

UNIT 15 *Variation*

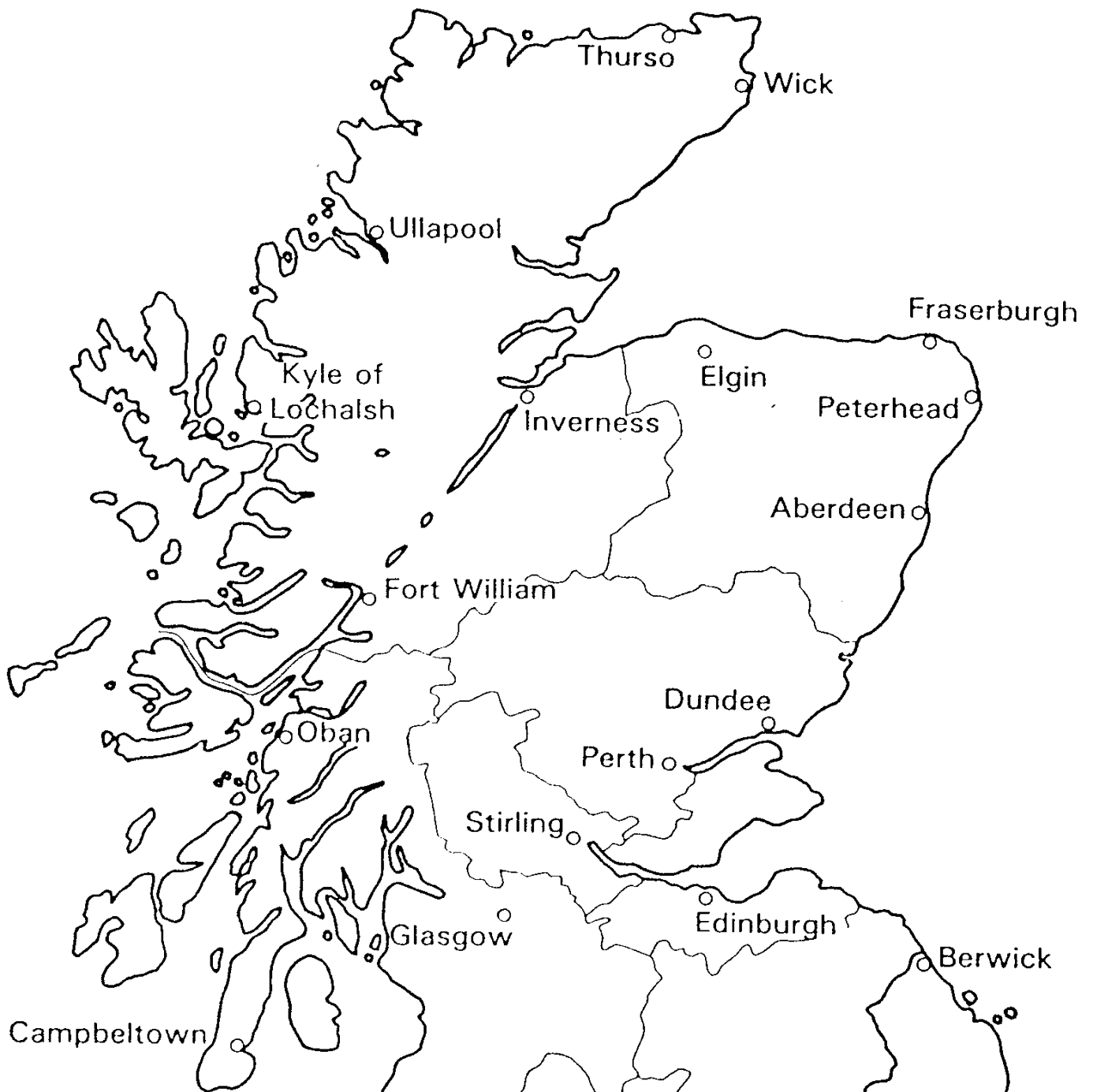
Overhead Slides

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- 15.1 Map Scales
- 15.2 Proportional Division
- 15.3 Direct Proportion
- 15.4 Inverse Proportion
- 15.5 Common Graphs
- 15.6 Relationships
- 15.7 Filling Bottles

OS 15.1

Map Scales



1. The actual shortest distance between Dundee and Aberdeen is 86 km.
What is the scale of this map?
2. Using this scale, estimate the distance in km between Edinburgh and Glasgow.
Check your answer from an atlas.

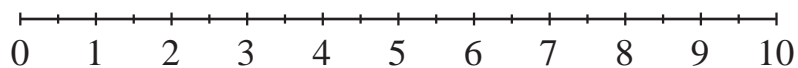
OS 15.2

*Proportional Division***(A)**

The line below measures 10 cm.

Divide it in the ratio

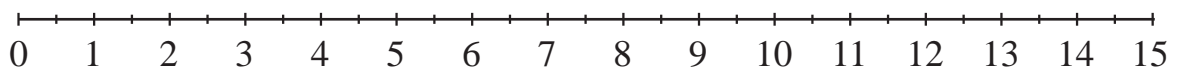
- (a) 7 : 3 (b) 4 : 1 (c) 3 : 2 (d) 3 : 1

**(B)**

The line below measures 15 cm.

Divide it in the ratio

- (a) 4 : 1 (b) 8 : 7 (c) 3 : 2 (d) 2 : 1



OS 15.3

Direct Proportion

(A) Using the data given in each table, check whether x and y could be **directly proportional**.

(a)

x	4	10	50	1000
y	20	200	250	5000

(b)

x	2	10	25	50
y	7	35	60	225

(c)

x	10	20	50	100
y	5	10	20	40

(B) Given that x and y are **directly proportional**, complete each table.

(a)

x	1	2	4	8
y	2			

(b)

x	2	4	6	8
y		12		

(c)

x	1	5	10	50
y			5	

OS 15.4

Inverse Proportion

(A) Using the data in each table, check whether x and y could be **inversely proportional**.

(a)

x	1	4	6	12
y	12	3	2	1

(b)

x	2	4	8	20
y	10	4	2	1

(c)

x	2	4	8	16
y	12	6	3	1.5

(B) Given that x and y are **inversely proportional**, complete each table.

(a)

x	1	2	3	4
y			6	

(b)

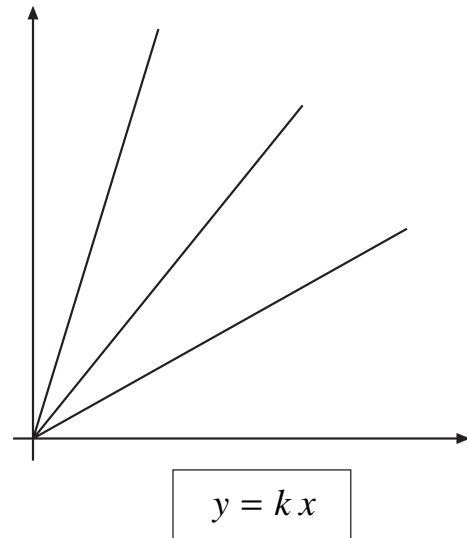
x	2	4	6	8
y		12		

(c)

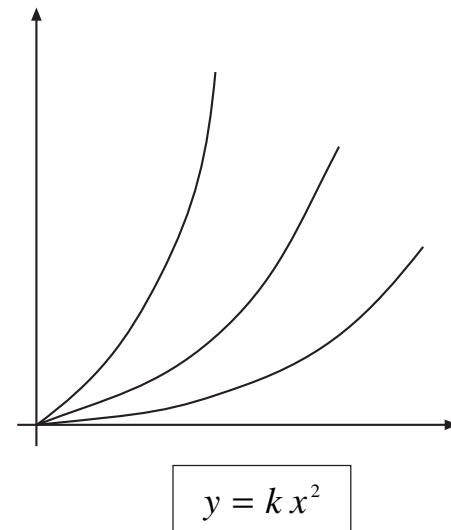
x	1	10	50	100
y			2	

OS 15.5*Common Graphs*

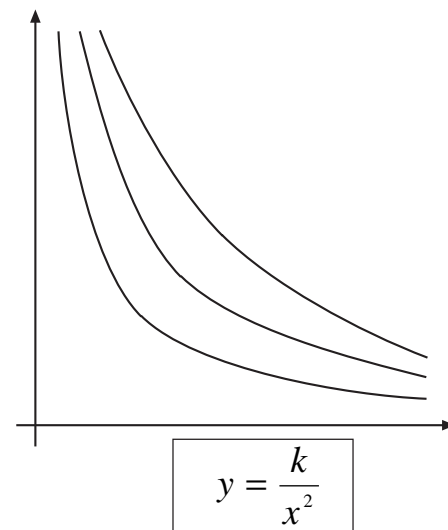
(a) y is proportional to x



(b) y is proportional to x^2



(c) y is inversely proportional to x



OS 15.6

Relationships

Find as many examples of variations with only two variables as you can and write them in the table below. One has been done for you.

1	$h = \frac{20}{\pi r^2}$	<p><i>h</i>: height of a cylinder of volume 20 cubic units</p> <p><i>r</i>: base radius of the above cylinder</p>	<p><i>h</i>: varies inversely as the square of <i>r</i></p> <p>i.e. $h \propto \frac{1}{r^2}$</p>	*
2				
3				
4				
Equal connecting only two variables		Definition of variables	Relationship between two variables	Constant of variation

Note
 *This is derived from $V = \pi r^2 h$, the volume of a cylinder

OS 15.7

Relationships

Here are 6 bottles and 9 graphs.

Choose the correct graph for each bottle. Explain your reasoning carefully.

For the remaining 3 graphs, sketch what the bottles should look like.

