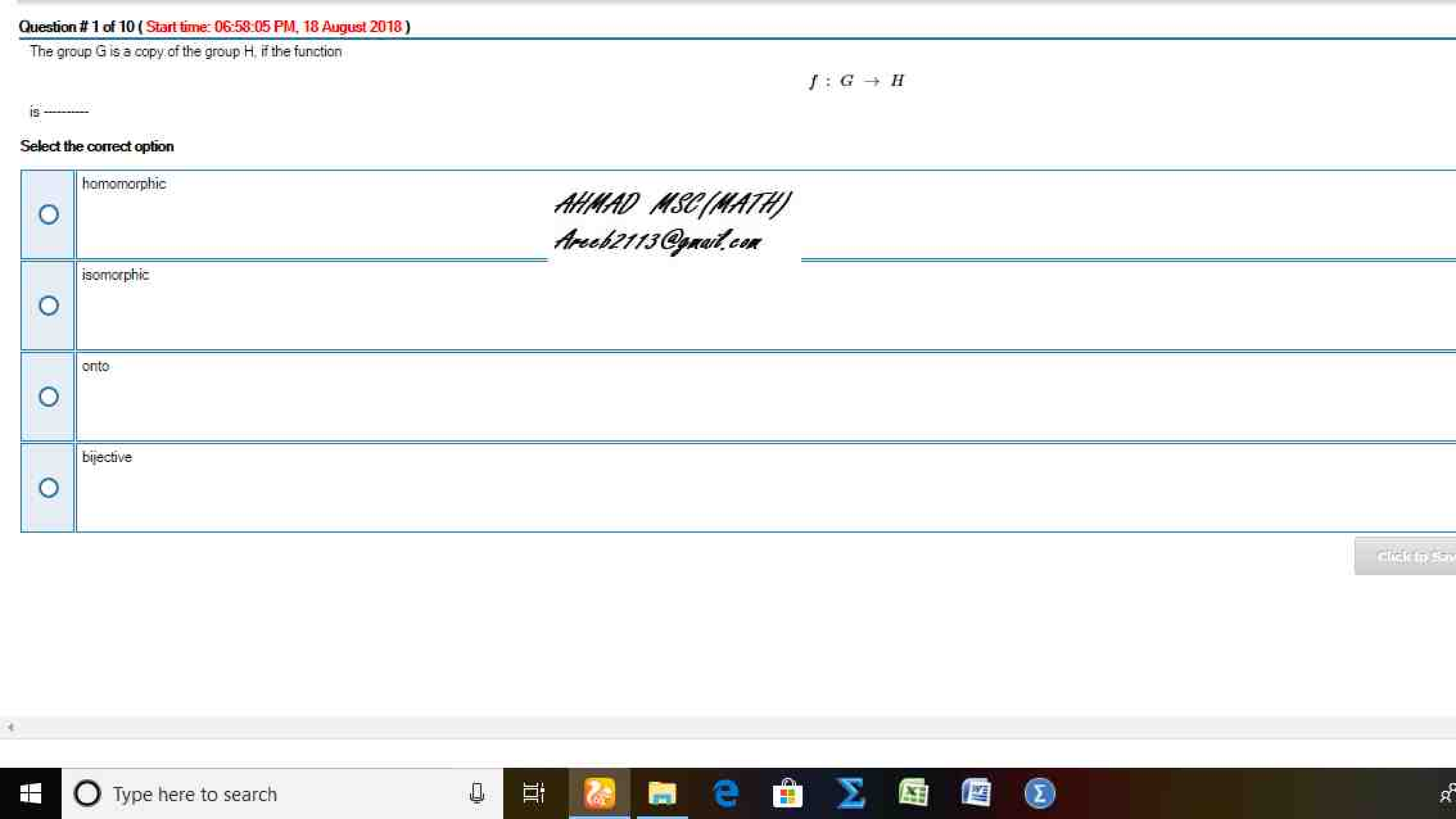


Question # 1 of 10 (Start time: 06:58:05 PM, 18 August 2018)

The group G is a copy of the group H, if the function

$$f : G \to H$$

is ----------

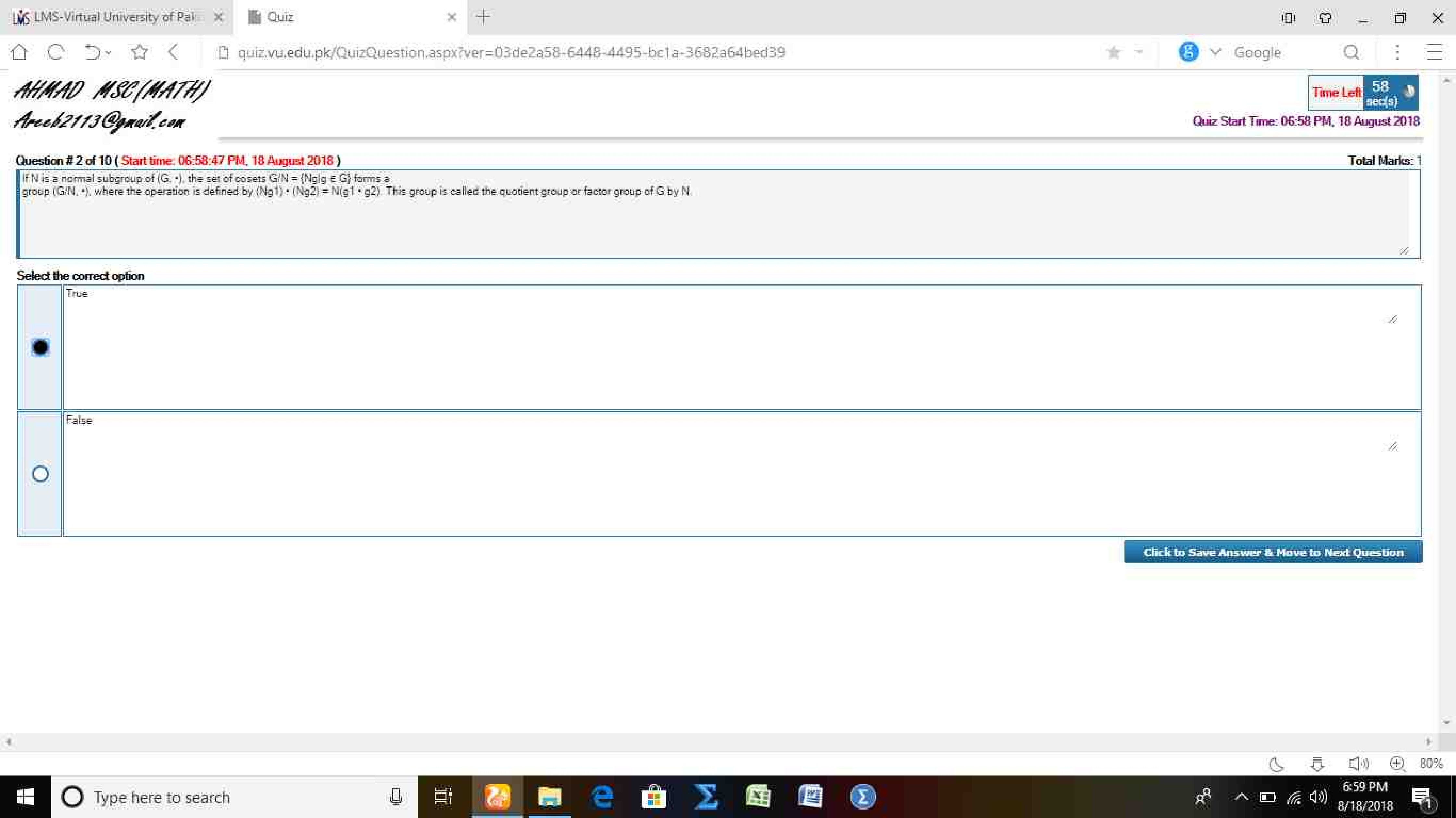
Select the correct option

○ homomorphic

○ isomorphic

○ onto

○ bijective



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Areeb2113@gmail.com

Time Left 58 sec(s)

Quiz Start Time: 06:58 PM, 18 August 2018

Question # 2 of 10 (Start time: 06:58:47 PM, 18 August 2018) **Total Marks: 1**

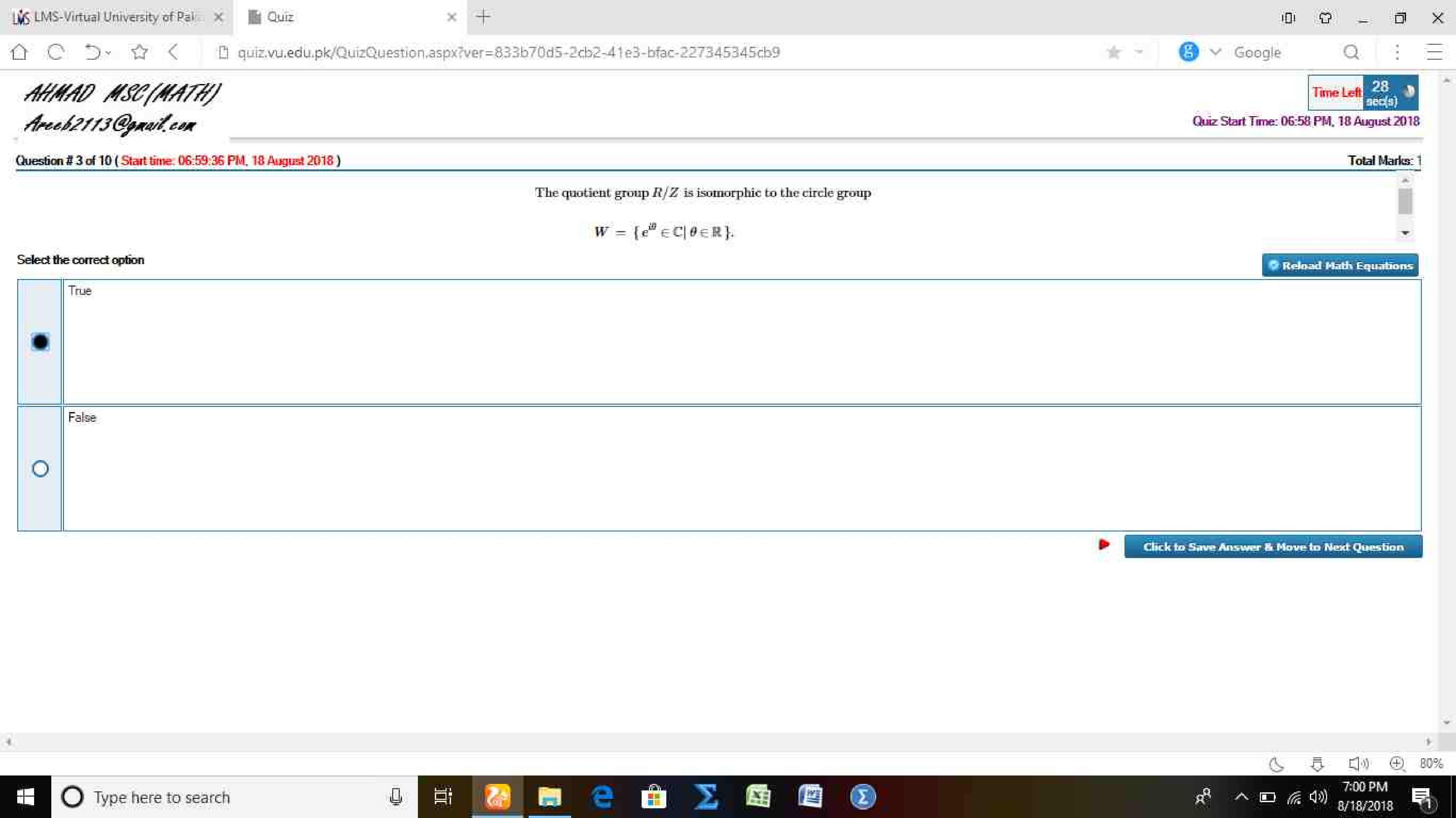
If N is a normal subgroup of (G, •), the set of cosets G/N = {Ng|g ∈ G} forms a
group (G/N, •), where the operation is defined by (Ng1) • (Ng2) = N(g1 • g2). This group is called the quotient group or factor group of G by N.

Select the correct option

● True

○ False

Click to Save Answer & Move to Next Question



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Areeb2113@gmail.com

Quiz Start Time: 06:58 PM, 18 August 2018

Question # 3 of 10 (Start time: 06:59:36 PM, 18 August 2018) **Total Marks: 1**

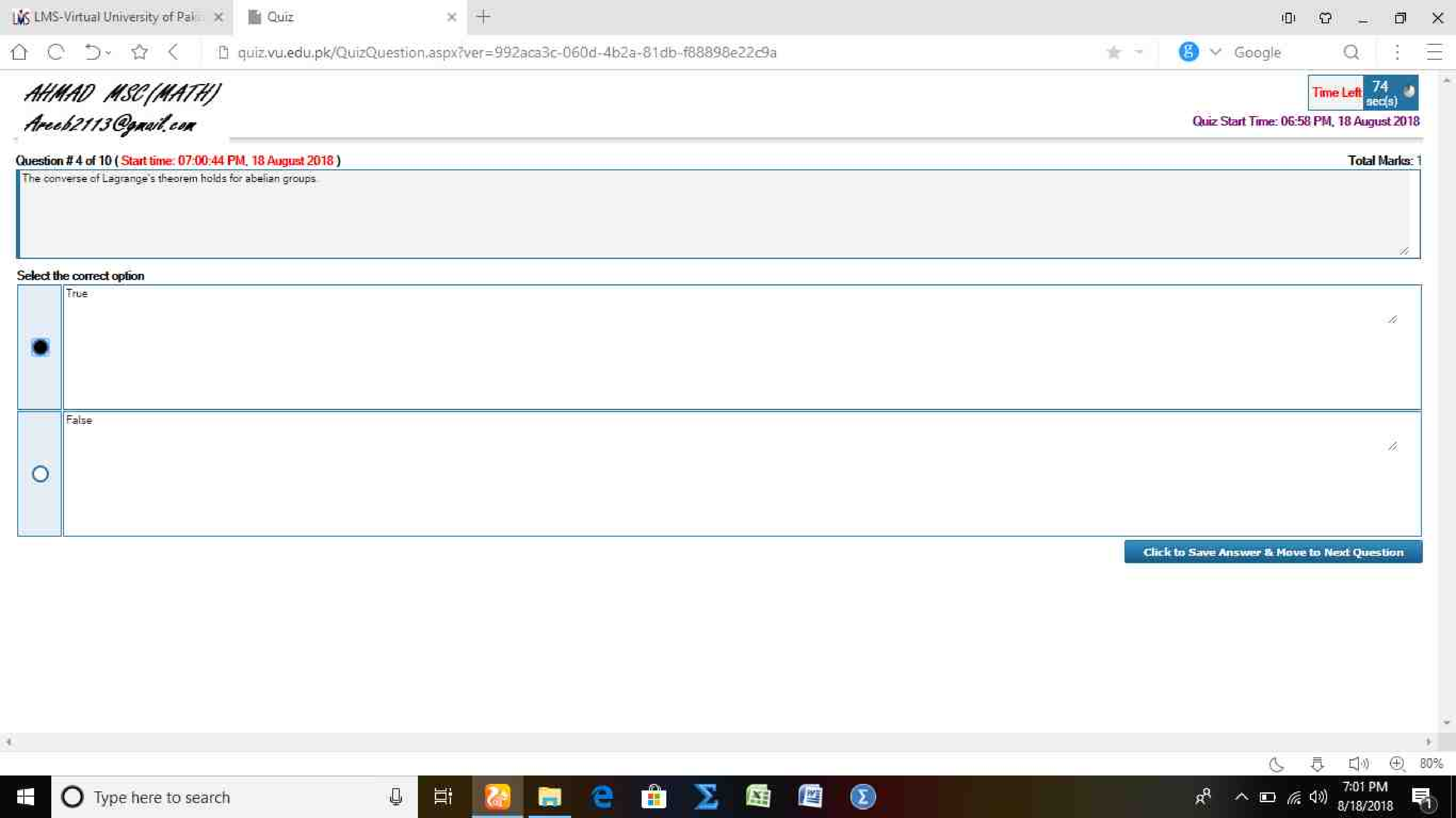
The quotient group R/Z is isomorphic to the circle group

$$W = \{e^{i\theta} \in \mathbb{C} | \theta \in \mathbb{R}\}.$$

Select the correct option

● True

○ False



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Time Left 74 sec(s)

Quiz Start Time: 06:58 PM, 18 August 2018

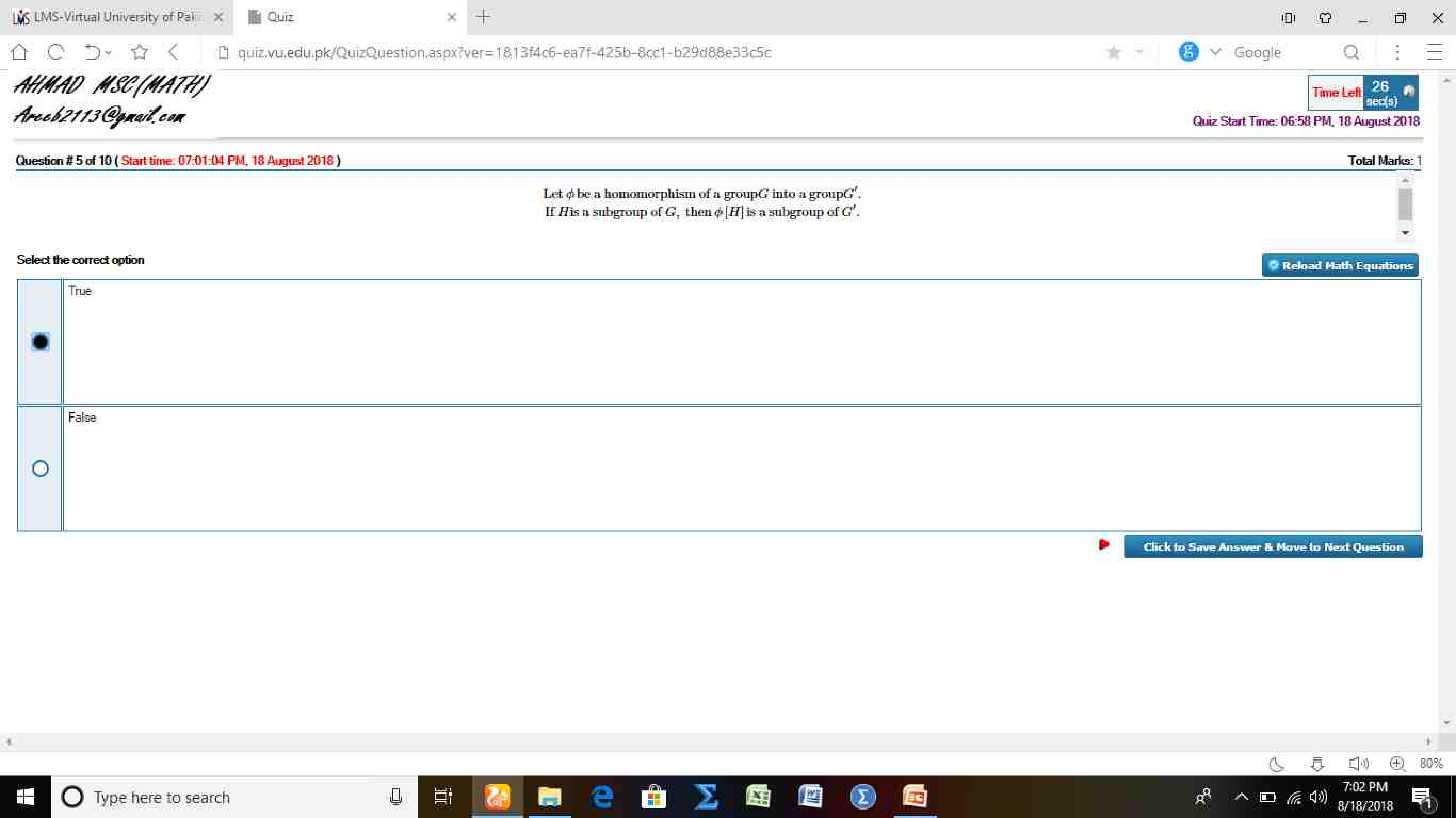
Question # 4 of 10 (Start time: 07:00:44 PM, 18 August 2018) **Total Marks: 1**

The converse of Lagrange's theorem holds for abelian groups.

Select the correct option

● True

○ False



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Areeb2113@gmail.com

Quiz Start Time: 06:58 PM, 18 August 2018

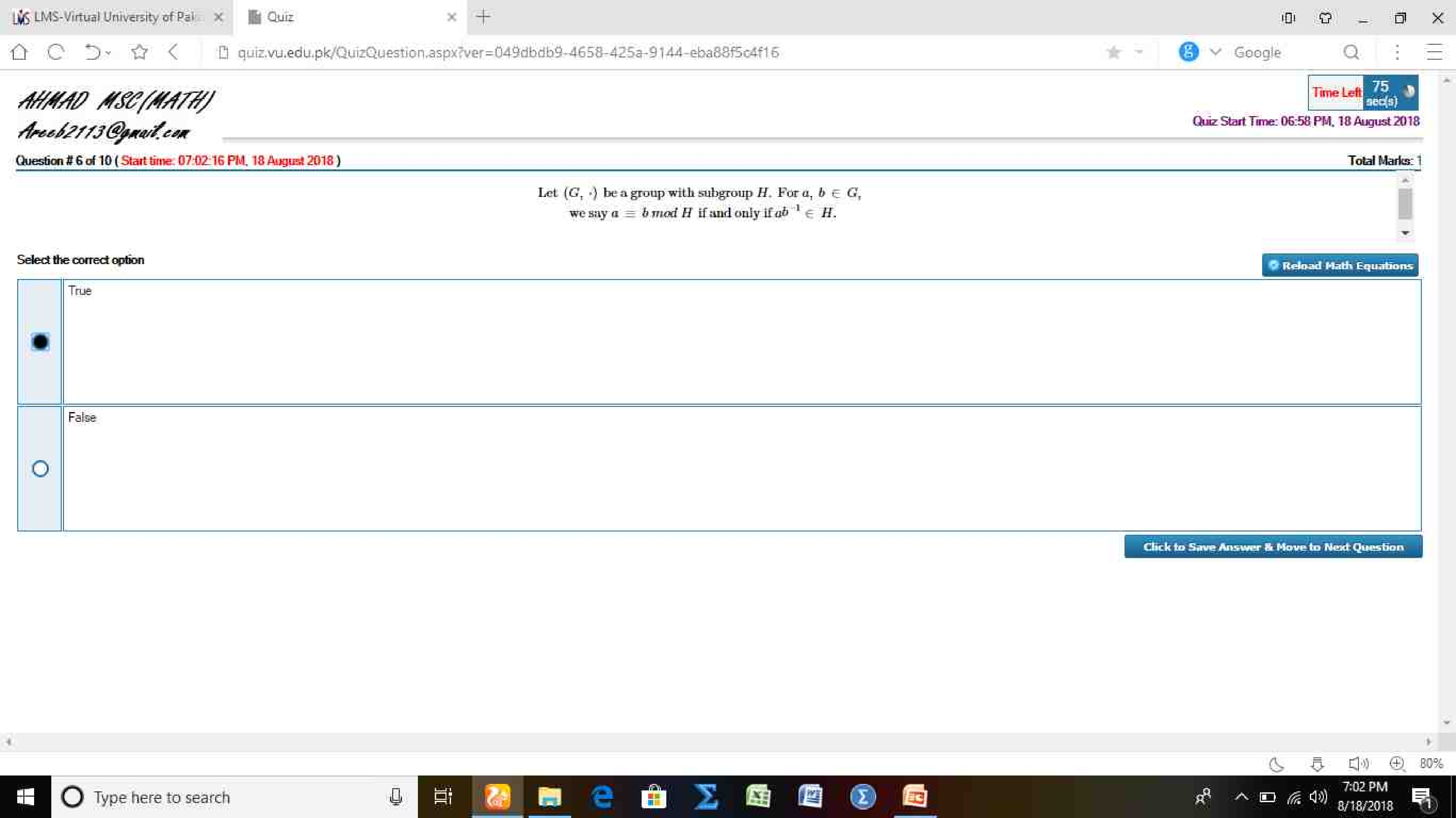
Question # 5 of 10 (Start time: 07:01:04 PM, 18 August 2018) **Total Marks: 1**

Let ϕ be a homomorphism of a group G into a group G'.
If H is a subgroup of G, then $\phi[H]$ is a subgroup of G'.

Select the correct option

● True

○ False



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Time Left 75 sec(s)

Quiz Start Time: 06:58 PM, 18 August 2018

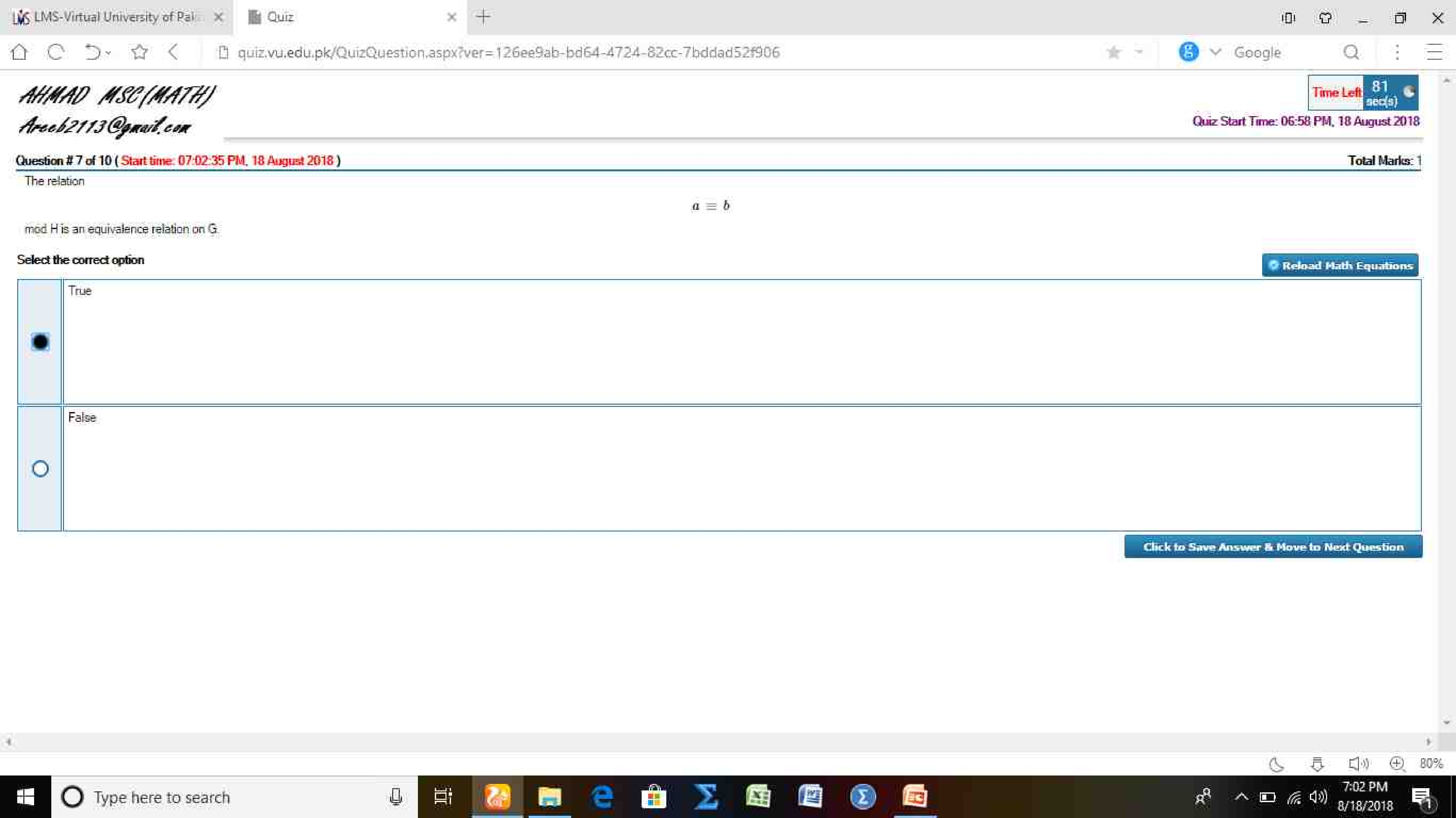
Question # 6 of 10 (Start time: 07:02:16 PM, 18 August 2018) Total Marks: 1

Let $(G, \cdot)$ be a group with subgroup H. For $a, b \in G$, we say $a \equiv b \, mod \, H$ if and only if $ab^{-1} \in H$.

Select the correct option

● True

○ False



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Time Left 81 sec(s)

Quiz Start Time: 06:58 PM, 18 August 2018

Question # 7 of 10 (Start time: 07:02:35 PM, 18 August 2018) **Total Marks: 1**

The relation

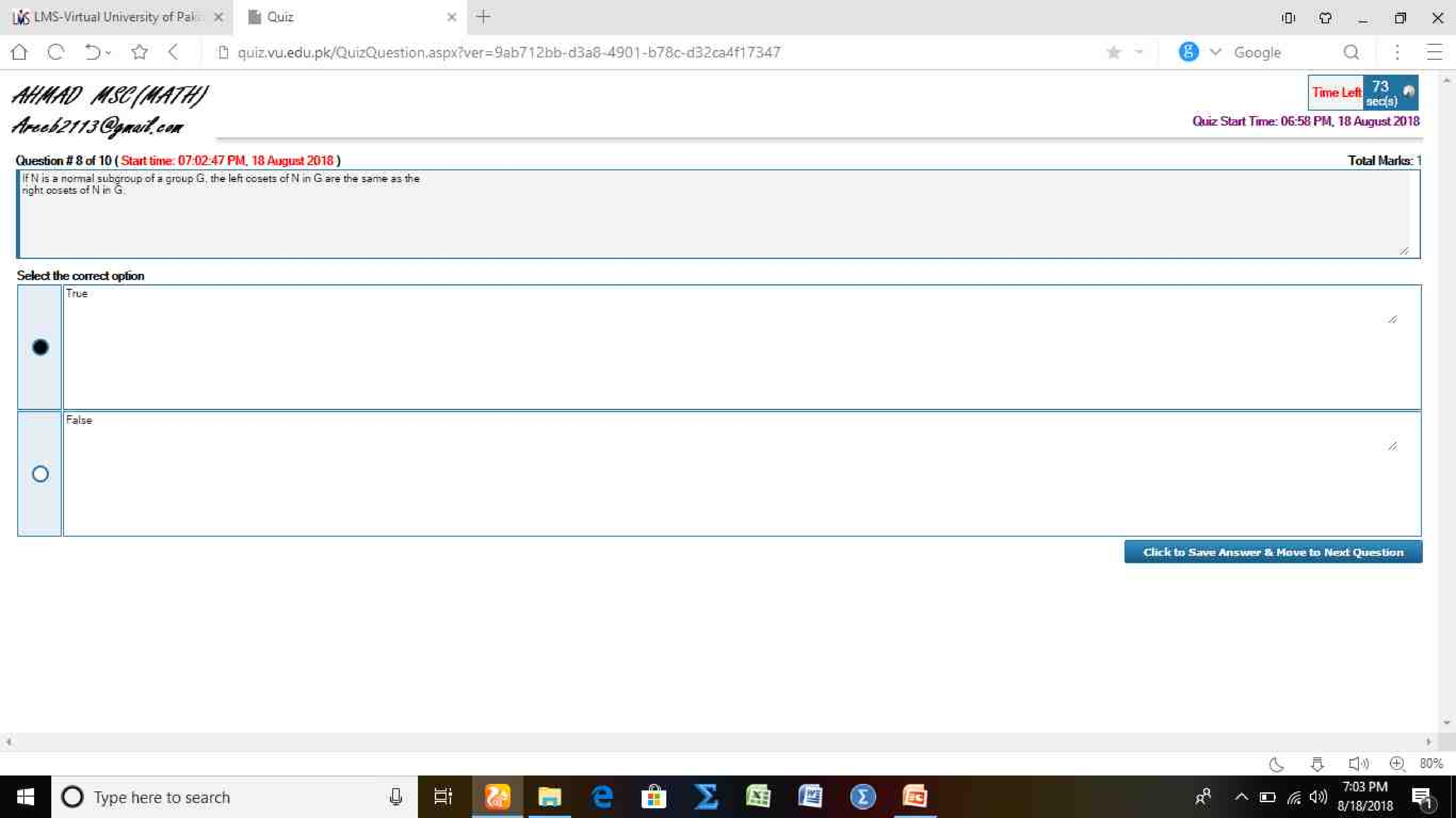
$$a \equiv b$$

mod H is an equivalence relation on G.

Select the correct option

● True

○ False



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Quiz Start Time: 06:58 PM, 18 August 2018

Question # 8 of 10 (Start time: 07:02:47 PM, 18 August 2018)

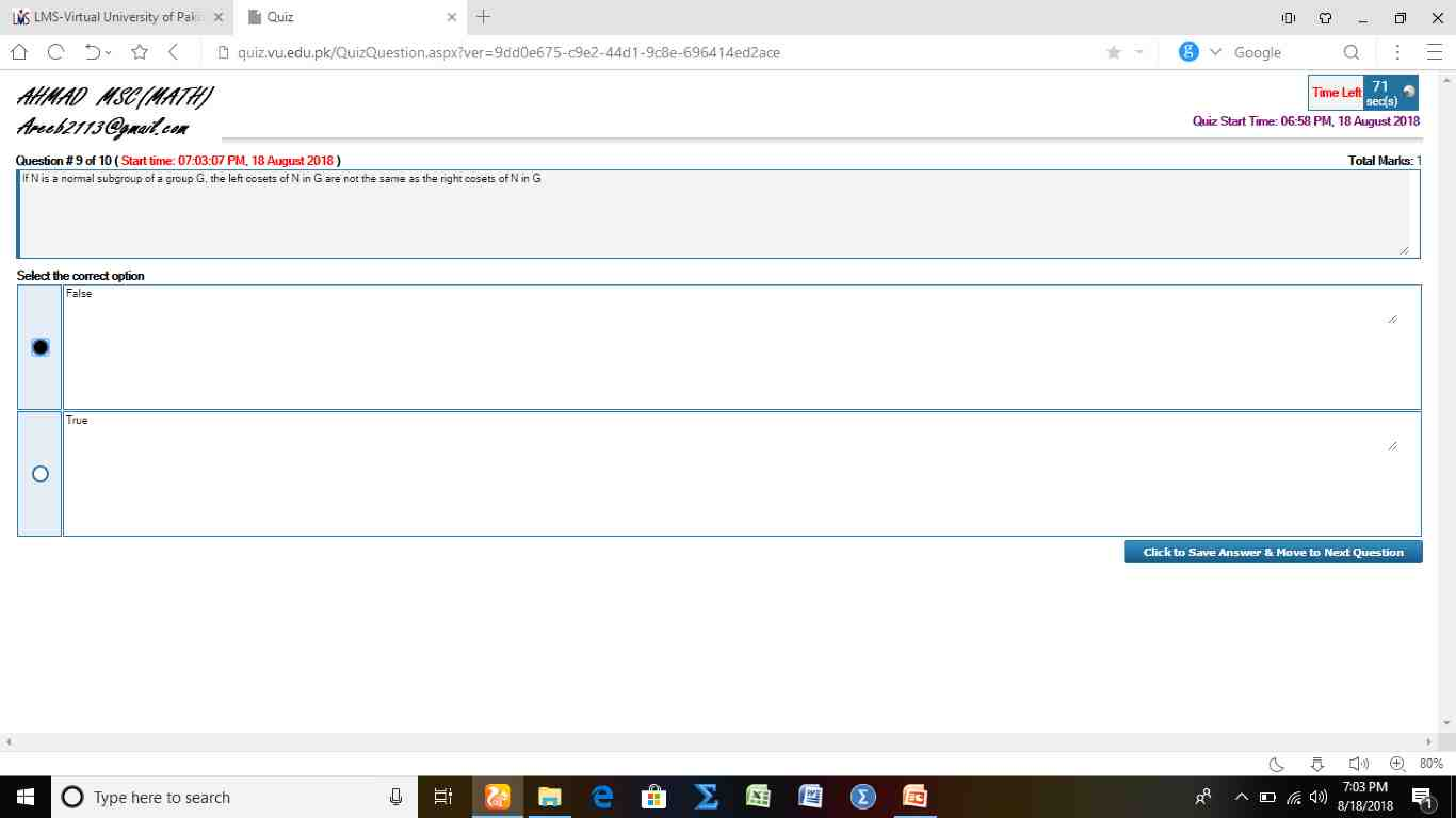
Total Marks: 1

If N is a normal subgroup of a group G, the left cosets of N in G are the same as the right cosets of N in G.

Select the correct option

● True

○ False



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Time Left 71 sec(s)

Quiz Start Time: 06:58 PM, 18 August 2018

Question # 9 of 10 (Start time: 07:03:07 PM, 18 August 2018)

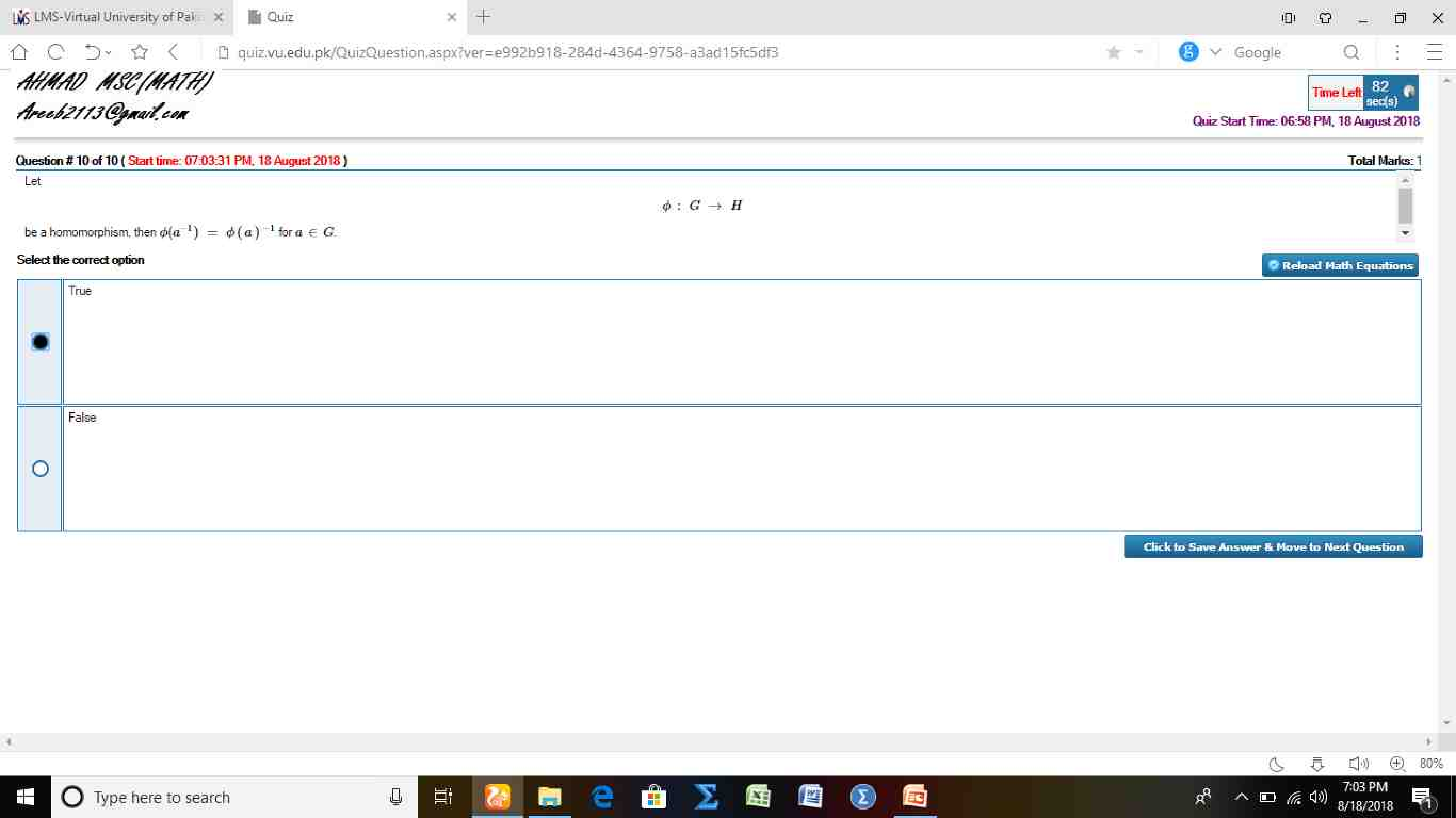
Total Marks: 1

If N is a normal subgroup of a group G, the left cosets of N in G are not the same as the right cosets of N in G

Select the correct option

● False

○ True



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Areeb2113@gmail.com

Time Left 82 sec(s)

Quiz Start Time: 06:58 PM, 18 August 2018

Question # 10 of 10 (Start time: 07:03:31 PM, 18 August 2018) **Total Marks: 1**

Let

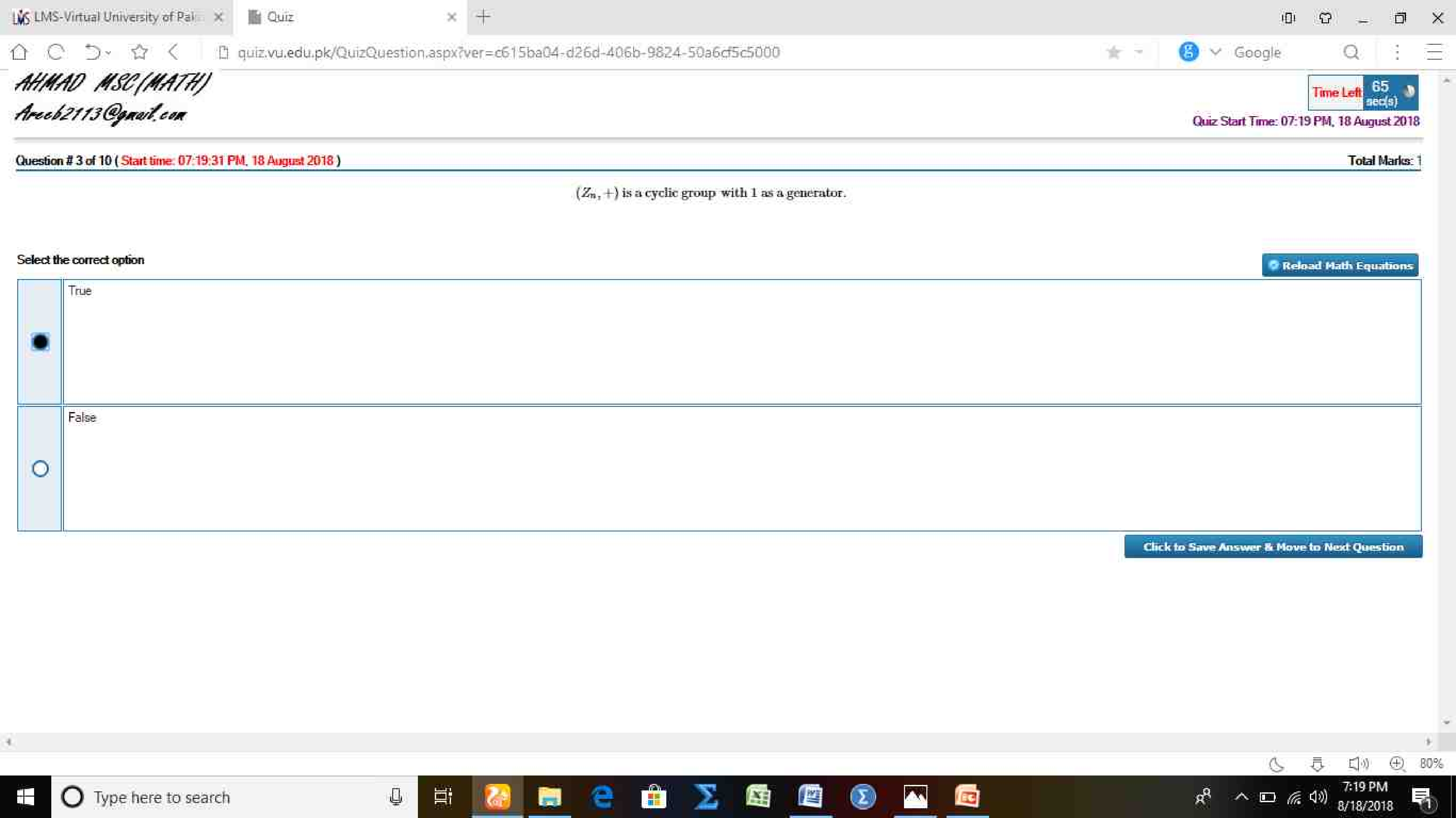
$$\phi : G \to H$$

be a homomorphism, then $\phi(a^{-1}) = \phi(a)^{-1}$ for $a \in G$.

Select the correct option

● True

○ False



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Areeb2113@gmail.com

Time Left 65 sec(s)

Quiz Start Time: 07:19 PM, 18 August 2018

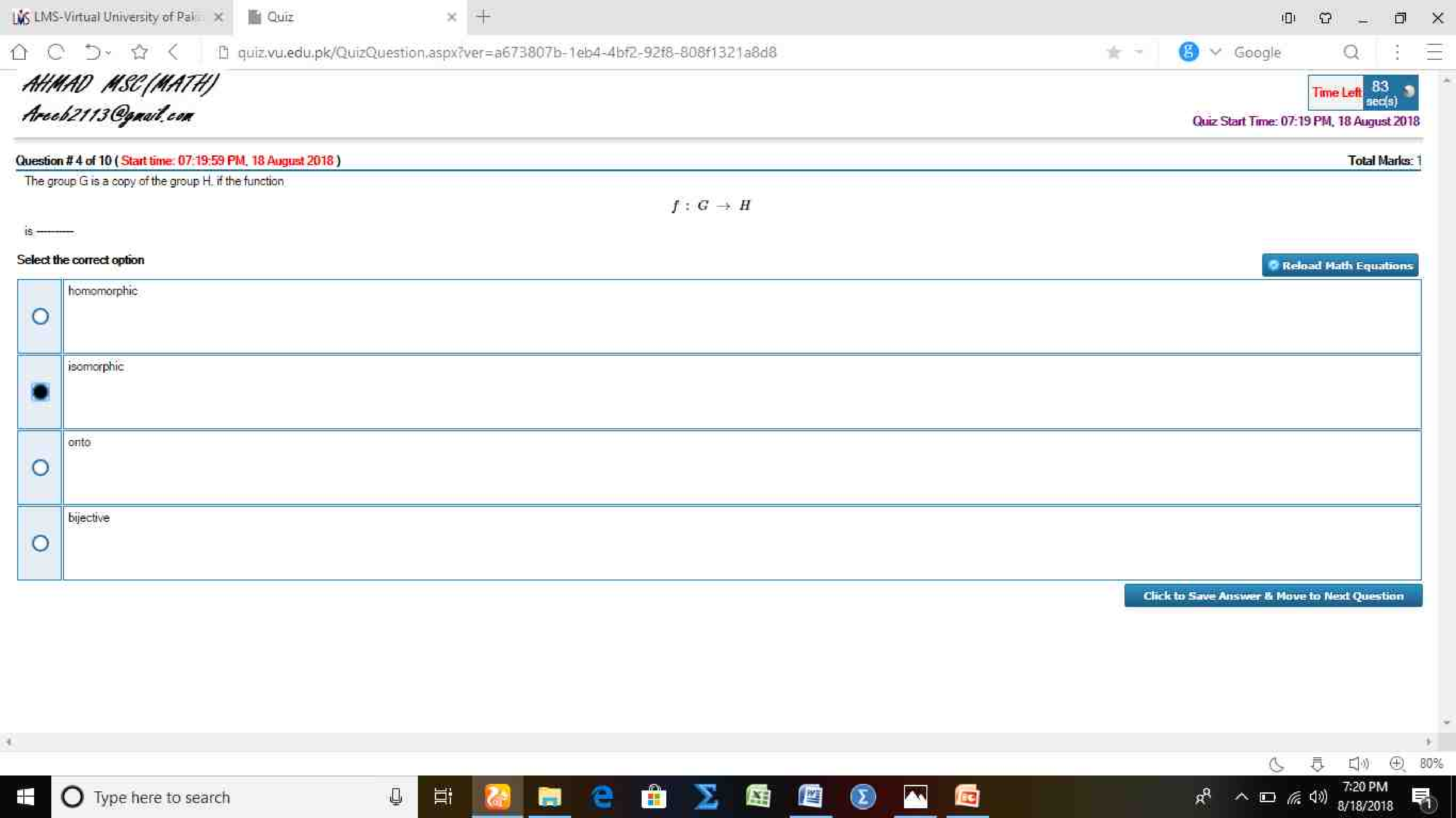
Question # 3 of 10 (Start time: 07:19:31 PM, 18 August 2018) **Total Marks: 1**

$(Z_n, +)$ is a cyclic group with 1 as a generator.

Select the correct option

● True

○ False



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Time Left 83 sec(s)

Quiz Start Time: 07:19 PM, 18 August 2018

Question # 4 of 10 (Start time: 07:19:59 PM, 18 August 2018) **Total Marks: 1**

The group G is a copy of the group H, if the function

$$f : G \to H$$

is --------

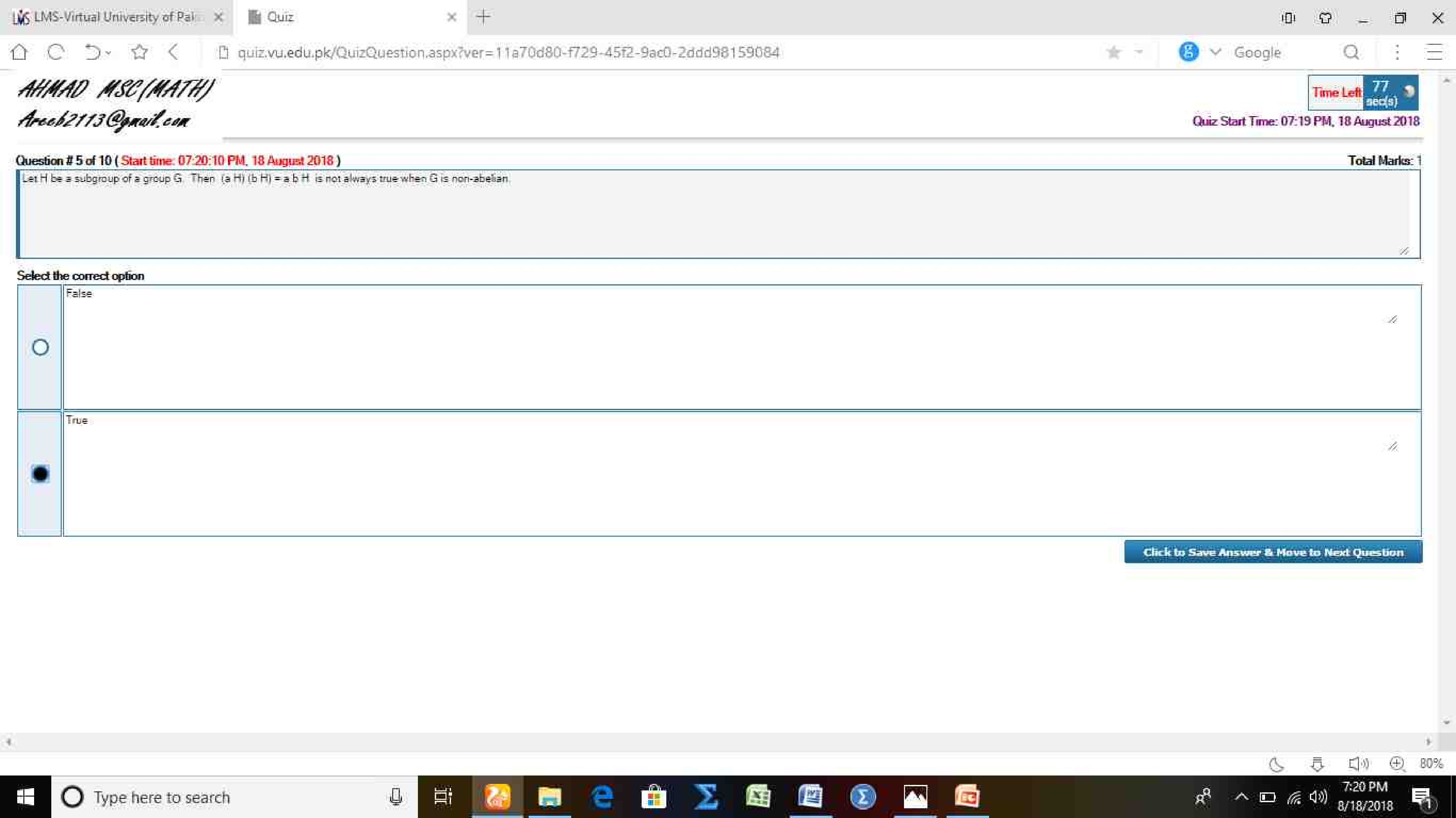
Select the correct option

○ homomorphic

● isomorphic

○ onto

○ bijective



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Areeb2113@gmail.com

Time Left 77 sec(s)

Quiz Start Time: 07:19 PM, 18 August 2018

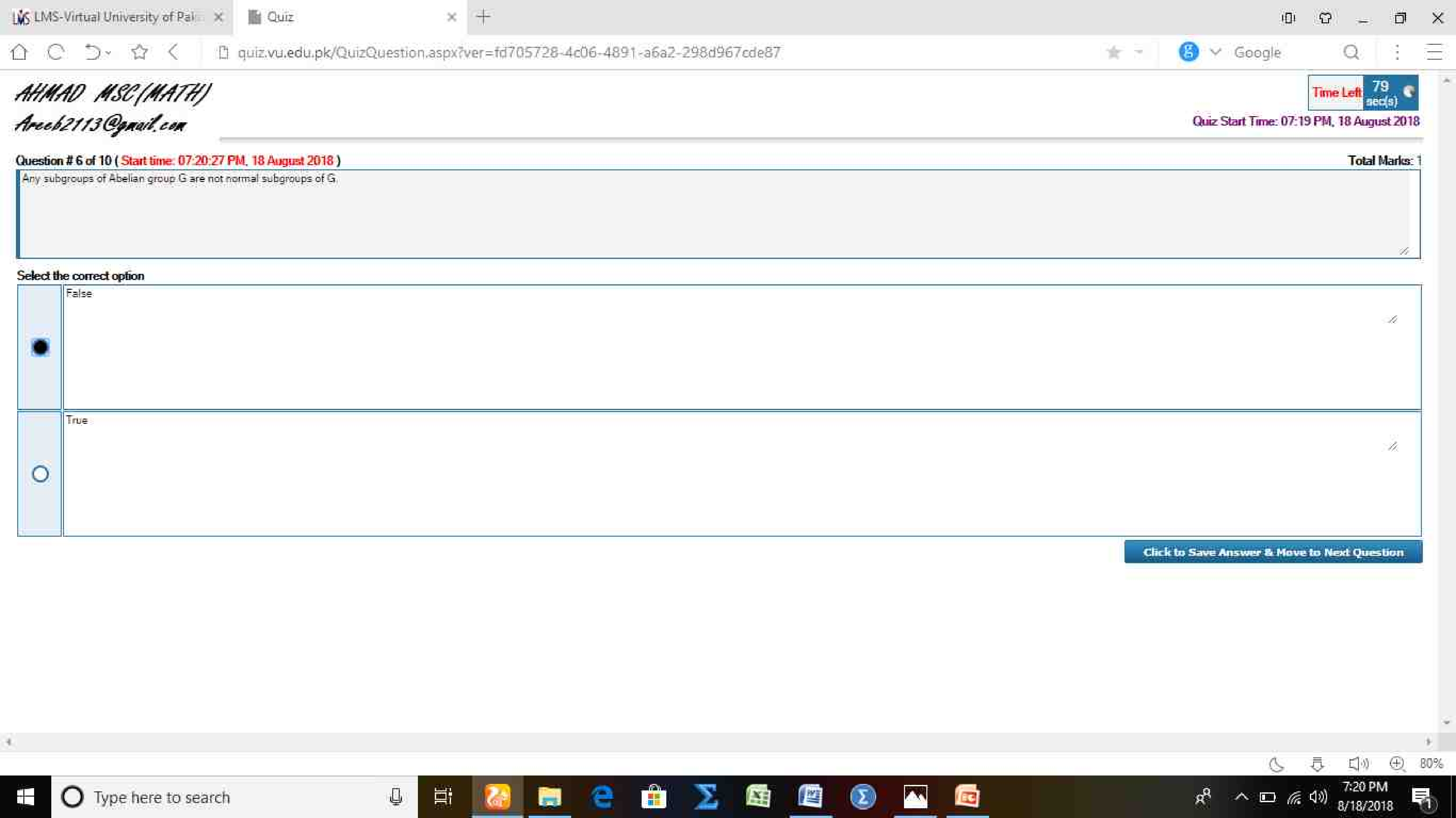
Question # 5 of 10 (Start time: 07:20:10 PM, 18 August 2018) **Total Marks: 1**

Let H be a subgroup of a group G. Then (a H) (b H) = a b H is not always true when G is non-abelian.

Select the correct option

○ False

● True



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Time Left 79 sec(s)

Quiz Start Time: 07:19 PM, 18 August 2018

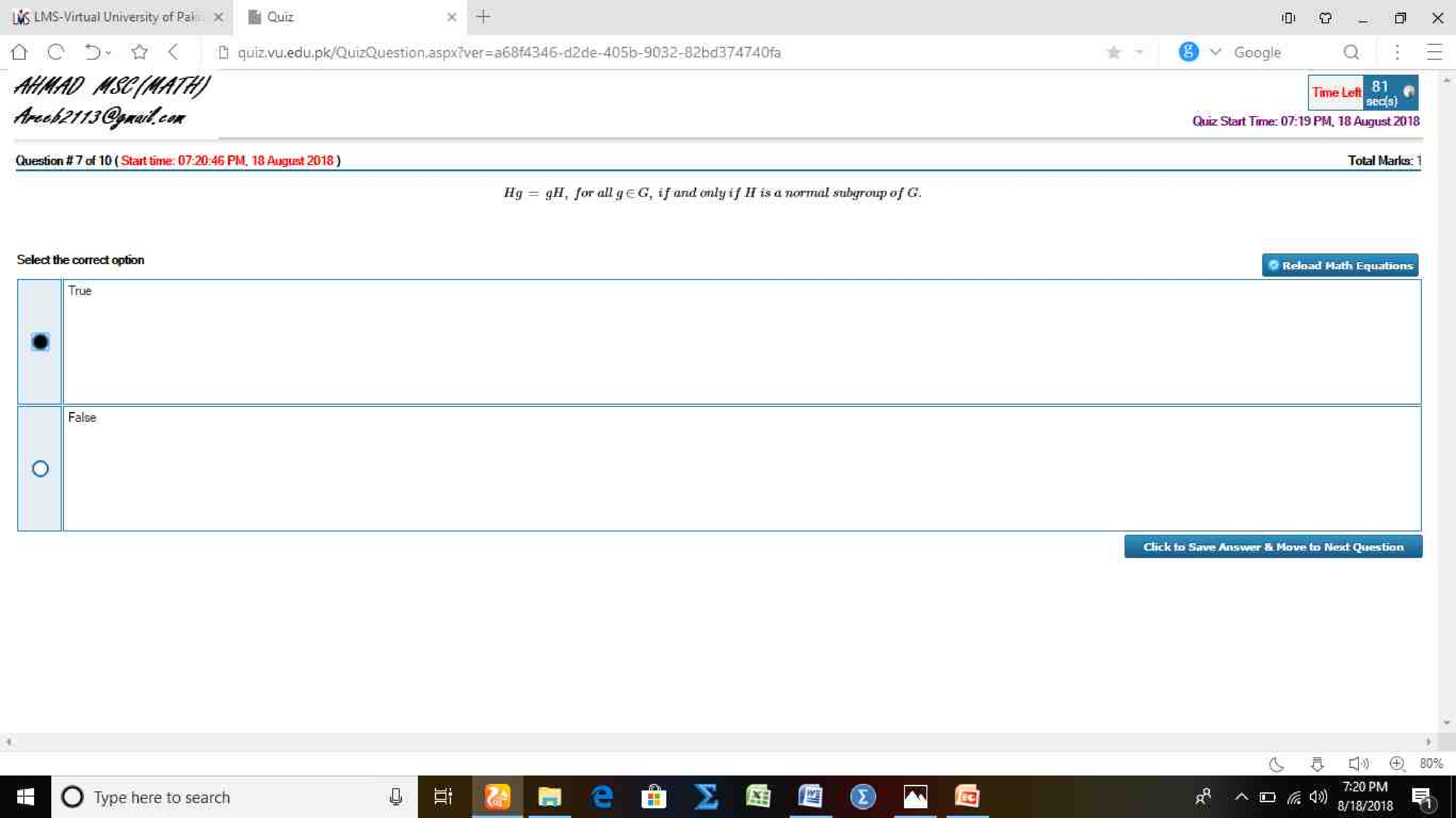
Question # 6 of 10 (Start time: 07:20:27 PM, 18 August 2018) **Total Marks: 1**

Any subgroups of Abelian group G are not normal subgroups of G.

Select the correct option

● False

○ True



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Quiz Start Time: 07:19 PM, 18 August 2018

Question # 7 of 10 (Start time: 07:20:46 PM, 18 August 2018)

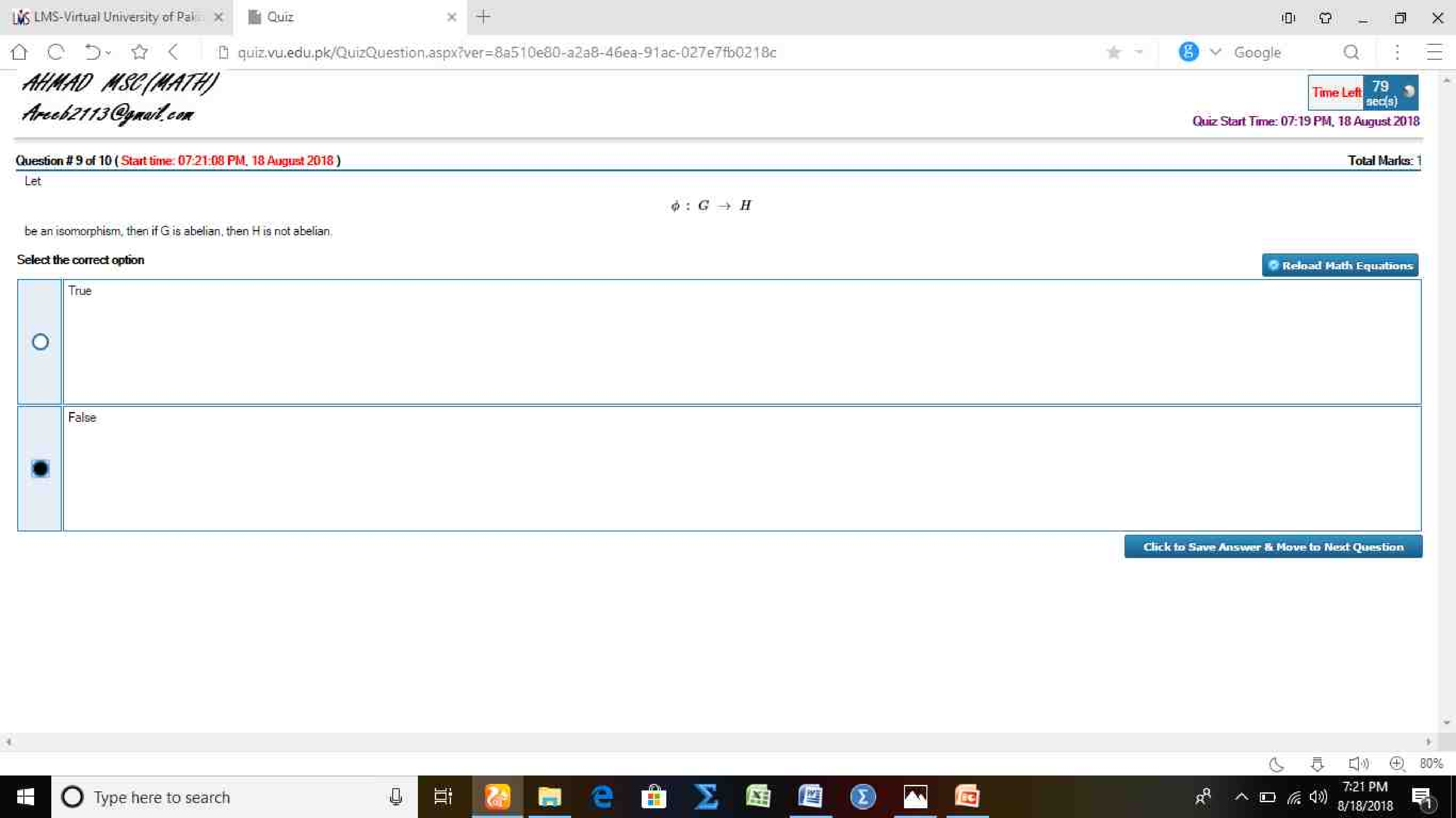
Total Marks: 1

$$Hg = gH,\ for\ all\ g \in G,\ if\ and\ only\ if\ H\ is\ a\ normal\ subgroup\ of\ G.$$

Select the correct option

● True

○ False



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Quiz Start Time: 07:19 PM, 18 August 2018

Question # 9 of 10 (Start time: 07:21:08 PM, 18 August 2018) **Total Marks: 1**

Let

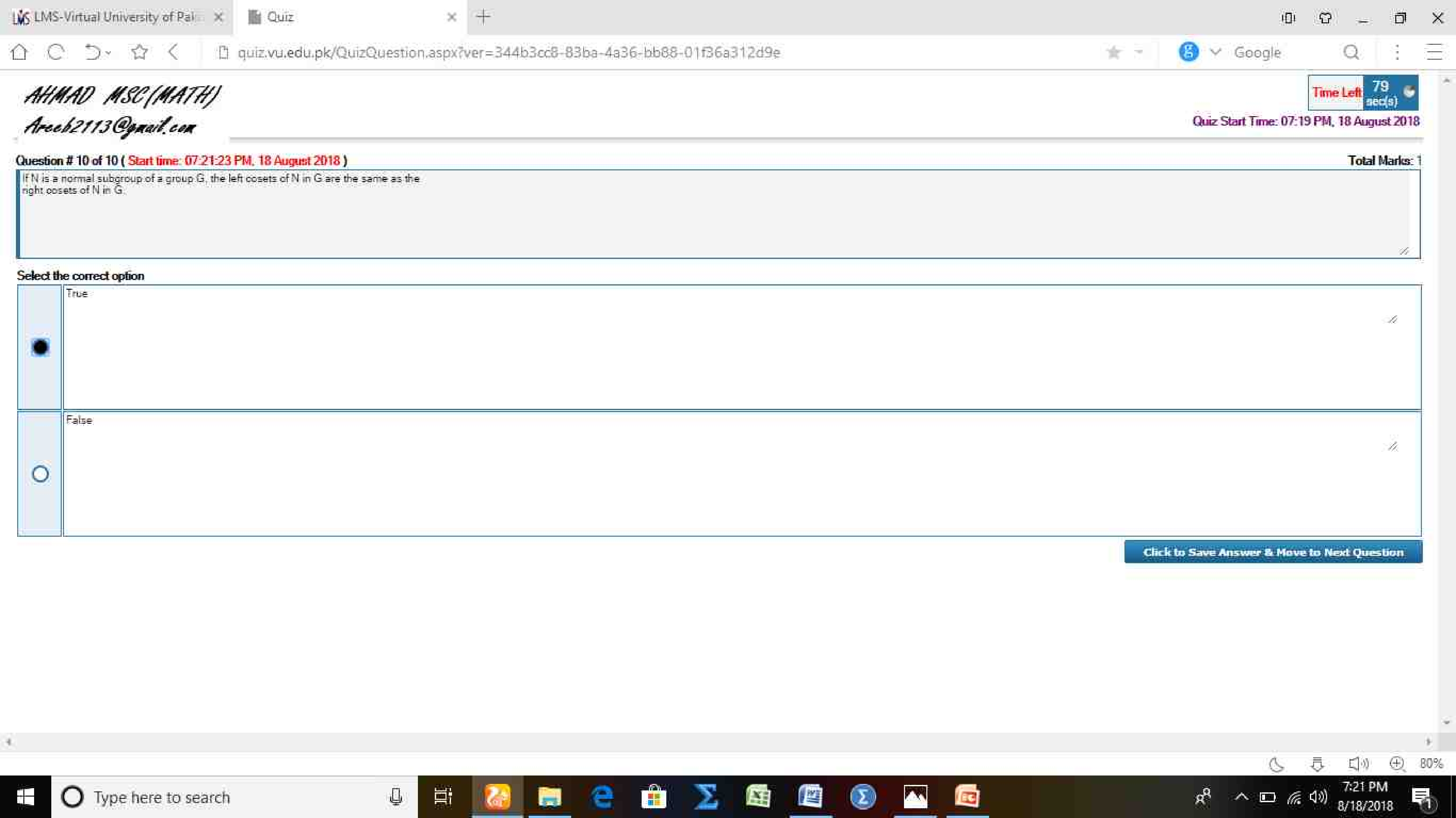
$$\phi : G \to H$$

be an isomorphism, then if G is abelian, then H is not abelian.

Select the correct option

○ True

● False



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Quiz Start Time: 07:19 PM, 18 August 2018

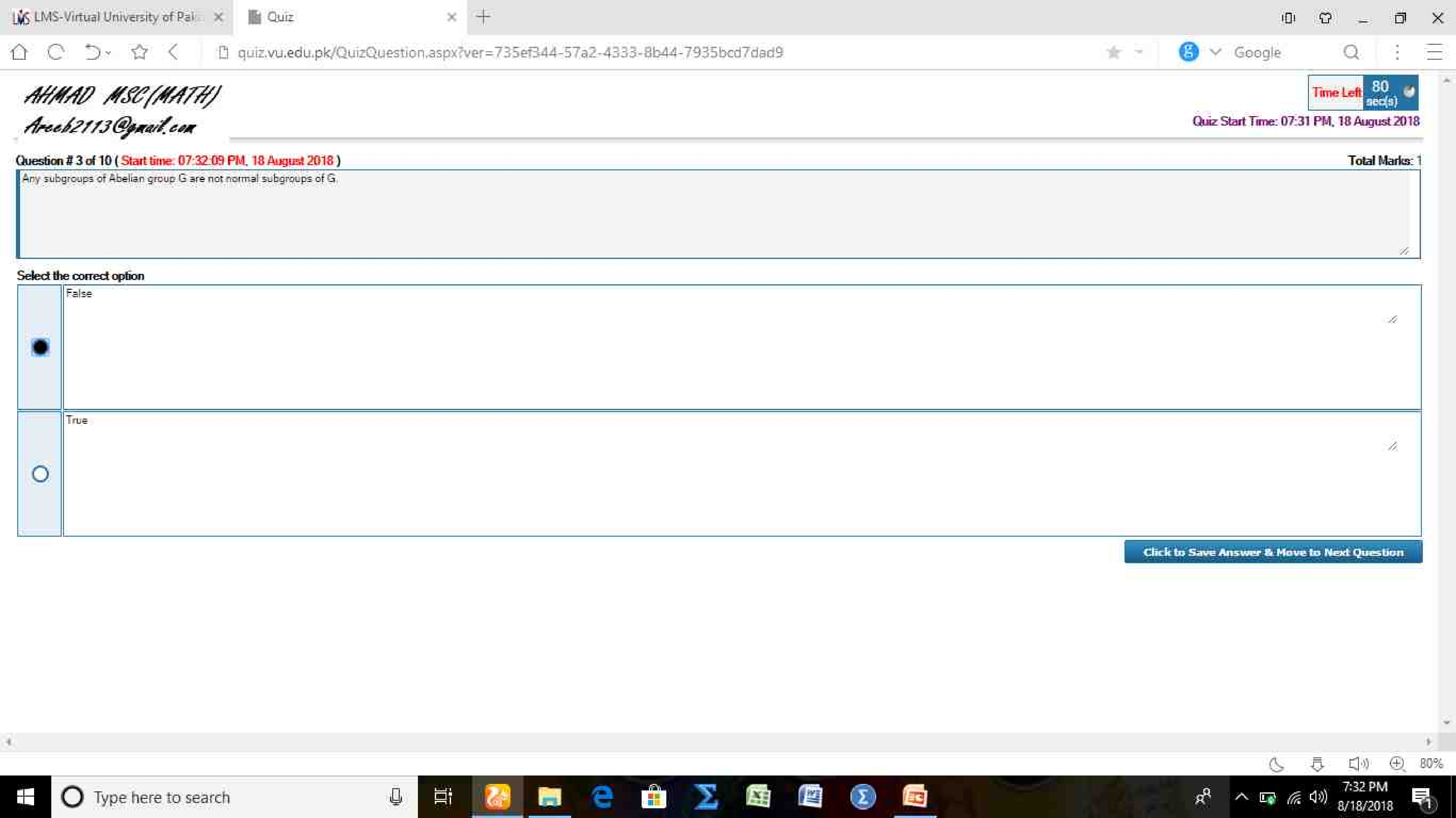
Question # 10 of 10 (Start time: 07:21:23 PM, 18 August 2018) Total Marks: 1

If N is a normal subgroup of a group G, the left cosets of N in G are the same as the right cosets of N in G.

Select the correct option

● True

○ False



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Time Left 80 sec(s)

Quiz Start Time: 07:31 PM, 18 August 2018

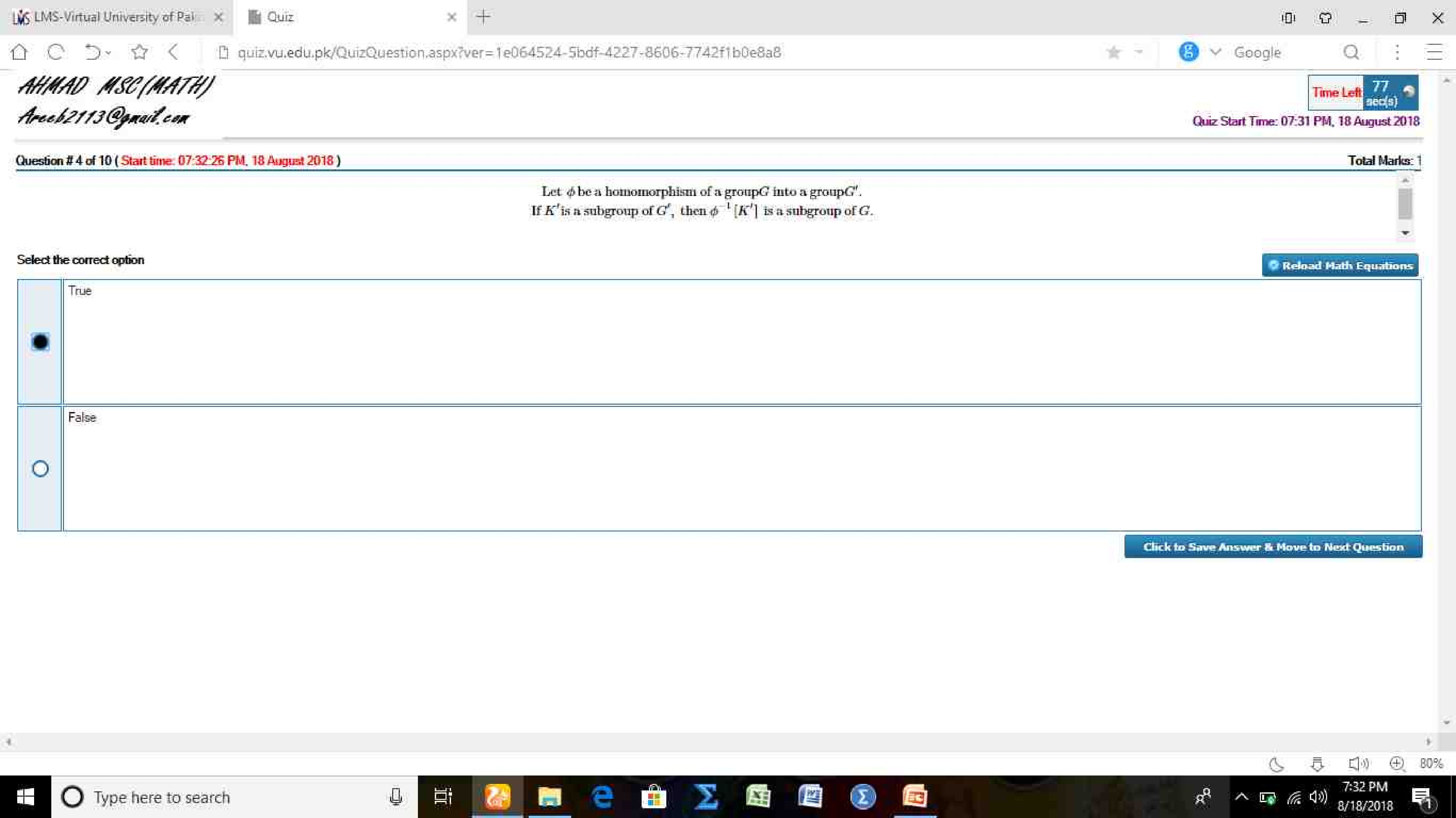
Question # 3 of 10 (Start time: 07:32:09 PM, 18 August 2018) **Total Marks: 1**

Any subgroups of Abelian group G are not normal subgroups of G.

Select the correct option

● False

○ True



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Time Left 77 sec(s)

Quiz Start Time: 07:31 PM, 18 August 2018

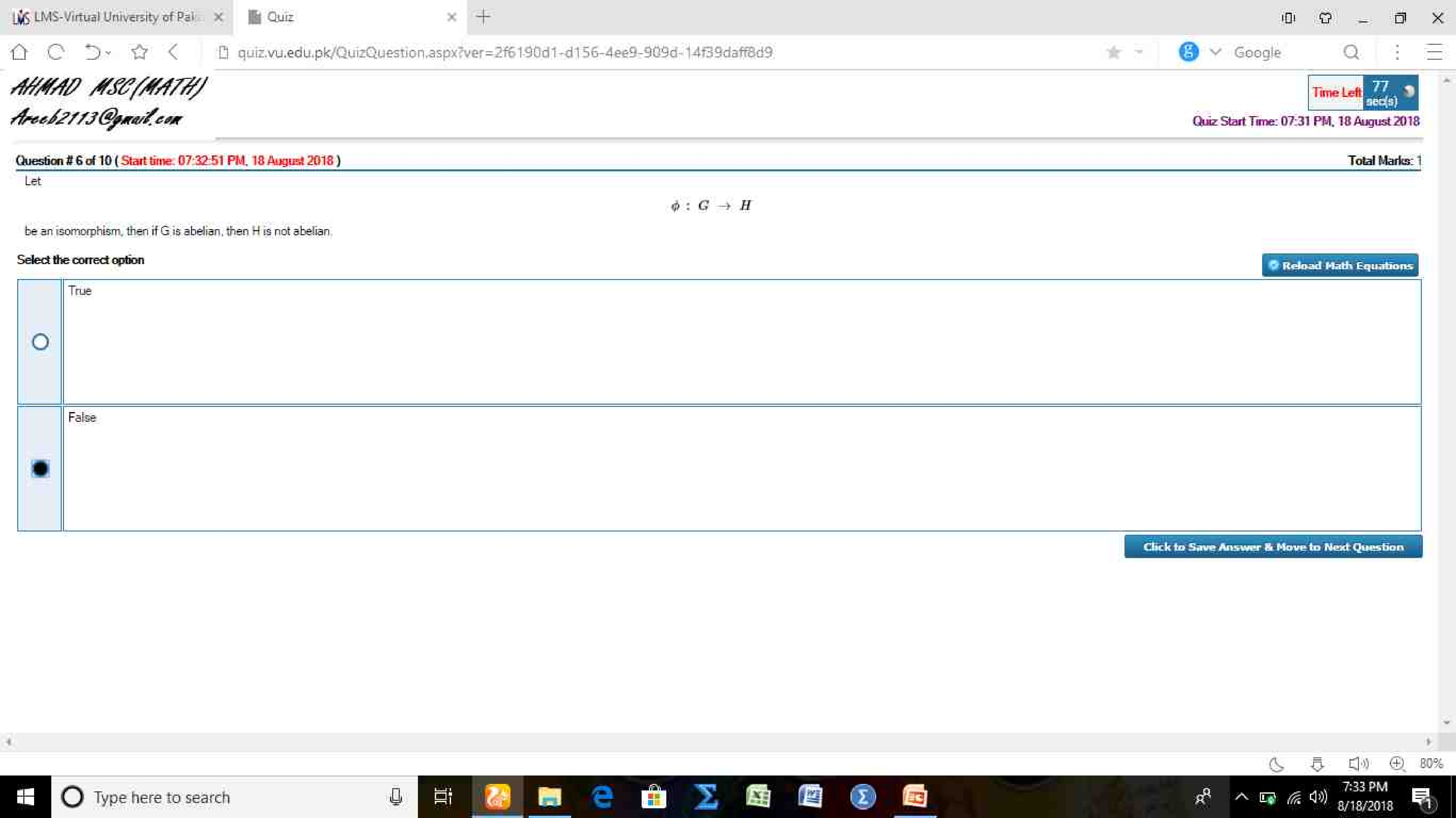
Question # 4 of 10 (Start time: 07:32:26 PM, 18 August 2018) Total Marks: 1

Let ϕ be a homomorphism of a group G into a group G'.
If K' is a subgroup of G', then $\phi^{-1}[K']$ is a subgroup of G.

Select the correct option

● True

○ False



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Quiz Start Time: 07:31 PM, 18 August 2018

Question # 6 of 10 (Start time: 07:32:51 PM, 18 August 2018) **Total Marks: 1**

Let

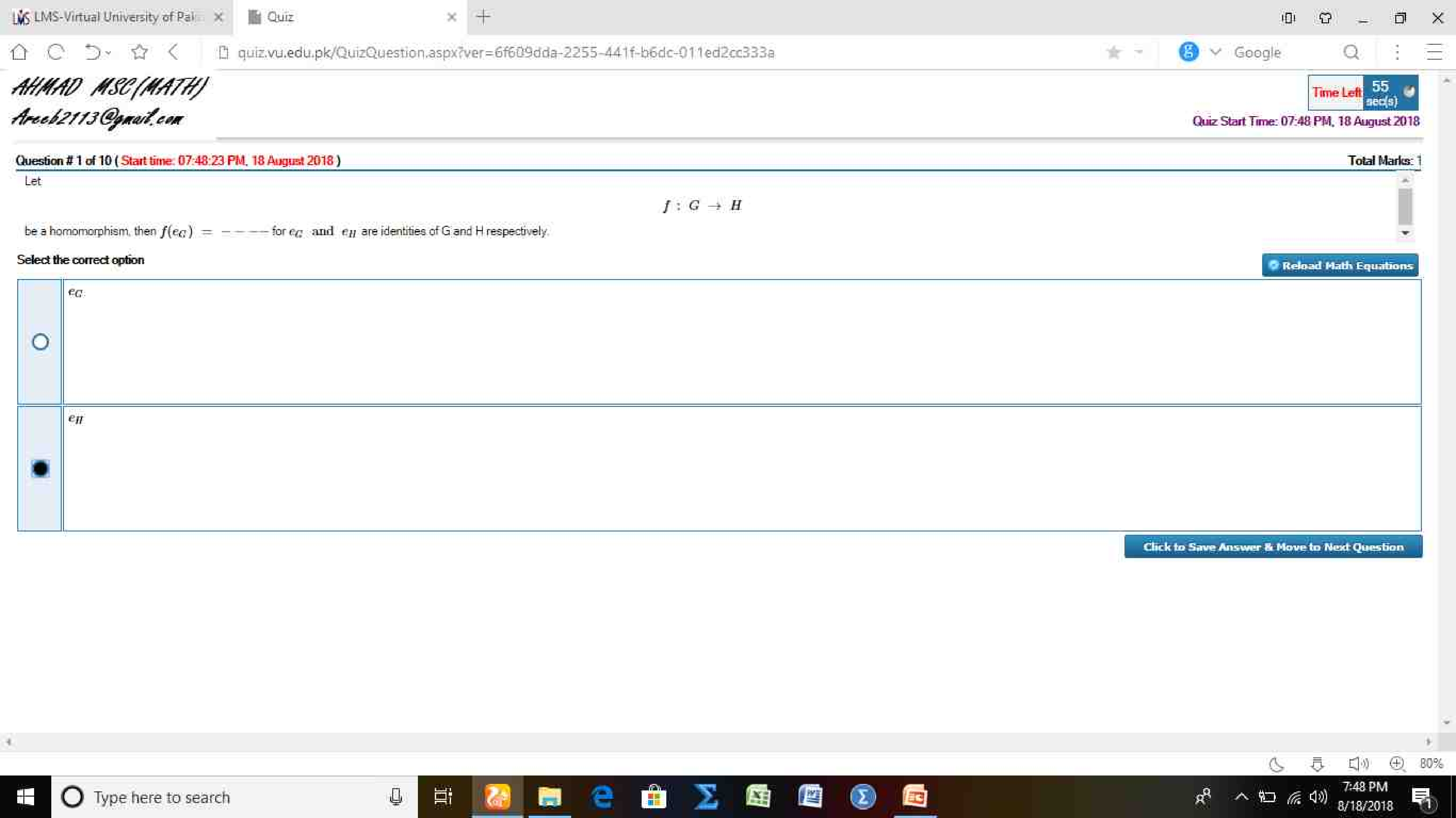
$$\phi : G \to H$$

be an isomorphism, then if G is abelian, then H is not abelian.

Select the correct option

○ True

● False



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Time Left 55 sec(s)

Quiz Start Time: 07:48 PM, 18 August 2018

Question # 1 of 10 (Start time: 07:48:23 PM, 18 August 2018) **Total Marks: 1**

Let

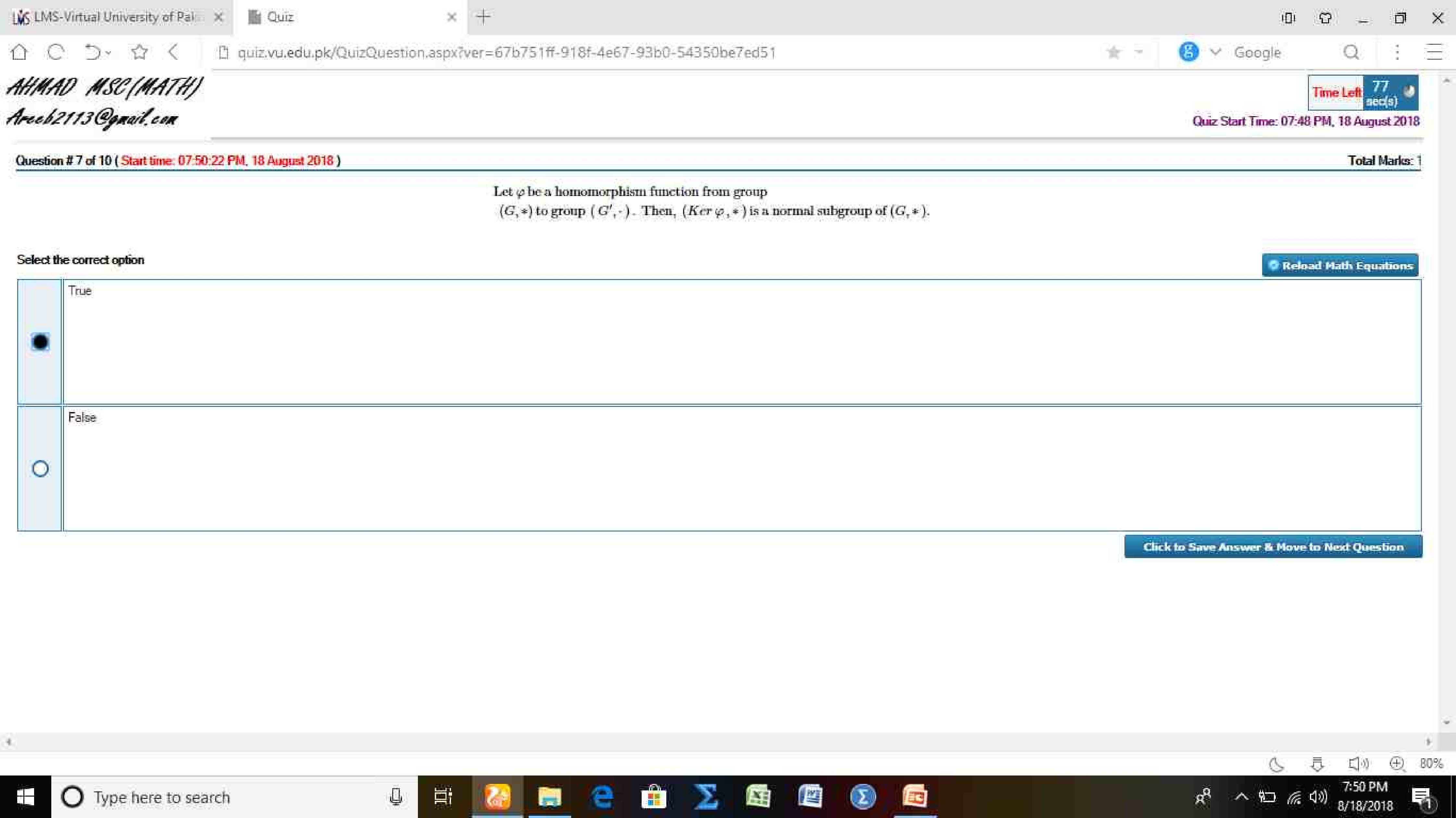
$$f : G \to H$$

be a homomorphism, then $f(e_G) = ----$ for e_G and e_H are identities of G and H respectively.

Select the correct option

○ e_G

● e_H



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Quiz Start Time: 07:48 PM, 18 August 2018

Question # 7 of 10 (Start time: 07:50:22 PM, 18 August 2018) **Total Marks: 1**

Let φ be a homomorphism function from group $(G,*)$ to group $(G',\cdot)$. Then, $(Ker\,\varphi,*)$ is a normal subgroup of $(G,*)$.

Select the correct option

● True

○ False

@No.8 Let $G = \langle a / a^x = e \rangle$ be a Finite Cyclic group of order n. show that the mapping $6 : a \rightarrow a^m$ is an automorphism of G iff $(m, n) = 1$.

@No.9

Classify the group $(Z_4 \times Z_2) / (\{0\} \times Z_2)$ according to the Fundamental theorem of Finitely generated abelian groups.

QNo.1 Give an example of Trivial homomophism. (2)

QNo.2 Difine Simple group. (2)

QNo.3 State Cauchy's theorem (2)

QNo.4 Write down all the generating sets of Group Z_6.

QNo.5 Give an example of group action on Set.

QNo.6 Show that the set of all inner automorphisms of group G is a Subgroup of $Aut(G)$.

QNo.7 Show that the set $aut(G)$ of all automorphisms of a group G is a group under Composition of mapping, and $Inn(G) \triangleleft Aut(G)$.

Moreover, $G/Z(G) \simeq Inn(G)$.

Note: Submit this sheet to Superintendent, before leaving the Examination Center.

mth633
define
stabilizer,commutator
and 2nd isomorphic
theorem.
HVN=HN=NH wala ak
swal.factor wala ak
swal

Group Theory

① Give Two examples of Normal groups 2 Marks

② Give an example of Trivial homomorphism

③ Give an example of Group action on a set 3 Marks

④ Define Third theorem on Homomorphism

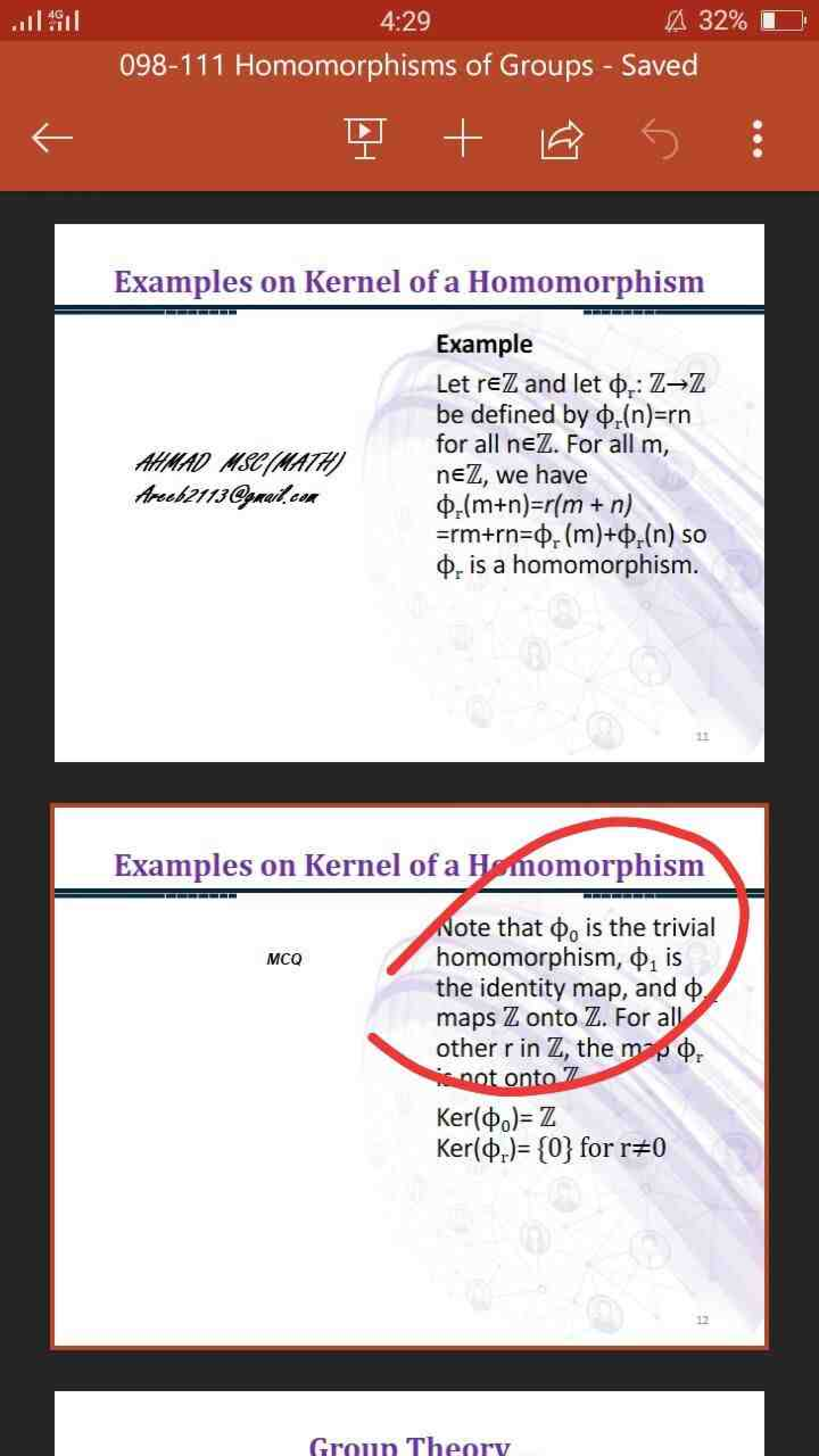
⑤ Prove for a prime 'p' every group G of order p^2 is Abelian 5 Marks

⑥ Show that $Z(G)$ is normal and Abelian Subgroup of G 5 marks

⑦ Find Subgroup of $Z_4 \times Z_6$ which is generated by $(0,2)$

⑧ Prove every cyclic group of a Subgroup is cyclic 3 Marks

⑨ Let $G = G \times \cdots \times G_i \times \cdots \times G_n$ be a direct product, then prove the Projection map $\pi_i : G \to G_i$ is homomorphism 5 Marks.



4:29 32%

098-111 Homomorphisms of Groups - Saved

Examples on Kernel of a Homomorphism

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Example

Let $r \in \mathbb{Z}$ and let $\phi_r: \mathbb{Z} \to \mathbb{Z}$ be defined by $\phi_r(n)=rn$ for all $n \in \mathbb{Z}$. For all m, $n \in \mathbb{Z}$, we have $\phi_r(m+n)=r(m+n)$ $=rm+rn=\phi_r(m)+\phi_r(n)$ so ϕ_r is a homomorphism.

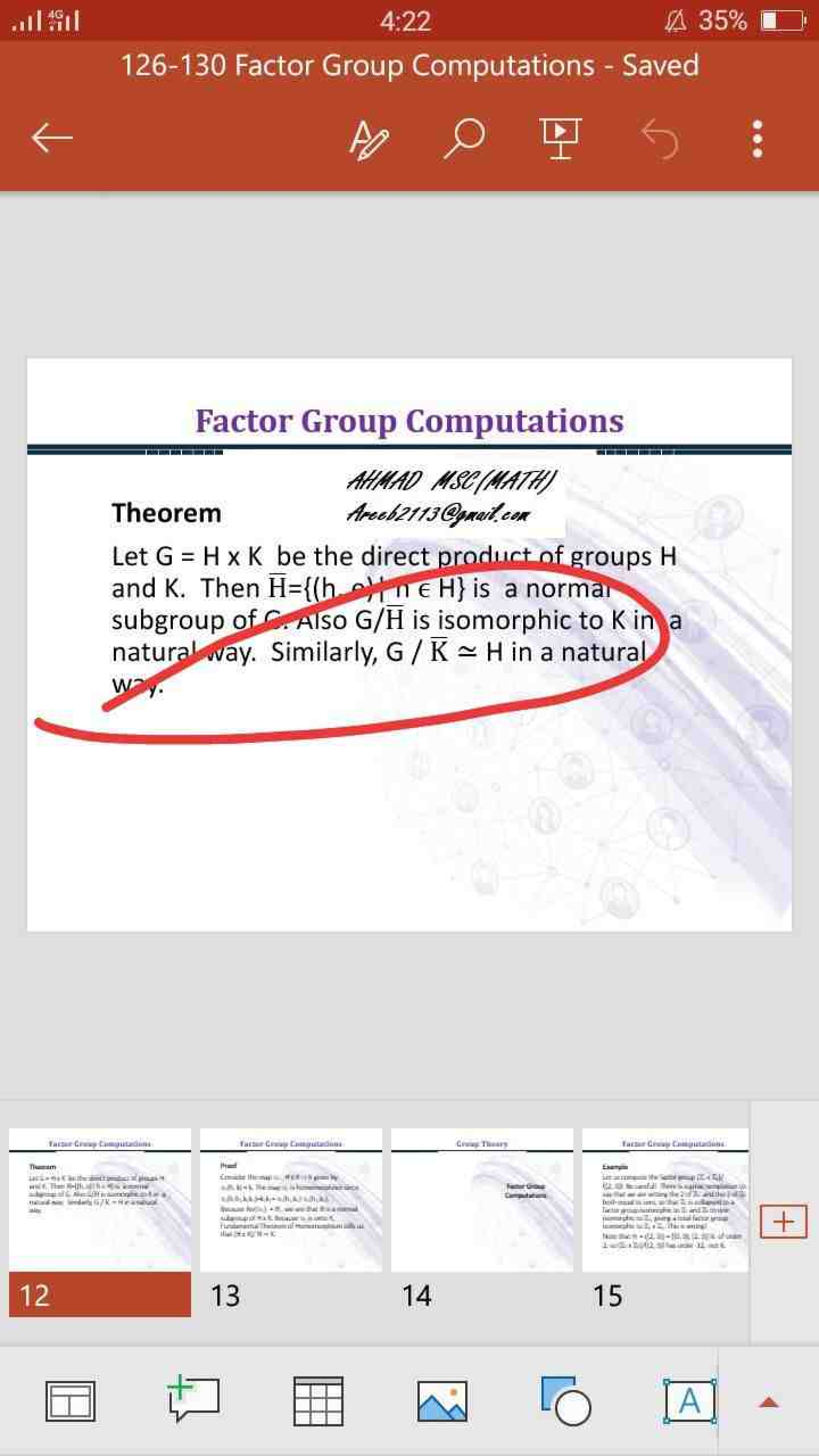
Examples on Kernel of a Homomorphism

MCQ

Note that ϕ_0 is the trivial homomorphism, ϕ_1 is the identity map, and ϕ_{-1} maps $\mathbb{Z}$ onto $\mathbb{Z}$. For all other r in $\mathbb{Z}$, the map ϕ_r is not onto $\mathbb{Z}$.

$\mathrm{Ker}(\phi_0)= \mathbb{Z}$
$\mathrm{Ker}(\phi_r)= \{0\}$ for $r \neq 0$

Group Theory



Factor Group Computations

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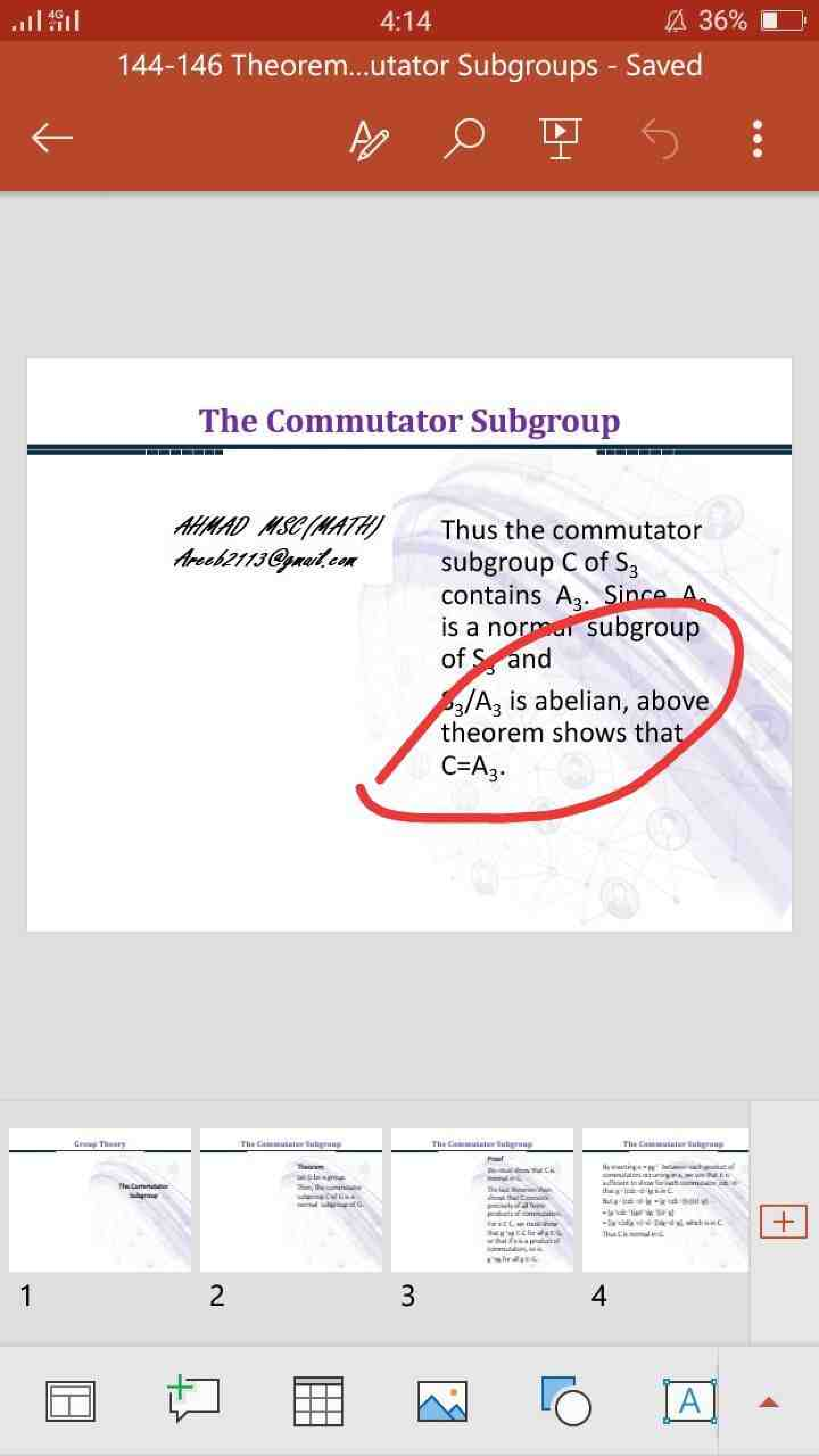
Theorem

Let G = H x K be the direct product of groups H and K. Then $\overline{H}=\{(h, e) \mid h \in H\}$ is a normal subgroup of G. Also $G/\overline{H}$ is isomorphic to K in a natural way. Similarly, $G / \overline{K} \simeq H$ in a natural way.



The Commutator Subgroup

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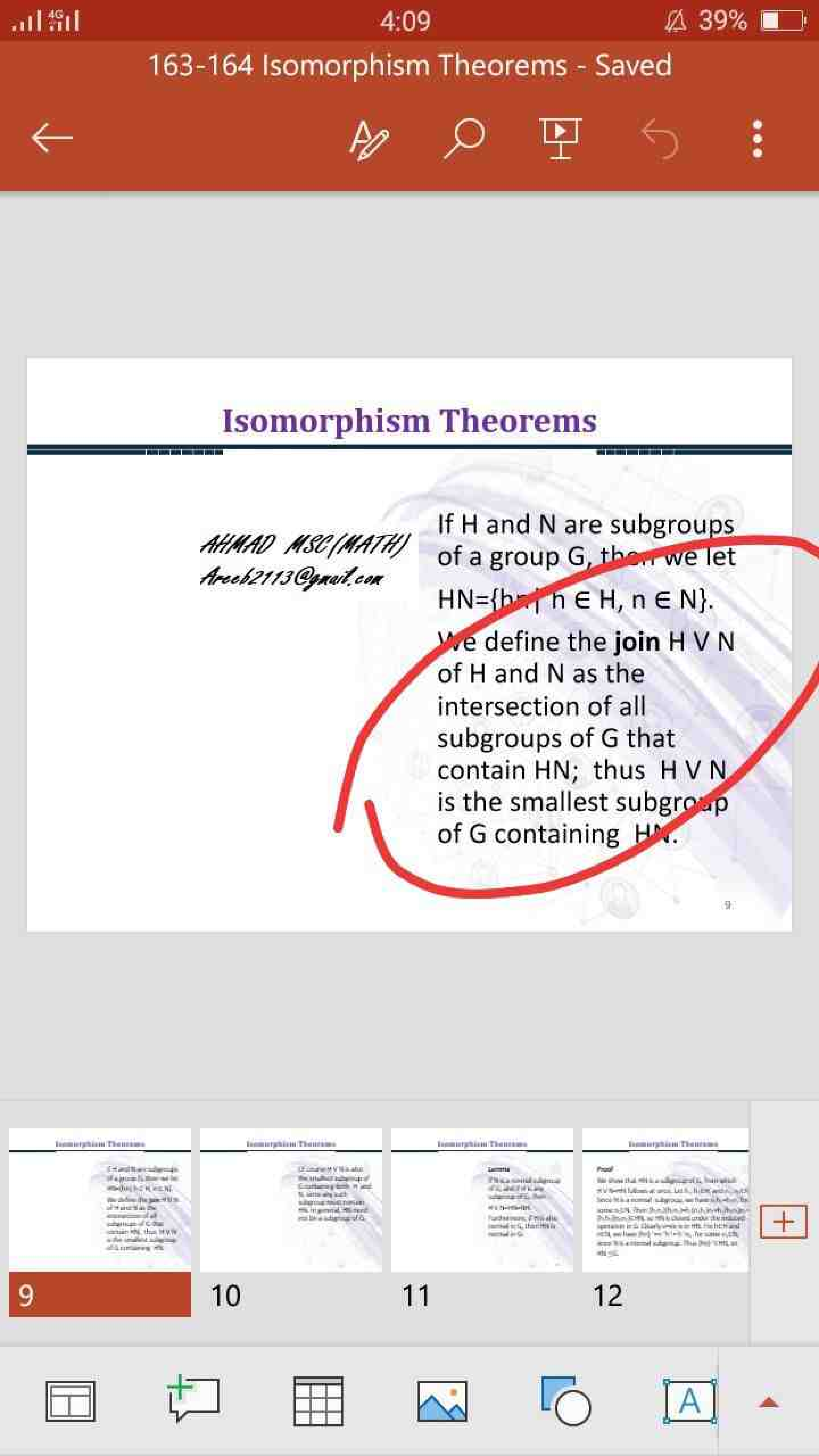
Thus the commutator subgroup C of S_3 contains A_3. Since A_3 is a normal subgroup of S_3 and

S_3/A_3 is abelian, above theorem shows that $C=A_3$.



Isomorphism Theorems

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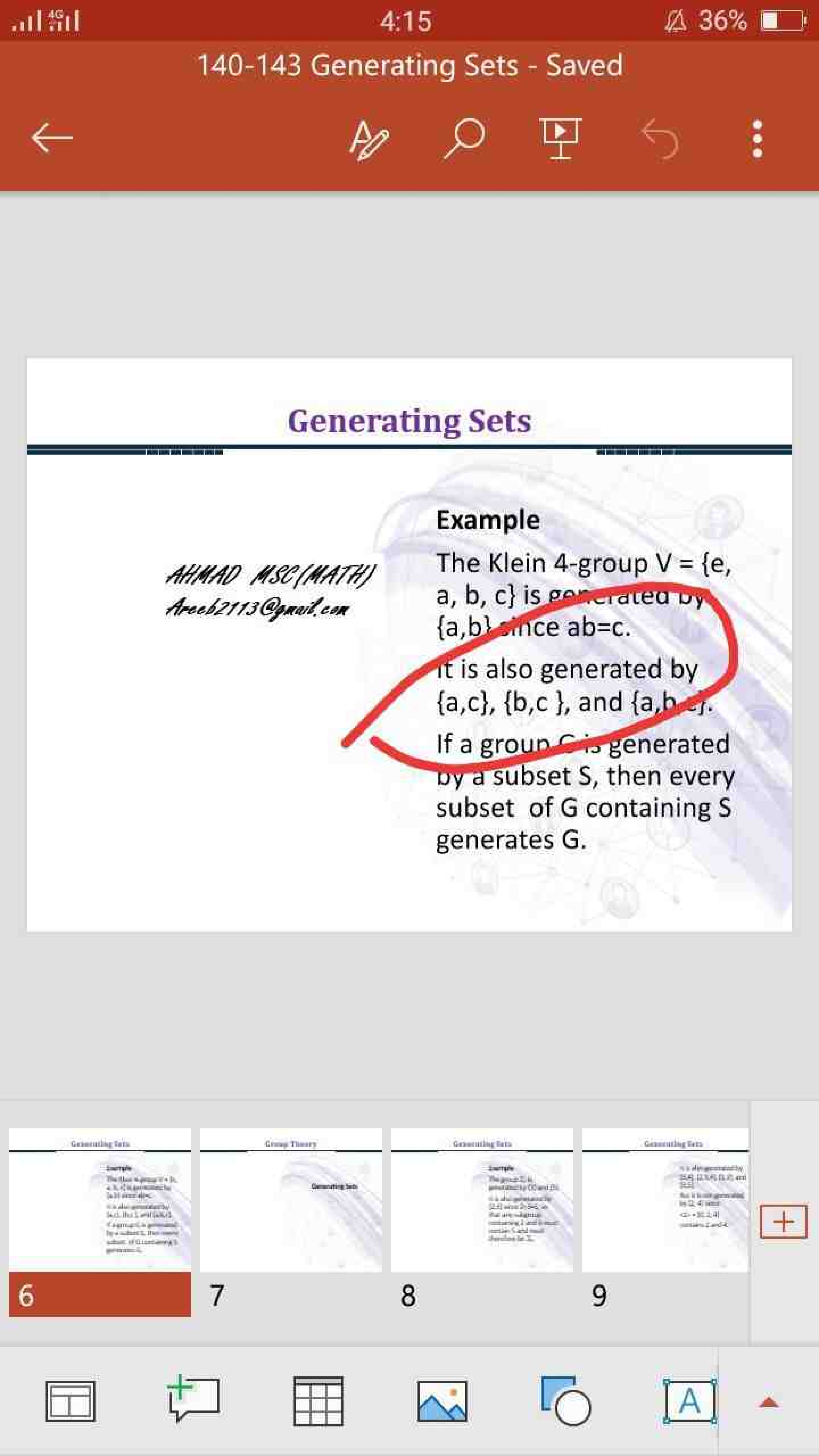
If H and N are subgroups of a group G, then we let

HN=$\{hn \mid h \in H, n \in N\}$.

We define the **join** H V N of H and N as the intersection of all subgroups of G that contain HN; thus H V N is the smallest subgroup of G containing HN.



Generating Sets

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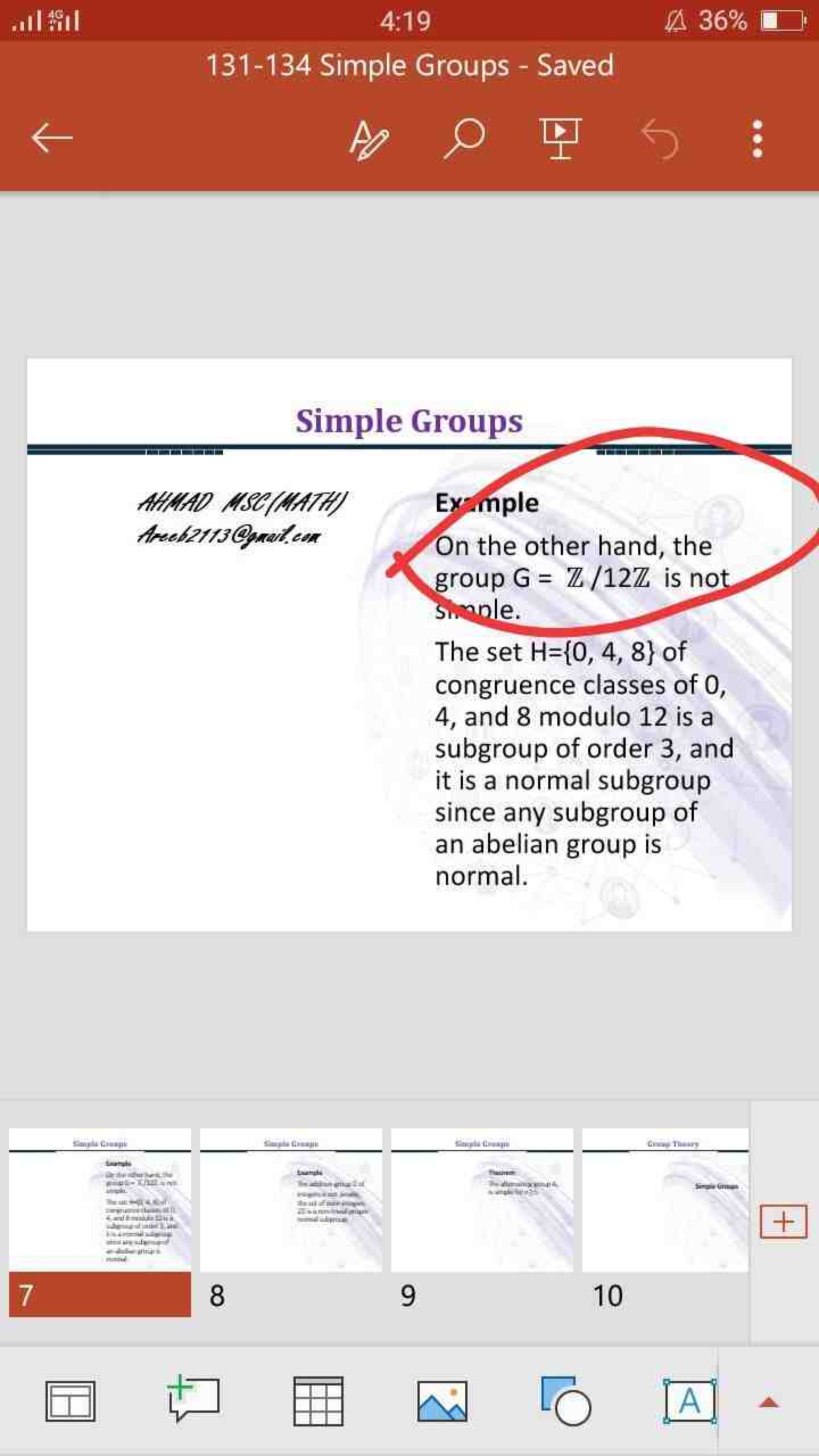
Example

The Klein 4-group V = {e, a, b, c} is generated by {a,b} since ab=c.

It is also generated by {a,c}, {b,c }, and {a,b,c}.

If a group G is generated by a subset S, then every subset of G containing S generates G.



Simple Groups

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Example

On the other hand, the group G = $\mathbb{Z}/12\mathbb{Z}$ is not simple.

The set H={0, 4, 8} of congruence classes of 0, 4, and 8 modulo 12 is a subgroup of order 3, and it is a normal subgroup since any subgroup of an abelian group is normal.