

8300

## GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic

---

Ratio, Proportion and Rates of Change

Writing ratios in the form 1:n or n:1

v1.0

---

Name \_\_\_\_\_

### Materials

For this paper you must have:

- Mathematical instruments

### Information

- The marks for questions are shown in brackets

### Advice

- In all calculations, show clearly how you work out your answer

For questions 1 to 5 you must **NOT** use a calculator.



**Q1.**

Write the ratio  $6 : 2$  in the form  $n : 1$

**(Total 1 mark)**

**Q2.**

$$\frac{1}{2} : \frac{2}{3} = x : 1$$

Circle the value of  $x$ .

$$\frac{1}{3}$$

$$\frac{3}{5}$$

$$\frac{3}{4}$$

$$\frac{4}{3}$$

**(Total 1 mark)**

**Q3.**

Simplify  $(2 \times 10^3) : (5 \times 10^{-1})$

Give your answer in the form  $n : 1$

**(Total 2 marks)**

**Q4.**

(a) Simplify fully  $56 : 24$

**(2)**

(b) Write the ratio  $5 : 4$  in the form  $n : 1$

**(1)**

(c) Share £180 in the ratio  $1 : 9$

**(2)**

**(Total 5 marks)**

**Q5.**

Write  $(3^6 \times 3^5) : 3^7$  in the form  $n : 1$  where  $n$  is an integer.

**(Total 3 marks)**

**For the rest of the questions, you may use a calculator.**



**Q6.**

The people at a party are from Spain, France or Germany.

68% are from Spain

number from France = number from Germany

Work out number from Spain : number from France

Give your answer in the form  $n : 1$

**(Total 3 marks)**

**Q7.**

The ratio  $4 : 9$  is written in the form  $1 : n$

Work out the value of  $n$

**(Total 1 mark)**

**Q8.**

Write  $30 : 12$  in the form  $n : 1$

**(Total 1 mark)**

**Q9.**

A forest has 6500 trees.

The trees are beech or maple.

number of beech : number of maple = 1.6 : 1

(a) What fraction of the trees are beech?

(2)

(b) Write number of beech : number of maple in the form  $1 : n$

(1)

**(Total 3 marks)**

**Q10.**

At a school

there are 912 students

the ratio of students to teachers is 15.2 : 1

The number of students stays the same.

The number of teachers increases by 2

Work out the new ratio of students to teachers.

Give your answer in the form  $n : 1$

**(Total 3 marks)**

**Q11.**

Which ratio is **not** equivalent to the ratio 3 : 4

Circle your answer.

$\frac{3}{4} : 1$

$1 : \frac{4}{3}$

1 : 1.3

6 : 8

**(Total 1 mark)**

**Q12.**

(a) Divide 120 in the ratio 1 : 4

(2)

(b) Write the ratio 7 : 4 in the form  $n : 1$

(1)

**(Total 3 marks)**

**Q13.**

Work out

cube root of 512 : reciprocal of 0.4

Give your answer in the form  $n : 1$

**(Total 3 marks)**

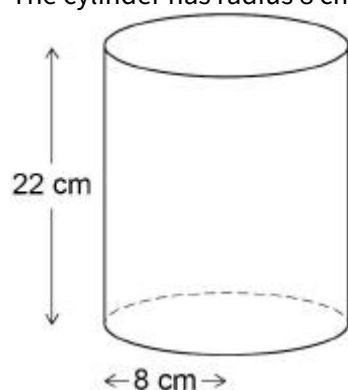
**Q14.**

A company makes two types of lampshade using fabric on wire frames.

**Lampshade A**

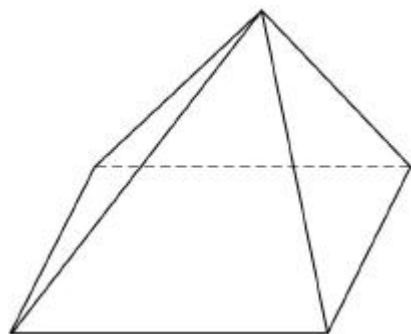
Fabric is used to make the curved surface of a cylinder.

The cylinder has radius 8 cm and height 22 cm

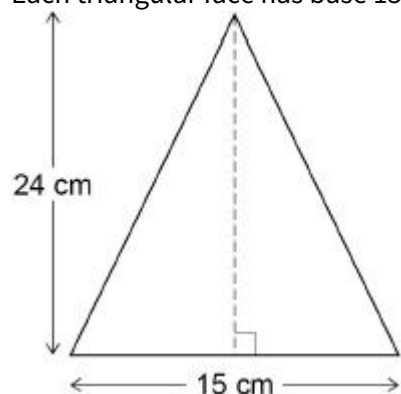


**Lampshade B**

Fabric is used to make the four triangular faces of a pyramid.



Each triangular face has base 15 cm and perpendicular height 24 cm



Not drawn  
accurately

|                   |                       |
|-------------------|-----------------------|
| Cost of fabric    | £400 per square metre |
| Other costs for A | £3.50 per lampshade   |
| Other costs for B | £7.50 per lampshade   |

Work out the ratio cost of one lampshade A : cost of one lampshade B

Give your answer in the form  $n : 1$

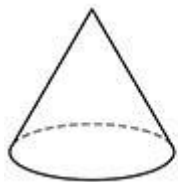
**(Total 5 marks)**

Questions 15 and 16 are **higher** tier only.

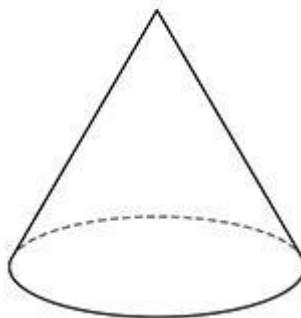
**Q15.**

Here are two similar cones.

Cone A



Cone B



The surface area of cone A is  $2 \text{ m}^2$

The surface area of cone B is  $4.5 \text{ m}^2$

Work out the ratio radius of cone A : radius of cone B

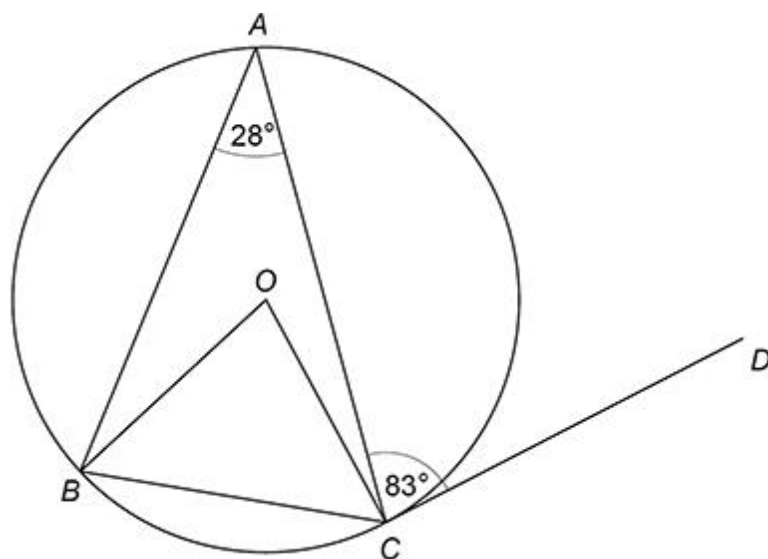
Give your answer in the form  $1 : n$

**(Total 3 marks)**

**Q16.**

A, B and C are points on a circle, centre O.

DC is a tangent to the circle.



Not drawn  
accurately

Show that angle ABO : angle ACO = 3 : 1

**(Total 5 marks)**