Ratio : compares quantities

Simplify a ratio

    8 : 12   HCF   4

    $\frac{8}{4} : \frac{12}{4}$ = 2:3

Eg 1) €400 is shared out between Liz and Mark
      in the ratio of 5:3. Find out how much each
      recieve

    Liz   :   Mark   Find the total no. of shares
    5 shares :   3 shares   5 + 3 = 8

                                Find out 1 share
    50 × 5   :   50 × 3   400 ÷ 8 = 50
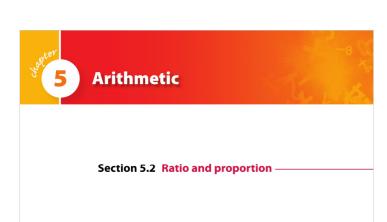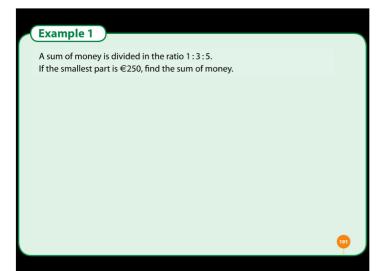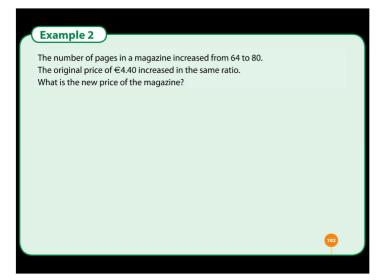   = €250   :   € 150

    C/W → H/W   Pg 102   Q1, 2, 3.

T&T3 5.2

T&T3
5.2.pptx

PROJECT MATHS

Text & Tests

3

Leaving   Certificate

Section 5.2 Ratio and proportion

Example 1

A sum of money is divided in the ratio 1 : 3 : 5.
If the smallest part is €250, find the sum of money.

101

Example 2

The number of pages in a magazine increased from 64 to 80.
The original price of €4.40 increased in the same ratio.
What is the new price of the magazine?

102

1. €80 is divided between two pupils in the ratio 7 : 3.
   How much does each pupil get?

$$7 + 3 = 10 \text{ shares}$$

$$\frac{80}{10} = 8 \quad 1 \text{ share}.$$

$$7 \times 8 = 56$$

$$3 \times 8 = 24$$
$$\overline{\quad 80 \quad}$$

102

2. €572 is divided in the ratio 2 : 3 : 6. Find the smallest share.

$$2 + 3 + 6 = 11 \text{ shares}$$

$$\frac{572}{11} = 52 \quad 1 \text{ share}$$

$$52 \times 2 = €104$$

102

$$A \quad B \quad C$$
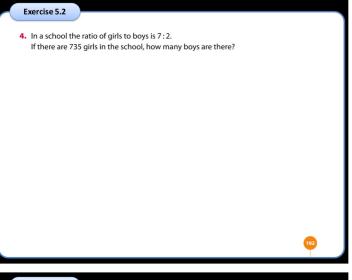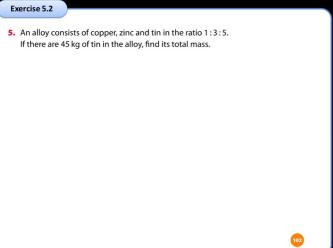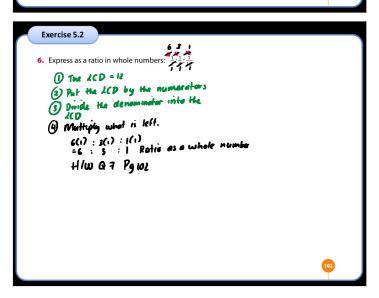
3. A prize fund is divided between A, B and C in the ratio 4 : 3 : 2 respectively.
   If C's share is €1224, find the total fund.

$$C \quad 2 \text{ shares} = 1224$$
$$1 \text{ share} \quad \frac{1224}{2} = 612 \quad 1 \text{ share}.$$

$$A \quad 4 \times 612 = 2448$$
$$B \quad 3 \times 612 = 1836$$
$$C \quad 2 \times 612 = 1224$$
$$\overline{\qquad\qquad\qquad}$$
$$\text{Total } €5508$$

102

4. In a school the ratio of girls to boys is 7 : 2.
   If there are 735 girls in the school, how many boys are there?

5. An alloy consists of copper, zinc and tin in the ratio 1 : 3 : 5.
   If there are 45 kg of tin in the alloy, find its total mass.

6. Express as a ratio in whole numbers: $\frac{1}{2} : \frac{1}{4} : \frac{1}{12}$

   ① The LCD = 12
   ② Put the LCD by the numerators
   ③ Divide the denominator into the LCD
   ④ Multiply what is left.
      6(1) : 3(1) : 1(1)
      = 6 : 3 : 1   Ratio as a whole number

   H/w Q 7 Pg 102

7. €1575 was shared among three people in the ratio $1 : 2 : \frac{1}{2}$.
Calculate the smallest share.

$1 : 2 : \frac{1}{2}$ $LCD = 2$

$2 : 4 : 1$ as whole

$2+4+1 = 7$ shares

$1575 \div 7 = 225$ 1 share

102

8. The perimeter of a rectangle is 200 cm.
If length : breadth = 7 : 3, find the area of the rectangle.

103

9. A factory employs 360 unskilled workers, one skilled worker for every 5 unskilled workers and 1 foreman for every 12 skilled workers.
Calculate the number of people employed in the factory.

103

Proportion

Compares part of a quantity to the total quantity.

Eg 1) If a waiter is working in a restaurant and is paid an hourly rate, the more hours he works the more money he will earn

When the line starts the origin (0,0) and is straight line — direct proportion.

Eg 2) A science teacher is ordering new test tubes. If 12 test tubes cost €30, find the cost of buying a set of <u>33</u> test tubes?

Find what 1 costs

12 test tubes = €30

1 test tubes = $\frac{30}{12}$ = 2.50

33 test tubes = 2.50 × 33 = €82.50

Eg 3) A recipe will make 12 buns
60g butter
3 tablespoons of honey
100g chocolate
90g oats
How many grams of butter is needed for 20 buns

12 buns = 60g butter
1 bun = $\frac{60}{12}$ = 5g butter
20 buns = 5g × 20 = 100g butter

Inverse Proportion

two variables are related, where one increases the other decreases.

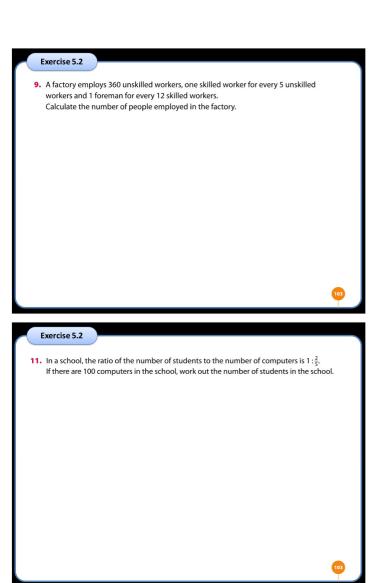If it takes 1 person 6 days to build a wall
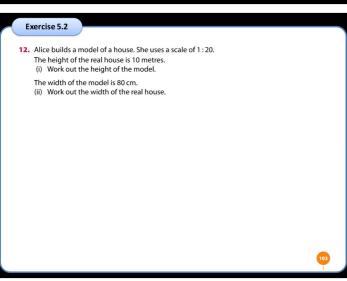
2 people = 3 days
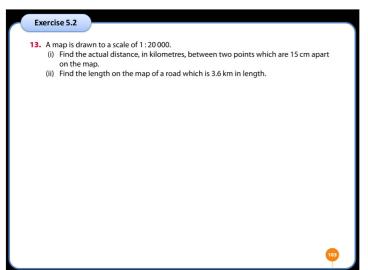3 people = 2 days
4 people = 1.5 days
5 people = 1.2 days
6 people = 1 days

Class work
Pg 103
Q 10, 11 Ratio
Q 14, 15, 16 Proportion.

9. A factory employs 360 unskilled workers, one skilled worker for every 5 unskilled workers and 1 foreman for every 12 skilled workers.
Calculate the number of people employed in the factory.

11. In a school, the ratio of the number of students to the number of computers is $1 : \frac{2}{5}$.
If there are 100 computers in the school, work out the number of students in the school.

12. Alice builds a model of a house. She uses a scale of $1 : 20$.
The height of the real house is 10 metres.
 (i) Work out the height of the model.

The width of the model is 80 cm.
(ii) Work out the width of the real house.

13. A map is drawn to a scale of 1 : 20 000.
　(i)　Find the actual distance, in kilometres, between two points which are 15 cm apart on the map.
　(ii)　Find the length on the map of a road which is 3.6 km in length.

14. The scale on a map is 1 :25 000. The length of a wall on the map is 3.2 mm.
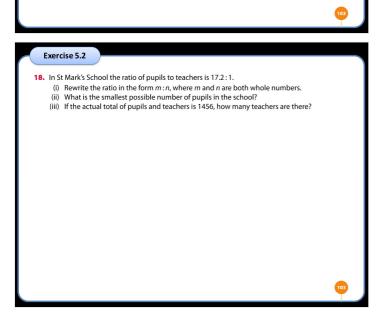Find the actual length in metres.

15. In the photograph John's height is 5 cm and
his sisters's height is 4 cm.
John's actual height is 1.5 m.
What is his sister's actual height?

16. The number of pages in a comic book was increased from 48 to 80. If the price, which was previously €6.00, is increased in the same ratio, what should the new price be?

17. A petrol company carried out a fuel consumption test and found that the winter to summer ratio for the same car over the same test track was 3.5 : 4. The winter fuel consumption rate was 8.4 km per litre. Find the summer consumption rate.

18. In St Mark's School the ratio of pupils to teachers is 17.2 : 1.
  (i)   Rewrite the ratio in the form $m : n$, where m and n are both whole numbers.
  (ii) What is the smallest possible number of pupils in the school?
  (iii) If the actual total of pupils and teachers is 1456, how many teachers are there?

19. The table opposite gives the relationship between some metric units and imperial units of measure.

Use the table to perform the following conversions:
- (i) Convert 50 miles to kilometres.
- (ii) Convert 160 km to miles.
- (iii) Convert 900 cm to feet.
- (iv) Convert 12 feet to centimetres.
- (v) Convert 40 kg to pounds.
- (vi) Convert 88 pounds to kilograms.
- (vii) Convert 40 litres to pints.
- (viii) Convert 84 pints to litres.

Metric unit	Imperial unit
8 km	5 miles
30 cm	1 foot
1 kg	2.2 pounds
1 litre (ℓ)	1.75 pints
4.5 litres	1 gallon

104

20. By how many metres is 15 miles greater than 23.5 km?

104

21. Tea served in a canteen is made from a mixture of two different types of tea, type A and type B. Type A costs €12.15 per kg. Type B costs €12.90 per kg.
The mixture costs €12.65 per kg.
If the mixture contains 7 kg of type A, how many kilograms of type B does it contain?

104

1. €56, €24   2. €104   3. €5508
4. 210   5. 81 kg   6. 6 : 3 : 1
7. €225   8. 2100 cm²   9. 438
10. (i) 10 kg   (ii) 15 kg
11. 250
12. (i) 50 cm   (ii) 16 m
13. (i) 3 km   (ii) 18 cm
14. 80 m   15. 1.2 m
16. €10.00   17. 9.6 km/ℓ
18. (i) 86:5   (ii) 86   (iii) 80
19. (i) 80 km   (ii) 100 miles   (iii) 30 ft
    (iv) 360 cm   (v) 88 lb   (vi) 40 kg
    (vii) 70 pints   (viii) 48 ℓ
20. 500 m   21. 14 kg