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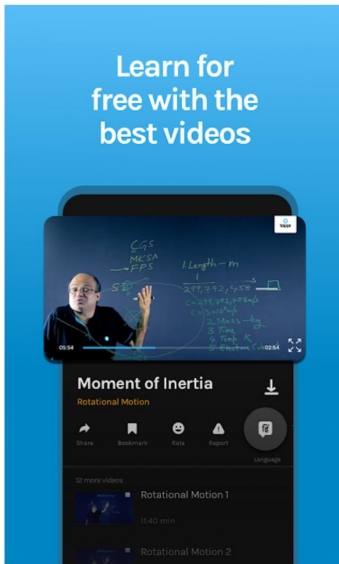
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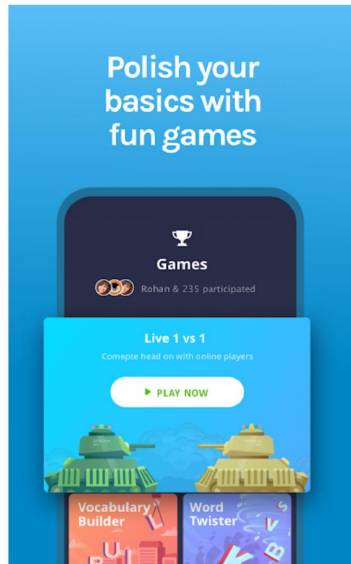


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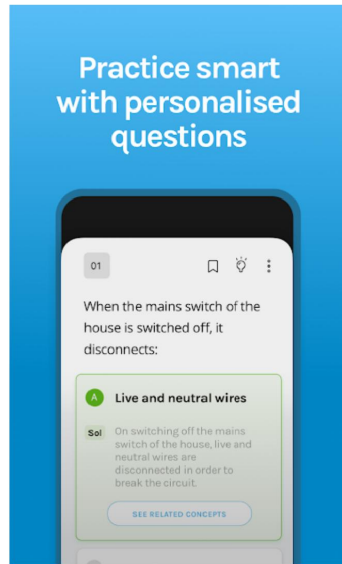
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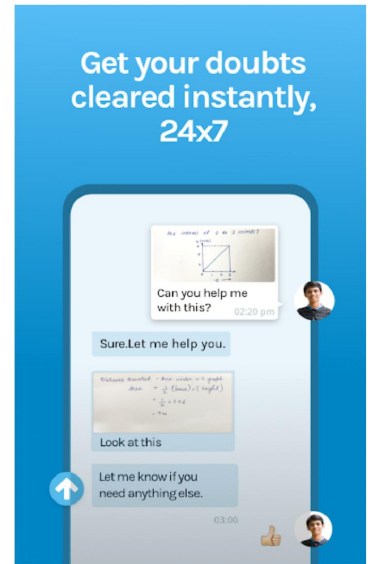
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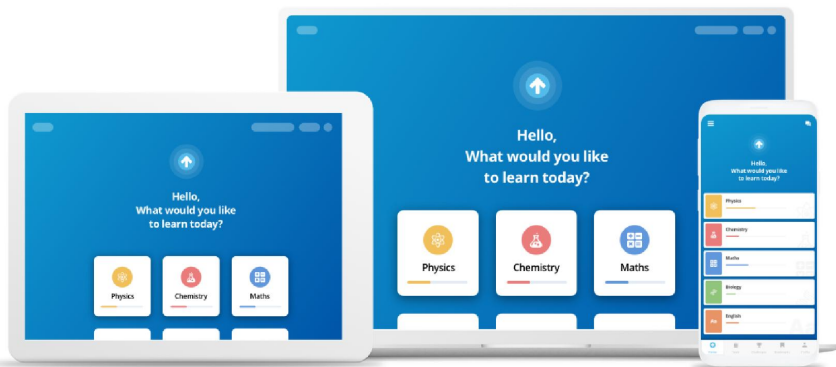
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#463624

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

- A** (i), (ii) - True
 (iii), (iv), (v) - False
- B** (i), (ii), (iii) - True
 (iv), (v) - False
- C** (i), (ii) - False
 (iii), (iv), (v) - True
- D** (i), (ii), (iii) - False
 (iv), (v) - True

Solution

- (i) Only one line can pass through a single point is false, because there are infinite lines passes through a single point.
- (ii) There are an infinite number of lines which pass through two distinct point is false, because through two distinct point only one line can pass .
- (iii) A terminated line can be produced indefinitely on both sides is true, because a line can be extended from both sides.
- (iv) If two circle are equal then their radii are equal is true, because if two circle are equal then their center is coincide and inscribe equal area thus their radii are equal.
- (v) True, according to Euclid's First Axiom, "Things which are equal to the same thing are equal to one another".

#463627

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 there postulates consistent? Do they follow from Euclid's postulates? Explain.

Solution

There are several undefined terms which we should keep in mind. They are consistent, because they deal with two different situations:

- (i) says that the given two points A and B , there is a point C lying on the line in between them;
 (ii) says that given A and B , we ca take C not lying on the line through A and B .

These 'postulates' do not follow from Euclid's postulates. However, they follow from axiom stated as given two distinct points; there is a unique line that passes through them.

#463632

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).

Solution

Axiom 5 states that the whole is greater than the part.

This axiom is known as a universal truth because it holds true in any field, and not just in the field of mathematics.

Let us take two cases – one in the field of mathematics and one other than that.

Case I

Let t represent a whole quantity and only a, b, c are parts of it.

$$t = a + b + c$$

Clearly, t will be greater than all its parts a, b and c .

Therefore, it is rightly said that the whole is greater than the part.

Case II

Let us consider the continent Asia. Then, let us consider a country India which belongs to Asia. India is a part of Asia and it can also be observed that Asia is greater than India

That is why we can say that the whole is greater than the part. This is true for anything in any part of the world and is thus a universal truth.

#463633

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

Solution

Two lines are said to be parallel if they are equidistant from one other and they do not have any point of intersection.

#463634

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

Solution

The sum of the interior angles will be equal to sum of the two right angles then two lines will not meet each other on either sides and therefore they will be parallel to each other