost of material – 5 sqft x $0.85/ sqft = **$4.25**

1. Back veneer 20” x 18”

Convert to decimal foot - 1.6666667’ x 1.5’ = 2.5 sqft

Add waste – 2.5 sqft + 100% = 5 sqft

Add cost of material – 5 sqft x $0.35/ sqft = **$1.75**

1. Headers (4) 26” x 2-1/2”

Bdft of 1 board =

Bdft of 1 board = 0.451388888 bdft

Add waste – 0.451388888 bdft + 60% = 0.722222222 bdft for 1 header.

*4 headers per panel, therefore* 4 x 0.722222222 bdft = 2.888888889 bdft total for all 4 headers.

Add the cost. 2.888888889 bdft x $2.85/ bdft = **$8.23**

Now add up the total cost for 1 panel

Core = $1.35

Face veneer = $4.25

Back veneer = $1.75

4 headers = $8.23

Total for 1 panel = $15.58 each

X’s number of panels x25

**Total cost = $389.50**