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# GCSE

# MATHEMATICS

GCSE 8300

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Teaching guidance – Direct and inverse proportion extract

For teaching from September 2015 onwards

For GCSE exams in June 2017 onwards

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Version 1.0, August 2014



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Our specification is published on our website ([www.aqa.org.uk](http://www.aqa.org.uk)). We will let centres know in writing about any changes to the specification. We will also publish changes on our website. The definitive version of our specification will always be the one on our website, this may differ from printed versions.

You can get further copies of this Teaching guidance from:  
The GCSE Mathematics Department  
AQA  
Devas Street  
Manchester  
M15 6EX

Or, you can download a copy from our All About Maths website (<http://allaboutmaths.aqa.org.uk/>)

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# General Information - Disclaimer

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This teaching guidance will help you plan by providing examples of the content of the specification.

It is not, in any way, intended to restrict what can be assessed in the question papers based on the specification.

Questions will be set in a variety of formats including both familiar and unfamiliar contexts.

Examples given in this teaching guidance illustrate the type of questions which would be asked on a question paper. However, the wording and format used in this guidance do not always represent how questions would appear in a question paper. Questions in this guidance have not been through the same rigorous checking process used in our question papers.

All knowledge from the Key Stage 3 and Key Stage 4 programmes of study is subsumed into the content of the GCSE specification.

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## Subject content

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Students can be said to have confidence and competence with mathematical content when they can apply it flexibly to solve problems.

The expectation is that:

- All students will develop confidence and competence with the content identified by standard type
- All students will be assessed on the content identified by the standard and the underlined type; more highly attaining students will develop confidence and competence with all of this content
- Only the more highly attaining students will be assessed on the content identified by **bold** type. The highest attaining students will develop confidence and competence with the **bold** content.

The distinction between standard, underlined and bold type applies to the content statements only, not to the assessment objectives or to the mathematical formulae in the appendix.

R13

Understand that  $X$  is inversely proportional to  $Y$  is equivalent to  $X$  is proportional to  $\frac{1}{Y}$ ; interpret equations that describe direct and inverse proportion

### Teaching Guidance

Students should be able to:

- understand that an equation of the form  $y = kx$  represents direct proportion and that  $k$  is the constant of proportionality
- understand that an equation of the form  $y = \frac{k}{x}$  represents inverse proportion and that  $k$  is the constant of proportionality.

### Examples

1  $y = \frac{5}{x}$

Describe what happens to the value of  $y$  as the value of  $x$  increases from 1 to 10

2  $\text{Time} = \frac{\text{distance}}{\text{speed}}$

If the distance is doubled and the speed is halved, what happens to the time?

Circle your answer.

$\times 2$                        $\times 4$                        $\times \frac{1}{2}$                        $\times \frac{1}{4}$

3 For a rectangle of length  $l$  and width  $w$ ,

$$l = \frac{k}{w}$$

What does the constant  $k$  represent?

## R13h

Understand that  $X$  is inversely proportional to  $Y$  is equivalent to  $X$  is proportional to  $\frac{1}{Y}$ ; construct and interpret equations that describe direct and inverse proportion

## Teaching Guidance

Students should be able to:

- understand that an equation of the form  $y = kx$  represents direct proportion and that  $k$  is the constant of proportionality
- understand that an equation of the form  $y = \frac{k}{x}$  represents inverse proportion and that  $k$  is the constant of proportionality.

## Notes

Understand that if  $l$  and  $w$  are inversely proportional, then  $lw = A$ , where  $A$  is a constant.

## Examples

- The weight ( $w$ ) of a sphere is proportional to the cube of its radius ( $r$ ).  
When  $r = 5$  cm,  $w = 500$ g  
Find the weight of a sphere with  $r = 10$  cm
- The distance,  $d$  kilometres, of the horizon from a point  $h$  metres above sea level is given by  $d \propto \sqrt{h}$   
If  $d = 7.5$  when  $h = 25$  find
  - $d$  when  $h = 40$
  - $h$  when  $d = 10$
- The number of beats per minute ( $b$ ) a pendulum makes is inversely proportional to the square root of its length ( $l$ ).  
A pendulum of length 0.16 m makes 150 beats per minute.  
Work out an equation connecting  $b$  and  $l$ .
- $y$  is inversely proportional to  $x^2$   
When  $x = 8$ ,  $y = 2$   
Work out the value of  $y$  when  $x = 5$

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## Get help and support

Visit our website for information, guidance, support and resources at [aqa.org.uk/8300](http://aqa.org.uk/8300)

You can talk directly to the Mathematical Studies subject team

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