**Points and Lines**

**Exercise 1**

*Before you begin working with the text 'Points and Lines' read these words and guess their meaning.*

'alphabet n, 'definite *a,* lo'cation, sub'set *n,* to lo'cate, to 'differ (from), 'abstact a.

*You can guess the meaning of the words:* 'arrow' ['aerou] *n,* 'ray' *n* and 'vertex' *n from the context.*

*Read these notes. \*

1. serve as models – служат в качестве моделей
2. have in common – имеют общее

*Read the text and render it either in Russian or in English.*

**Points and Lines**

1. The world around (вокруг) us contains many physical objects from which mathematicians have developed geometric ideas and these objects can serve as models1 of the geometric figures. 2. The edge (ребро) of a ruler, or an edge of this page is a model of a line. 3. We have agreed to use the word line to mean straight line. 4. A geometric line is the property these models of lines have in common2 it has length but no thickness (толщина) and no width; it is an idea. 5. A particle (частица) of dust (пыль) in the air (воздух), or a dot on a piece of paper is a model of a point. 6. A point is an idea about an exact location; it has no dimensions. 7. We usually use letters of the alphabet to name geometric ideas. 8. For example, we speak of the following models of points as point *A,* point *B.* and point C.



1. We speak of the following as line AB or line BA.



10. The arrows on the model above indicate that a line extends indefinitely in both directions. 11. Let us agree to use the following figure to name a line. The symbol means line *.* 12. Can you locate a point *С* between A and *В* on the drawing of above? 13. Could you locate another point between *В* and C? 14. Could you continue this process indefinitely? Why? 15. Because between any two points on a line there is another point. 16. A line consists of (состоит из) a set of points. 17. Therefore, a piece (часть, кусок) of the line is a subset of the line. 18. There are many kinds of subsets of a line. 19. The subset (piece) of shown below is called a line segment as you might remember from the above.



20. The symbol for line segment *AB* is marked as follows: (segment AB). 21. You already know that points A and *В* are the endpoints of the segment. 22. A line segment is a set of points consisting of the two endpoints and all of the points on the line between them. 23. Notice that the symbol for a line segment ()contains the letters naming the endpoints, that is, only the endpoints need to be given while naming a line segment.

24. How does a line segment differ from a line? 25. Could one measure the length of a line? Of a line segment? 26. You can judge ([dӡʌdӡ] судить) from the above that a *line segment* has definite length but *a line* extends indefinitely in each of its two directions.

27. Another important subset of a line is called a ray. 28. The part of shown in black (черный) below is ray *AB* and the symbol for it is a one way arrow over .



1. A ray has 'infinite (бесконечный) length and only one endpoint which is called a vertex ['vә:tәks].
2. Traditionally, the symbol *AB* in geometry might represent a line, a line segment, or a ray. 31. We draw the figure that is to be named above the letters *()* to eliminate (исключить) the possible ambiguity ([,ӕmbi'gju:iti] двусмысленность).

32. It should be emphasized (['emfәsaiz] подчеркивать) that in the drawings given above you see pictures of a line, a line segment, and a ray and not the geometric ideas they represent. 33. Let us agree that to draw a geometric figure means to draw its picture.

1. Obviously (['ɔbviәsli] очевидно), if a geometric figure, being formed by a set of points, is an 'abstract 'concept, it cannot be seen.
2. Therefore we draw pictures of geometric figures just as we write numerals for numbers.

**Exercise 2**

*Translate these combinations of words.*

the location of the given point; the vertex of *MN;* the arrows indicating both directions; definite length; the people around us; the thickness and the width of this geometric object; particles of dust in the air; the edge of this book; does not extend indefinitely; a geo­metric figure; words consist of letters; sentences consist of words; a piece of good luck; the book contains a lot of pictures; to judge correctly; to differ in many-respects from; to eliminate wars; to avoid the ambiguity; to emphasize certain facts; obvious things; figures formed by; infinite discussions.

**Exercise 3**

*Compare the* ***ing****-forms in these sentences and translate the sentences.*

1. Measuring land is impossible without special instruments. 2.Measuring the length of a segment one must use a ruler. 3. He-is defining the volume of a geometric object. 4. The teacher spoke of defining volumes. 5. Geometry presented practical ways for obtaining information about the size and shape of various objects. 6. Obtaining that information we shall be able to extend our knowledge of space. 7. Extending a line indefinitely can be represented symbolically with the help of arrows indicating opposite directions. 8. Now I am extending the given line both to the left and to the right.

**Exercise 4**

*Write questions to which the given sentences are the answers.*

1. We use the edge of a ruler for drawing a line. 2. He continued-preparing for the conference. 3. Those particles have much in common. 4. The direction is shown by the arrow. 5. Dust particles move in all directions in the air. 6. The book consists of six chapters. 7. A particle may serve as a model of the Earth. 8. The letter *В* names the common vertex of the given rays.

**Exercise 5**

*Listen to the speaker as he is reading the words of the text 'Points and Lines' and repeat them.*

alphabet, definite, infinite, to differ, abstract, to locate, arrow, ray, vertex, to serve, edge, dust, common, thickness, particle, air, piece, judge, exact, indefinitely, to consist, subset, to contain, black, ambi­guity, emphasize *v,* eliminate, obviously, to form.

**Exercise 6**

*Listen and repeat. Guess the meaning of the italicized words.*

Alphabet–*alphabetic;* definite–*indefinite a;* judge *v*–*judgement;* infinite–*finite;* to serve–*service;* common–commonly–*uncommon;.* air–*airless*–*to air;* exact–*exactly*–*exactness;* to contain–*container:* black–*to blacken*–*blackness;* ambiguity–*ambiguous*–*inambiguous* obviously–*obvious;* to form–*formal–informal*–*formality*–*formalize*–*to deform*–*deformity;* object *n*–*object v*–*objection;* straight– *to straighten;* to differ–*different–differently–indifferent.*

**Exercise 7**

*Listen to the speaker's questions about the text and write down 'yes' or 'no' answers.*

1. Does the world around us contain physical objects? 2. Can these objects serve as models of the geometric figures? 3. Can the edge of a ruler serve as a model of a line? 4. Has a line any thickness? Has it length? 5. Is a point an idea of exact location? 6. Do we usually use letters of the alphabet to name geometric objects? 7. Can you locate as many points as you like between any two points? 8. Is a segment a subset of a line? 9. Does a line segment consist only of two endpoints? 10. Has a line -segment definite length? 11. Is there any difference between a segment and a ray? 12. Does a ray extend in two directions?