EXERCISE 5.1 - Question No. 1

Which of the following statements are true and which are false?

Give reasons for your answers. (i) Only one line can pass through a

single point. (ii) There are an infinite number of lines which pass

through two distinct points. (iii) A termin

EXERCISE 5.1 - Question No. 2

Give a definition for each of the following terms. Are there other terms that need to be defined first? What are they, and how might you define them? (i) parallel lines (ii) perpendicular lines (iii) line segment (iv) radius of a circle (v) square

EXERCISE 5.1 - Question No. 3

Consider two postulates given below: (i) Given any two distinct points A and B, there exists a third point C which is in between A and B. (ii) There exist at least three points that are not on the same line. Do these postulates contain any undefined terms? Are these

postulates consistent? Do they follow from Euclids postulates?

Explain.

EXERCISE 5.1 - Question No. 4

If a point C lies between two points A and B such that $AC = BC$, then prove that $AC = \frac{1}{2}AB$. Explain by drawing the figure.

EXERCISE 5.1 - Question No. 5

In Question 4, point C is called a mid-point of line segment AB.

Prove that every line segment has one and only one mid-point.

EXERCISE 5.1 - Question No. 6

In Fig. 5.10, if $AC = BD$, then prove that $AB = CD$.

EXERCISE 5.1 - Question No. 7

Why is Axiom 5, in the list of Euclids axioms, considered a universal truth? (Note that the question is not about the fifth postulate.)

EXERCISE 5.2 - Question No. 1

How would you rewrite Euclids fifth postulate so that it would be easier to understand?

EXERCISE 5.2 - Question No. 2

Does Euclids fifth postulate imply the existence of parallel lines? Explain.

SOLVED EXAMPLES - Question No. 1

If A. B and C are three points on a line, and B lies between A and C then prove that $AB - BC = AC$.

SOLVED EXAMPLES - Question No. 2

Prove that an equilateral triangle can be constructed on any given line segment.

SOLVED EXAMPLES - Question No. 3

Consider the following statement: There exists a pair of straight lines that are everywhere equidistant from one another. Is this statement a direct consequence of Euclid's fifth postulate? Explain.