# Ravi Maths Tuition

## Introduction to Euclid's Geometry

## 9th Standard

## Mathematics

Multiple Choice Question 25 x 1 = 25

1) In Indus Valley Civilisation (about 300 b.C), The brick used for construction work were having dimension in the ration

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

2) In ancient India, the shapes of altars used for household rituals were

(a) squares and circles (b) triangles and rectangles (c) trapeziums and phyramids

(d) rectangles and squares

3) In ancient India, alters with combination of shapes like rectangles, triangles and trapeziums were used for

(a) public workship (b) household rituals (c) both (a) and (b) (d) none of the above

4) Euclid belonged to the country

(a) Babylonia (b) Egypt (c) Greek (d) india

5) Pythagoras was a student of

(a) Thales (b) Euclid (c) both (a) and (b) (d) Archimedes

6) Number of dimension(s) a surface:

(a) 0 (b) 1 (c) 2 (d) 3

7) How many numbers of lines do pass through two distinct points?

(a) 1 (b) 2 (c) 3 (d) 4

8) The number of lines that can pass through a given point is:

(a) two (b) none (c) only one (d) infinite many

9) The number of line segments determined by three collinear points is:

(a) two (b) Three (c) Only one (d) Four

10) Two planes intersect each other to form a:

(a) plane (b) Point (c) straight line (d) angle

11) 'Lines are parallel if they do not intersect' is stated in the form of:

(a) an axiom (b) a definition (c) a postulate (d) a proof

12) A proof is required for:

(a) postulate (b) aximo (c) theorem (d) definition

13) Euclid stated that all right angles are equal to each other in the form of

(a) an axiom (b) a definition (c) a postulate (d) a proof

14) The things which coincide with one another are:

(a) equal to one another (b) un equal (c) double of same thing (d) triple of same thing

15) Euclid stated that things which are equal to the same thing are equal to one another in the form of:

(a) an axiom (b) a definition (c) a postulate (d) a proof

16) The thing which coincide with one another are:

(a) equal (b) unequal (c) half of some thinf (d) triple of one another

17) The things which are double of same thing are:

(a) equal (b) halves of same thing (c) unequal (d) double of the same thing

18) Which of the following statement is incorrect?

(a) A line segment has defined length

(b) Three line are concurrent id and only if they have a common point

(c) two lines drawn in a plane always intersected at a point

(d) One and only one line can be drawn passing through a given point parallel to a given line

19) Select the wrong statement:

(a) only one line can be pass through a single point.

(b) Only one line can pass through two distinct points.

(c) A terminated line can be produced indefinitely on both the sides.

(d) if two circles are equal, then their radii are equal.

20) Which one of the following statements is true?

(a) Only one line can pass through a single point.

(b) Three are an infinite number lines which pass through two distinct points.

(c) two distinct lines cannot have more than one point in common.

(d) If two circles are equal, then their radii are not equal.

21) Given four points such that no three of them are collinear, then the number of lines that can be drawn through them is:

(a) 2 lines (b) 4 lines (c) 6 lines (d) 8 lines

22) If the point P lies in between M and N, and C is mid point of MP, then:

(a) MC + PN + = MN (b) MP + CP = MN (c) MC + CN + MN (d) CP + CN = MN

23) Two interesting lines cannot be parallel to the same line, is started in the form of:

(a) an axiom (b) a definition (c) a postulate (d) a proof

24) John Playfair was a

(a) french mathematician (b) Scottish mathematician (c) Indian mathematician

(d) Egyptian mathematician

25) There exists a pair of straight lines that are everywhere equidistant from one another' is a direct consequence of Euclid's

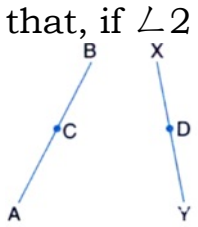
(a) first postulate (b) second postulate (c) third postulate (d) fifth postulate

1 Marks 50 x 1 = 50

26) Two salesmen make equal sales during the month of June. In July, each salesman doubles his sale of the month of June. Compare their sales in July. State which axiom you use here. Also, give two more axioms other than the axiom used in the above situation.

27) 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.

28) In the given figure, it is given that $\angle 1 = \angle 4$ and $\angle 3 = \angle 2$. By which Euclid's axiom, it can be shown that, if $\angle 2 = \angle 4$, then $\angle 1 = \angle 3$?



29) In ancient India, altars with combination of shapes like rectangles, triangles and trapeziums were used for what purpose?

30) Euclid divided the 'elements' into how many books?

31) Define the condition of a line segment AB, such that point C is called the mid-point of AB.

32) A point C is said to lie between the points A and B. Explain it.

33) It is known that, if x + Y = 10, then x + y + z = 10 + z. Which Euclid's axiom is used?

34) Solve the equation y - 25 = 40 and state which axiom will you use here?

35) If A, Band C are three collinear points, name all the line segments determined by them.

36) Given four collinear points A, B,C and D. List all the line segments determined by these.

37) Which term is assumed as universal truth in all branches of Mathematics?

38) If B lies between A and C, AC = 19 cm and BC = 8 cm. What is the measure of AB?

39) The difference of two complementary angles is 40°. Find the angles.

40) P lies in the interior of ∠BAC. If ∠BAC = 70 ° and ∠BAP = 42°, then determine the measure of ∠PAC.

41) Which term described the statement 'lines are parallel if they do not intersect'?

42) What does a theorem require?

43) Express in variables the things which are double of the same thing.

44) Explain when a system of axioms is called consistent.

45) How many lines can be passed through two distinct points?

46) What is a straight line?

47) Give any one example of a geometrical line from your surroundings.

48) What is a surface?

49) Write the number of dimension(s) of a surface.

50) How can we identify parallel lines?

51) Is the following statement a direct consequence of Euclid's fifth postulate? "There exists a pair of straight lines that are everywhere equidistant from one another."
Hint: Use playfair's axiom, which is equivalent to Euclid's fifth postulate.

52) Is the following statement true?
"Attempts to prove Euclid's fifth postulate using the other postulate and axioms led to the discovery of several other geometries."

53) What is the Euclid' s second axiom?

54) What is a theorem?

55) What is the Euclid's fifth postulate?

56) Is the following statement correct? "The axioms are Universal truths in all branches of Mathematics."

57) Complete the following statement:
The things which are double of the same thing are _____.

58) In how many chapters Euclid divided his famous treatise, "The Elements "?

59) J, M and R are friends. J is of the same age as M. R is also of the same age as M. Which Euclid's axiom illustrates the relative age of J and R?

60) How many dimensions does a solid has?

61) How many dimensions does a surface has?

62) How many dimensions does a point has?

63) Which of the following are the boundaries of a surface: lines; curves; surfaces?

64) Johan is of the same age as Mohan. Raghu is also of the same age as Mohan. State Euclid's axiom that illustrate the relative ages of Johan and Raghu.

65) Which of the following is the 5th postulate of Euclid?
(i) The whole is greater than the part.
(ii) If a straight line falling on two straight lines make the interior angles on the same side of it taken together less than two right angles then the two straight lines if produced indefinitely meet on that side on which the sum of angles is less than two right angles.
(iii) "all right angles are equal to one another."

66) Which of the following are assumed as axioms?
(i) Universal Truths in all branches of Mathematics.
(ii) Universal Truths specific to geometry.
(iii) Theorems
(iv) Defmitions.

67) Complete the following statement:
Pythagoras was a student of _____.

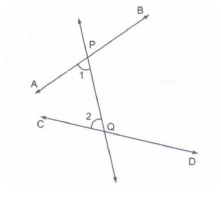
68) What do we call a closed figure formed by three line segments?

69) What do we call a figure formed by two straight lines having a common point?

70) What is the minumum number of lines required to make a closed figure?

71) How many straight lines can be drawn through two given points?

72) In the figure, line PQ falls on AB and CD such that $(\angle 1 + \angle 2) < 180°$. So, lines AB and CD, if produced will intersect on the left of PQ. This is an example of which Postulate of Euclid?




73) 4. Write 'true' or 'false' for the following statement:
(i) Three lines are concurrent if they have a common point.
(ii) A line separates a plane into three parts, namely the two half planes and the line itself.
(iii) Two distinct lines in a plane cannot have more than one point in common.
(iv) A ray has two end points.
(v) A line has indefinite length.

74) How many lines can pass through:
(i) one point
(ii) two distinct points?

75) AB and CD are two distinct lines. In how many points can they at the most intersect?

2 Marks 32 x 2 = 64

76) Consider the following statement: There exists a pair of straight lines that are everywhere equidistant from one another. Is this statement a

77) In the given figure, if A, Band Care three points on a line and B lies between A and C, then prove that AB + BC = AC.


78) Does Euclid s fifth postulate imply the existence of parallel lines? Explain.

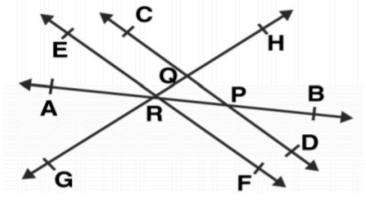
79) Read the following statements which are taken as axioms.
(i) If a transversal intersects two parallel lines, then corresponding angles are not necessarily equal.
(ii) If a transversal intersects two parallel lines, then alternate interior angles are equal.
Is this system of axioms consistent? Justify your answer.

80) An angle is 25° more than its complement. What is its measure?

81) If AB = (x + 3), BC = 2x and AC = (4x - 5), then for what value of x, Blies on AC?

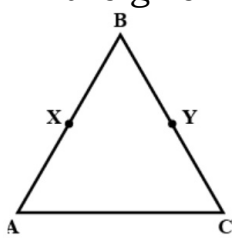
82) If x + y = 10 and x = z, then show that z + y = 10.

83) In the adjoining figure, name the following:



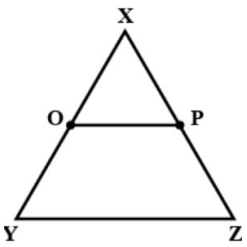

(i) Two pairs of intersecting lines and their corresponding points of intersection.
(ii) Three concurrent lines and their points of intersection
(iii) Three rays
(iv) Two line segments

84) In the given figure, If AB = BC and BX = BY, then show that AX = CY.



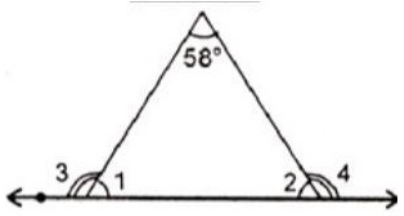

85) In the given figure, if $\angle 1 = \angle 3$, $\angle 2 = \angle 4$ and $\angle 3 = \angle 4$, then write the relation between $\angle 1$ and $\angle 2$.

86) In the adjoining figure, if OX = $\frac{1}{2}$XY,




PX = $\frac{1}{2}$XZ and OX = PX, then show that XY = XZ.

87) In the given figure, $\angle 2 = \angle 1$ and $\angle 3 = \angle 4$. Find $\angle \theta$ .




88) State whether the following statements are true or false. Justify your answer.
(i) The Euclidean geometry is valid only for figures in the plane.
(ii) Euclid's fourth axiom says that everything equals itself.
(iii) Two dis tinct intersecting lines cannot be parallel to the same line.

89) Solve the equation u - 15 = 45 and state the axiom that you use here.

90) John is of the same age as Mohan. Ram is also of the same age as Mohan. State the Euclid's axiom that illustrates the relative ages of John and Ram.

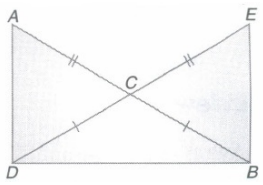
91) What is the difference between a Euclid's Postulates and an axioms?

92) Which of the following statements are true?
(i) A line segment has no definite length.
(ii) A line separates a plane into three parts, namely the two half planes and the line itself.
(iii) Three lines are concurrent if they have a common point.
(iv) Two lines are coincident if they have a common point.

93) State any two Eulis's axioms.

94) State any two Euclid's axioms.

95) In the given figure AC = DC, CB = CE, Show that AB = DE.




Write Euclid's axiom to support this.

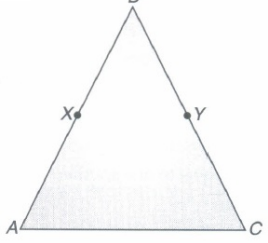
96) In the given figure, we have AB=AD and AC=AD. Prove that AB=AC. State the Euclid's axiom to support this.

97) Ram and Ravi have the same weight. If they each gain weight by 2kg, how will their new weights be compared?

98) Solve the equation x+4=10 and state Euclid's axiom used.

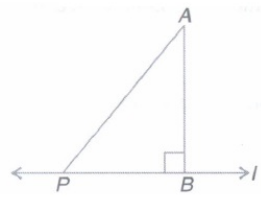
99) In a triangle PQR, X and Y are the points on PQ are QR respectively. If PQ = QR and QX = QY, Show that PX = RY.

100) In the given figure, we have AB = BC, BX = BY. Show that AX = CY. State the axiom used.



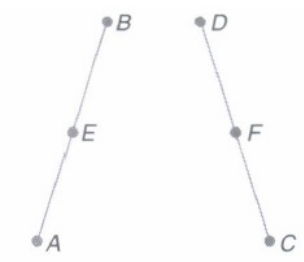

101) How many planes can be made to pass through
(i) Three collinear points.
(ii) Three non-collinear points.

102) Show that of all the line segments drawn from a given point to a line, not on it, the perpendicular line segment is the shortest.



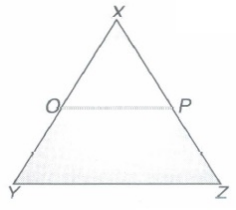

103) State playfair's axiom. Is it equivalent to one of the Euclid's postulate.

104) In figure, AE = DF, E is the mid-point of AB and F is the mid-point of DC. Using an Euclid's axiom, show that AB = DC.




105) In the given figure, if AB = CD, then prove that AC = BD. Also write the Euclid's axiom used for proving it.

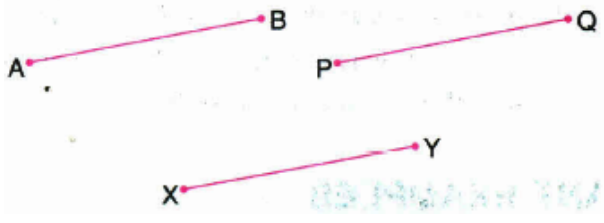

106) In the given figure, if $OX = \frac{1}{2}XY, PX = \frac{1}{2}XZ$ and OX = PX, Show that XY = XZ.




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

3 Marks 26 x 3 = 78

108) 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 terminated line can be produced indefinitely on both the sides.
(iv) If two circles are equal, then their radii are Equal.




109) 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.

110) 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 Euclid's postulates? Explain.

111) 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.

112) Point C is called a mid-point of line segment AB. Prove that every line segment has one and only one mid-point.

113) In figure, if AC = BD, then prove that AB = CD.

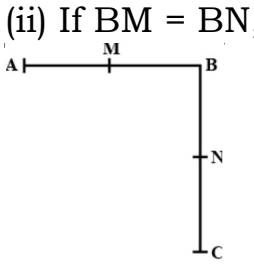

114) Prove that an equilateral triangle can be constructed on any given line segment

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

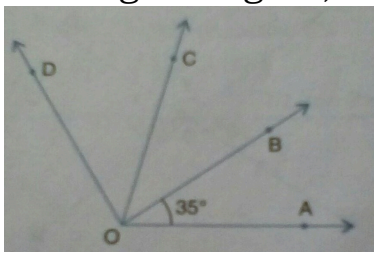
116) (i) Why is Axiom 5, in the list of Euclid's axioms, considered a 'universal truth'? (Note that the question is not about the fifth postulate).
(ii) How would you rewrite Eulid's fifth postulate so that it would be easier to understand?

117) Does Euclid 's fifth postulate simply the existence of parallel lines? Explain.

118) In the figure given below:
(i) If AB = BC, then Mis the midpoint of AB and N is the midpoint of BC. Show that AM = NC.
(ii) If BM = BN, then Mis the midpoint of AB and N is the midpoint of BC. Show that AB = BC.




119) In the given figure, if ∠DOB = 87°, ∠COA = 82° and ∠BOA = 35°, then find ∠COB and ∠COD.



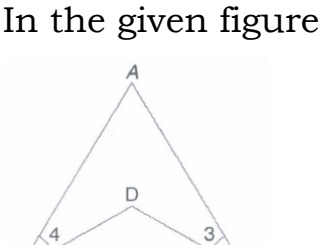
120) "A square is a polygon made up of four line segments, out of which length of three line segments are equal to the length of fourth one and all its angles are right angles", Using Euclid's, Axiom/postulates, justify that all angles and sides of a square are equal.

121) Prove that the two lines which are parallel to the same line, are parallel to each other.

122) PQ is a line segment 12 cm long and R is a point in its interior such that PR = 8 cm. Then, find QR. $PQ^2 - PR^2$ and $PR^2 + QR^2 + 2PR \cdot QR$.

123) Study the following statement:
"Two intersecting lines cannot be perpendicular to the same line." Check whether it is an equivalent version to the Euclid's fifth postulate.

124) If P and Q are the centres of two intersecting circles, then prove that
PQ = QR = PR.

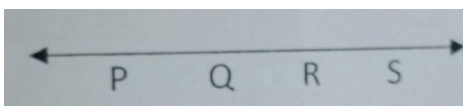



125) In the given figure, if AC = DC and CB = CE, then show that AB = DE.

126) The measure of an angle is 3 times its supplement. Find the angle.

127) If S is a point lies in the interior of ΔPQR such that, ∠PQR = 80° and ∠PQS = 35°, determine the measure of ∠RQS.

128) In the adjoining figure, PR = RS and RQ = RT. Show that PQ =  and write the Euclid's axiom to support this.



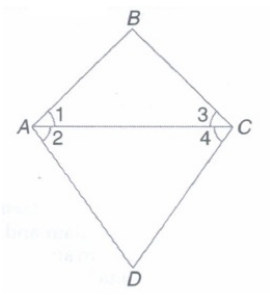

129) In the given figure, if $\angle 1 = \angle 3, \angle 2 = \angle 4$ *and* $\angle 3 = \angle 4$, write the relation between $\angle 1$ *and* $\angle 2$ using Euclid's axiom.

130) In a triangle ABC, X and Y are the points On AB and BC such that BX = BY and AB = BC. Show that AX = CY. State the Euclid's Axiom used.

131) In the given figure, we have $\angle ABC = \angle ACB, \angle 3 = \angle 4$. Show that $\angle 1 = \angle 2$.




132) In the given figure, we have $\angle 1 = \angle 3$ and $\angle 2 = \angle 4$. Show that, $\angle A = \angle C$.



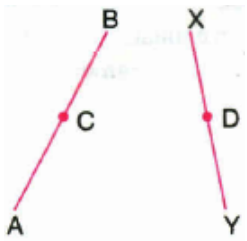

133) In question 4, point C is called a mid-point of the segment AB. Prove that every line segment has one and only one mid-point.

4 Marks 23 x 4 = 92

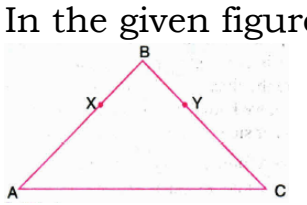
134) Solve the equation x -15 = 25 and state Euclid's Axiom used here.

135) In the given figure, if AB = CD, then prove that AC = BD. Also, write the Euclid's Axiom used for proving it.

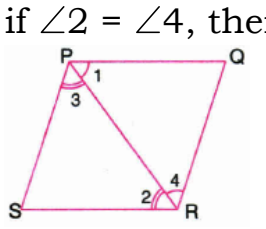
136) In figure, AC = XD, C is the midpoint of AB and D is the midpoint of XY. Using an Euclid's axiom, show that AB = XY.




137) In the given figure AB = BC and BX = BY. Show that AX = CY. State Euclid's Axiom used.




138) In the given figure, it is given that $\angle 1 = \angle 4$ and $\angle 3 = \angle 2$. By which Euclid's axiom, it can be shown that if $\angle 2 = \angle 4$, then $\angle 1 = \angle 3$.



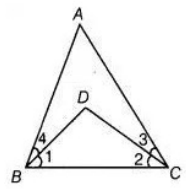

139) In figure, C is the mid-point of AB and Dis the mid-point of AC. Prove that AD = $\frac{1}{2}$ AB.


140) (i) If a point C lies between two points A and B such that AC = BC, then prove that AC= AB.
(ii) Is CB = $\frac{1}{2}$ AB?
(iii) Apala says that the ratio of AC and BC is 1 : 1. Is she correct? If so, which value of Apala is depicted by her statement?
(iv) Which mathematical concept has been covered in this problem?
(v) Write the formulae used in the solution

141) Read the following axioms.
(i) Things which are equal to the same things are equal to one another.
(ii) If equals are added to equals, then wholes are equal.
(iii) Things which are double of the same things are equal to one another.
Check whether the given system of axioms is consistent or inconsistent

142) Read the following statement
"An equilateral triangle is a polygon made up of three line segments out of which two line segments are equal to the third one and all its angles are 60° each." Define the terms used in this definition which you feel necessary. Are there any undefined terms in this? Can you justify that all sides and all angles are equal in an quilateral triangle?

143) In the given figure, we have $\angle ABC = \angle ACB$ and $\angle 3 = \angle 4$. Show that BD = DC

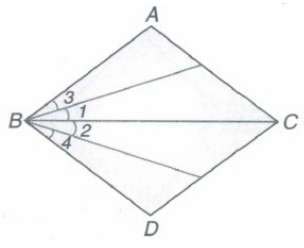



144) A square figure is given ahead. If $\angle 3 = \angle 4$, then show that ED = EC

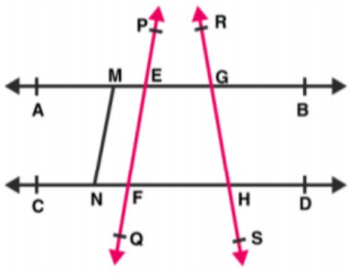
145) Suppose Lucknow, Jaipur and Bombay are three capital cities of Indian states and these are represented by the letters A, B and C, respectively. AB, BC and AC are highways to join the cities. To protect these cities from enemy countries, the Indian government decided to build two air bases at D and E, in such a way that D and E are midpoints of the highways AB and AC.
(i) If AB = AC, then prove that AD = AE.
(ii) What is the significance of this act by Indian government?

146) Rehman and Prakash contributed equal amount towards Prime Minister Relief Fund. Prakash and Rahul also contributed equal amount towards Prime Minister Relief Fund. If Rahul contributed Rs500, then how much Rehman contributed? What value they all are exhibiting by doing so? Which Euclid axiom help in reaching the correct answer? State anyone more Euclid's postulate.

147) In the given figure, we have $\angle 1 = \angle 2$ and $\angle 3 = \angle 4$. Show that $\angle ABC = \angle DBC$. State the Euclid's axiom used.




148) In the given figure, name the following:




(i) Six points
(ii) Five line segments
(iii) Four collinear points
(iv) Four lines

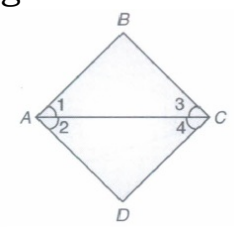
149) Read the following two statements which are taken as axiom:
i. If two lines intersect each other, then the vertically opposite angles are not equal.
ii. If a ray stands on a line, then the sum of two adjacent angles, so formed is equal to 180°.
Is this system of axioms consistent? Justify your answer.

150) If a straight line falling on two straight lines makes the interior angles on the same side of it, whose sum is 120°, then the two straight lines, if produced indefinitely, meet on the side on which the sum of angles is less than 120°. Is it true or false? Explain it.

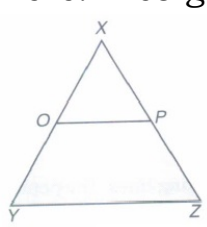
151) In a game, PQRS is a square field. Three students started from point P with same speed to follow paths PR, PQR and PSR.
(i) State who reached first at point R?
(ii) Which value is depicted by the students?

152) To promote health and well-being, a state government opens hospitals in the rural areas all over the state. The two towns X and Z are located along a straight road in such a way that the distance between X and Z is 40 km. The government opens a hospital Y between the towns X and Z, i.e. 15 km apart from Z.
(i) What is the distance of hospital from the town X?
(ii) Is the distance equal from both towns?
(iii) What values are shown by the government?

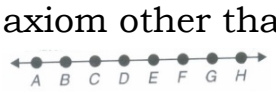
153) In the fig, we have $\angle 1 = \angle 3$ *and* $\angle 2 = \angle 4$. Show that $\angle A = \angle C$. State which axiom you use here. Also give two more axioms other than the axioms used in the above situation.




154) In the fig., if $OX = \frac{1}{2}XY$, $PX = \frac{1}{2}XZ$ and OX = PX, Show that XY = XZ. State which axiom you use here. Also give two more axioms other than the oxiom used in the above situation.




155) Using Euclid's axiom, Compare length AD and AF. State which axiom you used here. Aso give two more axiom other than the axiom used in the above situation.

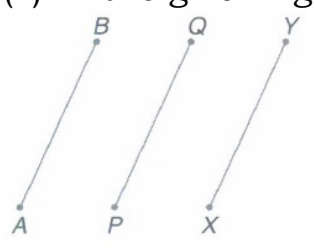


156) Read the following statement :
"A square is a polygon made up of four line segments, out of which, length of three line segement, out of which length of three line segments are equal to the length of fourth one and all its angles are right angles."
(i) Define the terms used in this definition which you feel necessary. Are there any undefined terms in this? Can you justify that all angles and sides of a square are equal?
(iii) What is its value?

5 Marks 9 x 5 = 45

157) How would you rewrite Euclid's fifth postulate, so that it would be easier to understand?

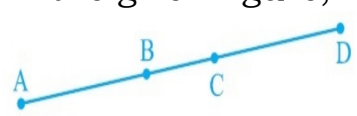
158) Which of the following statements are true and which are false? Give reason for your answers.
(i) Only one line can pass through a single point.
(ii) There are an infinite number of lines which pass through two distinct points.
(iii) The terminated line can be produced indefinitely on both the sides.
(iv) If two circles are equal, then their radii are equal.
(v) In the given figure, if AB = PO and PO = XY, then AB =XY.




159) 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

160) If a point C lies between two points A and B such that AC = BC, then. prove that AC = AB/2, explain by drawing the figure.

161) In the given figure, if AC = BD, then prove that AB = CD.




162) Why is axiom 5, in the list of Euclid's axioms, considered a 'universal truth'?

163) 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 terminated line can be produced indefinitely on both the sides.
(iv) If two circles are equal, then their radii are equal.
(v) In the following figures. if AB = PQ and PQ = XY. then AB = XY.


164) 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

165) Fill in the blanks to complete the following axioms:

(i) Things, which are equal to the same things, are _____ .

(ii) If equals are added to equals, the _____.

(iii) If equals are subtracted from equals, _____.

(iv) Things which coicide with one another are _____ .

(v) The whole is greater than the _____ .

(vi) Things which are double of the same things are _____.

(vii) Things which are halves of the same things, are _____ .

(viii) If equals are multiplied by equals, then their _____ .

(ix) If equals are divided by equals, then their _____ .

(x) Of the two quantities of the same kind, the first is greater than, equal to or less than the second. This axiom is called _____.

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