

NEW EDITION

# Technical English +

Course Book

Terry Phillips

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EDUCATION

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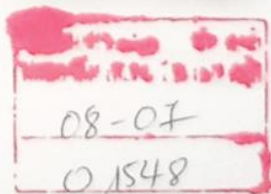


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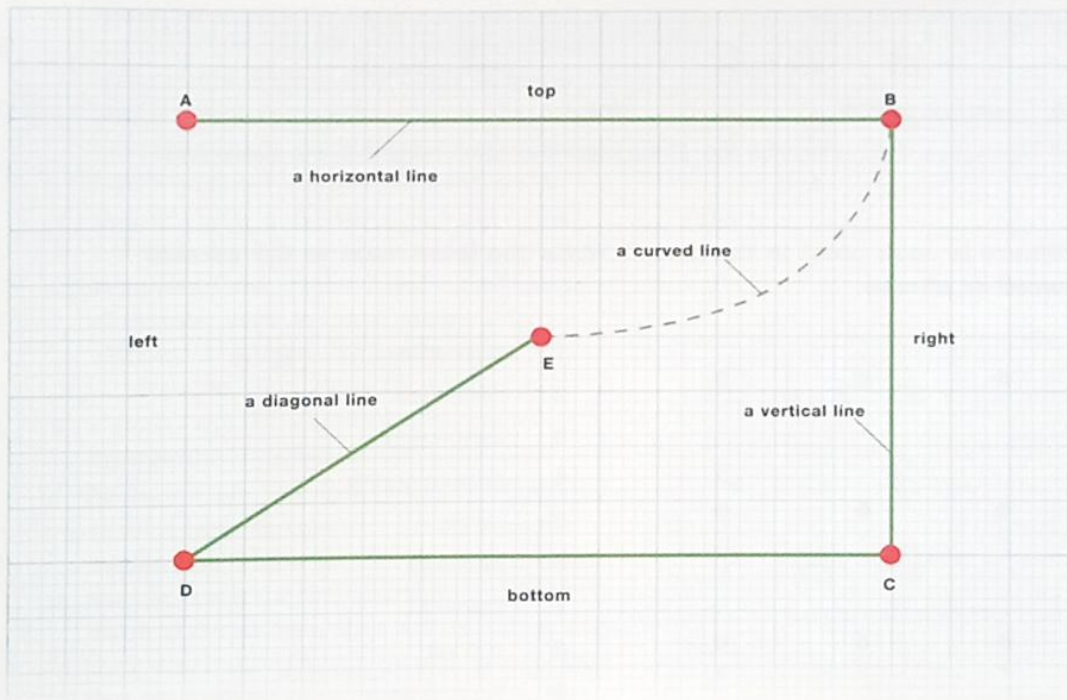
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# Book map

Unit	Title	Reading text with multiple-choice questions	Structure 1	Structure 2
1	Points and lines	Explanation: <i>Numbers on a display screen</i>	<i>there is / are</i>	<i>it is / they are</i>
2	Fractions and ordinals	Explanation: <i>How do you say numbers?</i>	cardinals	ordinals
3	Arithmetic	Instruction manual: <i>How to use Supercalc</i>	imperatives	
4	Surfaces and angles	Explanation: <i>Types of triangle</i>	<i>which + verb</i>	
5	Spaces and volumes	Report: <i>Shapes for a perfume bottle</i>	<i>have to / should</i>	
6	Measuring	Instructions with visuals: <i>How to weigh an elephant</i>	<i>what + noun; how + adjective</i>	
7	Algebra and formulas	Explanation: <i>Using algebra</i>	<i>if + present, (then) present</i>	
8	Natural or man-made?	Explanation: <i>Alternative energy sources</i>	joining with <i>and, but, or, because, so</i> and <i>However</i>	
9	Bits and bytes	Explanation: <i>Computer jargon</i>	comparatives	
10	Computer networking	Instruction manual: <i>Error messages</i>	<i>may and might</i>	<i>may have done</i>
11	Elements and compounds	Graphic + explanation: <i>The periodic table</i>	present simple passive	past simple
12	States of matter	Experiment; line graph and table	simple past: active versus passive	
13	Properties of matter	Explanation: <i>The problem of rubbish</i>	present progressive	present simple
14	Symbols and keys	Instruction manual: <i>Troubleshooting</i> ; circuit diagram and flow chart	gerunds	
15	Structures and plans	Report: <i>Progress on building houses</i> ; Gantt chart	present perfect	<i>have to do</i>
16	Forces, loads and tools	Instruction manual: <i>Making a shelf</i>	phrasal verbs	formal versus informal English
17	Energy and motion	Explanation: <i>The three laws of motion</i>	<i>if, when, unless</i>	
18	Cells, organs and systems	Explanation: <i>The Human Genome Project</i>	modals: <i>could and be able to</i>	
19	Chains, webs and cycles	Explanation: <i>The interdependence of organisms</i> ; food chain and food web	<i>could, would, might</i>	
20	Micromachines and ICT	Newspaper article: <i>The world's smallest thermometer</i>	modal passives	
21	Electricity and magnetism	Explanation: <i>Terms connected with electricity</i>	review of main tenses / structures	

# Points and Lines

## Section 1: Vocabulary



### A Read the text and look at the diagram.

**Geometry** is a part of mathematics. It is the study of **points** and lines, surfaces and angles, and solid shapes. We look at points and lines in this unit, surfaces and angles in Unit 4 and solid shapes in Unit 5.

A point has **position**. For example, point A is **top left** of the diagram, and point C is **bottom right**. Point E is in the **centre**. We can also say that point A is **above** point D and point C is **below** point B.

A **line** has **direction**. For example, line AB goes **left to right**. We call a line like this **horizontal**.

Line BC goes **top to bottom**. We call a line like this **vertical**. Line DE goes **bottom left to centre**. We call a line like this **diagonal**.

The shortest line between two points is **straight**. All the **solid** lines in the diagram are straight lines. However, we can also join two points with a **curved line**. The **dotted line** EB is curved.

When two straight lines have the same direction, but do not meet, we call them **parallel**. DC is parallel to AB.

A line also has **length**. It can be long, or short, or medium **length**.

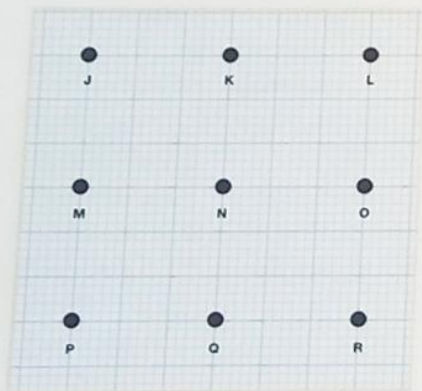
**B** Look at the signs on the right. Complete the description. Use the words in the box.

above below curved diagonal horizontal left parallel top vertical

- There is a short \_\_\_\_\_ line.
- There is a short horizontal line crossed by a short \_\_\_\_\_ line.
- There is a short horizontal line and one point \_\_\_\_\_ the centre and one point \_\_\_\_\_ the centre.
- There is a \_\_\_\_\_ line from top left to bottom right crossed by another \_\_\_\_\_ line from \_\_\_\_\_ right to bottom \_\_\_\_\_.
- There is a vertical \_\_\_\_\_ line.
- There is a short horizontal line. There is another short horizontal line above and \_\_\_\_\_ to it.

—  
+  
÷  
×  
( or )  
=

**C** Where is each point in the panel? Write the letter next to the correct word or phrase.



1	top centre	K
2	centre left	
3	centre right	
4	bottom centre	
5	centre	
6	above O	
7	below M	
8	top left	
9	bottom right	

## Section 2: Reading

**A** Read the text opposite. Choose the best answer in each case.

- In Figure 1, number 7 has a short horizontal line and:
  - a long horizontal line.
  - a long diagonal line.
  - a short vertical line.
  - a long curved line.
- In Figure 1, how many numbers have a curved line?
  - six
  - seven
  - eight
  - nine
- The numbers in Figure 2:
  - have no straight lines.
  - have no curved lines.
  - have no thick and thin lines.
  - have no black and white lines.
- How can you make the number 7 on the screen of a calculator?
  - BD + DF
  - AB + BD + CD + CE
  - AB + BD + DF
  - AB + BD



# Displaying Numbers

WHEN SCIENTISTS DESIGNED THE first pocket calculator, they needed a simple way to show the Arabic numerals 0 to 9 on the screen. They wanted to use straight horizontal and vertical lines of the same length. Is there a way? Handwrite the numbers (Figure 1) and the answer seems to be *No*. There *are* straight vertical lines in number 1 and number 4, and straight horizontal lines in numbers 2, 4, 5 and 7. But there are other lines too. There are diagonal lines in number 4 and number 7, and curved lines in all the other numbers except number 1. In addition, the lines are different lengths.

However, we can write the numbers in a simpler way. For example, there is a set of numbers used by computer systems in some banks. It is called 'computer readable' (Figure 2). In this system, the computer actually reads the numbers, on cheques for example, so the number must be exactly the same each time. But, look closely at this set of numbers and you will see that the system is still quite complicated. Some of the lines are thick and some are thin. There are two positions for the short horizontal line in the centre (in 3 and 4) and the horizontal line in the centre of 2 is shorter than the centre line in 6.

Then scientists found the answer. Turn on your calculator. Look closely at the screen. There are only seven lines. They are arranged like the number 8 (Figure 3). They are all the same length. However, with these seven lines, we can make all the numbers from 0 to 9. The computer program in the calculator tells the screen which lines to light up to make each number. So the computer instruction for number 1 is  $BD + DF$ , and for number 5, it is  $AB + AC + CD + DF + EF$ .

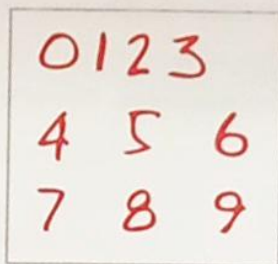


Figure 1

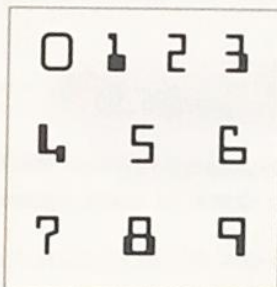


Figure 2



Figure 3

## B Study the Grammar Box.

### Talking about new topics

We use **There is** and **There are** to introduce a new topic.

We use **It is** and **They are** to give more information about an 'old' topic.

**Examples:**

**There is** a set of numbers. **It is** called 'computer readable'.

**There are** seven straight lines. **They are** arranged like the number 8.

## C Look at the numbers. Complete each sentence with a suitable word.

There is \_\_\_\_\_ diagonal line in the number 7. It \_\_\_\_\_ from the top right to the bottom left. \_\_\_\_\_ is also a horizontal line.

\_\_\_\_\_ is at the top. There aren't \_\_\_\_\_ curved lines.

There \_\_\_\_\_ three straight lines in the number 4. \_\_\_\_\_ is a vertical line. \_\_\_\_\_ meets a diagonal line \_\_\_\_\_ the top.

There is \_\_\_\_\_ horizontal line. It meets \_\_\_\_\_ diagonal line \_\_\_\_\_ the left and crosses \_\_\_\_\_ vertical line.



## Section 3: Listening

### A Listen and complete the summary of the reading text in Section 2. Write one word in each space.

The screen of a pocket calculator has to show all the Arabic \_\_\_\_\_ 0 to 9. It does this with just seven \_\_\_\_\_. The lines are arranged like the number 8 and they are all the same \_\_\_\_\_. There are two \_\_\_\_\_ lines on the left and two on the right. There is one \_\_\_\_\_ line across the top, one across the bottom and one across the centre.

ABCDE  
FGHIJK  
LMNOP  
QRSTU  
WXYZ

### B Listen and choose the best answer in each case.

- This listening text is about:
  - designing cell phones.
  - displaying letters on calculators.
  - writing the English alphabet.
  - displaying numbers on calculators.
- How many capital letters can you make with the pocket calculator system?
  - 6
  - 16
  - 26
  - 60
- The calculator system can't make the other capital letters because there aren't any:
  - diagonal lines.
  - vertical lines.
  - horizontal lines.
  - curved lines.

