Wood Manufacturing & Finishing
Ratio & Proportion

Phase 6

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Proportions

- If we were mixing paint in the ratio 3:1

  (3 parts blue paint to 1 part white paint)

  means 3 + 1 = 4 parts in all.

- If we wanted to increase the amount of paint we needed we would need to increase the proportions say doubling it to 6:2.
- The ratio of the coloured paints would still be the same.

  (6 parts blue paint to 2 part white paint)

  means 6 + 2 = 8 parts in all.

Simplifying Ratios

- We can make the numbers in ratios smaller so that they are easier to compare by dividing each side of the ratio by the same number, the highest common factor.
- **Example:**
  In a garden the ratio of trees to shrubs is 12:18
- Both 12 and 18 can be divided by 2. so 6:9
- To make the ratio simpler again, we can divide both 6 and 9 by 3 making it 2:3
- So a simplest way of saying 12:18 is **2:3**.

Simplifying Ratios

- **Units**
- Always check that the things you are comparing are measured in the **same units.**
- 75 cents to €2 would be 0.75 : 2
- So common denominator would be 0.25
- Ratio 3 : 8

Ratios & Proportions Example 1 (Niall D)

- **Example 1:** A builder estimates that for every € 1.00 he spends on materials he needs € 1.25 for labour and € 0.50 for overheads.
- On a job costing a total of € 11,000 what will be the cost of
  (a) overheads (b) labour
  - *(Firstly bring them all to full numbers for dividing out)*
  - 100 : 125 : 50 = 275 parts divided equally and proportionally in total.

  (*100 parts materials : 125 parts labour : 50 parts overheads)*
  - ***(Total amount to be divided)*** **€11,000**
  - ***(Total number of equal parts)*** **275 = € 40 each part**
- **Answer (a) Overheads = 50 parts @ €40 = € 2,000**
  (b) Labour = 125 parts @ €40 = € 5,000

Ratios & Proportions Example 2

- **Example 2:** A builder estimates that for every € 1.00 he spends on materials he needs € 1.25 for labour and € 0.50 for overheads.
- On a job costing a total of € 11,000 what will be the cost of
  (a) overheads (b) labour
- *(Firstly find the common denominator)*
- 1.00 : 1.25 : 0.50 = 4 : 5 : 2 = 11 parts divided proportionally.
- 0.25
  4 parts materials : 5 parts labour : 2 parts overheads
- €11000 ÷ 11 = 1000 1000 x 2 = 2000
- Overhead = 2 parts = €2000
- €11000 ÷ 11 = 1000 1000 x 5 = 5000
- labour = 5 parts = €5000

Ratios & Proportions Example 3

- **Example 2:** A builder estimates that for every € 1.00 he spends on materials he needs € 1.25 for labour and € 0.50 for overheads.
- On a job costing a total of € 11,000 what will be the cost of
  (a) overheads (b) labour
- *(Firstly add up all the numbers)*
- 1.00 : 1.25 : 0.50 = 2.75
- €11000 ÷ 2.75 = 4000
- *1.00 parts materials : 1.25 parts labour : 0.50 parts overheads*
- Materials = 4000 x 1.00 = 4000
- Labour = 4000 x 1.25 = 5000
- Overhead = 4000 x 0.50 = 2000
  Total €11,000

Ratios & Proportions Question 1

- Q.1. A builder estimates that for every € 1.00 he spends on materials he needs € 1.20 for labour and € 0.40 for overheads. On a job costing a total of € 26,000 what is the amount of
  (a) overheads (b) labour
- *(Firstly find the common denominator)*
- **Answer:**
- $\underline{1.00 \;\; 1.20 \;\; 0.40}$ = 5 : 6 : 2 = 13 parts
  0.20
- 1 part €26000 ÷ 13 = 2000
- Overheads 2 parts 2000 x 2 = €4000
- Labour = 6 parts 2000 x 6 = €12000

Ratios & Proportions Question 2

- Q.2. A builder estimates that for every € 1.25 he spends on materials he needs € 2.00 for labour and € 0.75 for overheads. On a job costing a total of € 120,000 what is the amount of
  (a) overheads (b) labour (c) materials
- *(Firstly find the common denominator)*
- **Answer:**
- $\underline{2.00 \quad 1.25 \quad 0.75}$ = 8 : 5 : 3 = 16 parts
  0.25
- €120,000 ÷16 = 7,500
- Overheads = 3 parts 7,500 x 3 = €22,500
- Labour = 8 parts 7,500 x 8 = €60,000
- Materials = 5 parts 7,500 x 5 = €37,500

Ratios & Proportions Question 3

- Q.3. A builder estimates that for every € 1.00 he spends on materials he needs € 1.50 for labour and € 0.50 for overheads. On a job costing a total of € 18,600 what is the amount of
  (a) overheads (b) labour (c) materials
- *(Firstly find the common denominator)*
- **Answer :**
- 1.50 1.00 0.50 = 3 : 2 : 1 = 6 parts
  0.50
- €18,600 ÷ 6 = 3100
- Overheads = 1 part 3100 x 1 = €3100
- Labour = 3 parts 3100 x 3 = €9300
- Materials = 2 parts 3100 x 2 = €6200

Ratios & Proportions Question 4

- Q.4. A builder estimates that for every € 2.25 he spends on materials he needs € 3.75 for labour and € 0.75 for overheads. On a job costing a total of € 36,405 what is the amount of
  (a) overheads (b) labour (c) materials
- *(Firstly find the common denominator)*
- **Answer:**
- $\frac{3.75 \quad 2.25 \quad 0.75}{0.75} = 5 : 3 : 1 = 9$ parts
- €36,400 ÷ 9 = 4045
- Overheads = 1 part 4045 x 1 = €4,045
- Labour = 5 parts 4045 x 5 = €20,225
- Materials = 3 parts 4045 x 3 = €12,135

Ratios & Proportions Wages Example 1

- Q.1. In a workshop, a tradesperson, a 2nd year and a 3rd year apprentice all work together. It is estimated that on all work done, every €1.00 on materials will cost € 1.50 on labour and €0.20 on overheads.
- If the total cost of materials and overheads is € 36,000.00, how much will the third year apprentice get?
- Third year gets 75% of trade rate
  Second year gets 50% of trade rate
- **Ratio of work :** 1 : 1.50 : 0.20 (x 10)
- 10 :15: 2
- Materials and overheads = 12 parts € 36,000 ÷ 12 = €3000
- Labour = 15 parts 3000 x 15 = €45,000

Ratios & Proportions Wages Example 1

- Q.1. In a workshop, a tradesperson, a 2nd year and a 3rd year apprentice all work together. It is estimated that on all work done, every €1.00 on materials will cost € 1.50 on labour and €0.20 on overheads.
- If the total cost of materials and overheads is € 36,000.00, how much will the third year apprentice get?
- Third year gets 75% of trade rate
  Second year gets 50% of trade rate
- **Answer part 2 Labour = €45,000**
- **Ratio of wages :** $\frac{1: 0.75 : 0.50}{0.25}$ = 4:3:2 = 9
- €45,000 ÷ 9 = €5,000 = 1 part
- **Third year** gets 3 parts = 5000 x 3 = **€ 15,000**

Ratios & Proportions Wages Question 2

- Q.2 In a workshop, a tradesperson, a 2nd year and a 4th year apprentice all work together. It is estimated that on all work done, every €1.00 on materials will cost €1.80 on labour and €0.30 on overheads.
- If the fourth year apprentice gets €4,500, how much will the materials cost?
- 4th year gets 90% of trade rate,
  2nd year gets 50% of trade rate
- **Answer**
- **Ratio of wages :** 1 : 0.90 : 0.50 (x 10)
- 10 : 9 : 5 = 24 parts
- €4,500 ÷ 9 = € 500 = 1 part
- **Total labour cost** = € 12,000 (24 parts)

Ratios & Proportions Wages Question 2

- Q.2. In a workshop, a tradesperson, a 2nd year and a 4th year apprentice all work together. It is estimated that on all work done, every €1.00 on materials will cost €1.80 on labour and €0.30 on overheads.
- If the fourth year apprentice gets €4,500, how much will the materials cost?
- 4th year gets 90% of trade rate,
  2nd year gets 50% of trade rate
- **Answer Part 2 Total labour cost** = € 12,000
- **Ratio of work :** 1.80 : 1 : 0.30
- = 18 : 10 : 3
- Labour = 18 parts €12,000 ÷ 18 = €666.67
- **Materials** = 10 parts 666.67 x 10 = **€6666.70**

Ratios & Proportions Wages Question 3

- Q.3. In a workshop, a tradesperson, a 2nd year and a 3rd year apprentice all work together. On each job for every €1.00 spent on materials will cost €1.75 on labour and €0.25 on overheads.
- If the total cost of overheads is €200.00, how much will the 2nd year apprentice get?
- Third year gets 75% of trade rate
  Second year gets 50% of trade rate
- **Ratio of work** : $\frac{1.00 : 1.75 : 0.25}{0.25}$ 7:4:1 = 12
- Overheads = 1 part = € 200
- Total cost = 12 parts 200 x 12 = €2,400
- Labour = 7 parts 200 x 7 = €1,400

Ratios & Proportions Wages Question 3

- Q.3. In a workshop, a tradesperson, a 2nd year and a 3rd year apprentice all work together. On each job for every €1.00 spent on materials will cost €1.75 on labour and €0.25 on overheads.
- If the total cost of overheads is €200.00, how much will the 2nd year apprentice get?
- Third year gets 75% of trade rate
  Second year gets 50% of trade rate
- **Answer part 2 Labour = €1,400**
- **Ratio of wages** : $\frac{1 : 0.75 : 0.50}{0.25}$ 4:3:2 = 9
- €1,400 ÷ 9 = €155.56 = 1 part
- 2nd year gets 2 parts 155.56 x 2 = **€ 311.12**