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## Exploration of trigonometric concepts among male and female students

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### Abstract

Present study was intended to explore the trigonometric concepts among male and female students. 400 respondents were selected with due representation of gender. All respondents were selected from 10<sup>th</sup> standard of Government and private schools. Whole data was selected by using Random Sampling Technique (RST). The trigonometric sub-test of modern mathematical concept test developed by Seema S. and S. C. Gakhar (2016) was used for data collection. The data was subjected to statistical treatment by using frequency distribution, percentage, mean, S. D and 't' value. The results revealed that three exists significant differences between male and female respondents on trigonometric concepts. Male respondents were reported with high level of the trigonometric concepts as compared to female respondents.

**Keywords:** Trigonometric Concepts, Male School Students, Female Students

### 1. Introduction

Mathematics has grown as a tool of exact concepts, expanding man's knowledge and controlling the material world around him. It has followed a centuries long line of evolution, growing in complexity, because it has been used (as a tool) to do more and more complex tasks. The basics domain of modern mathematical concepts is underlying in the field of trigonometry also. Trigonometric concepts and ideas continue to be an important component of the high school mathematics curriculum. In spite of its importance to both high school and advanced mathematics and science, research has shown that trigonometry remains a difficult topic for both students and teachers. On the present study, the investigator describe a sequence of activities designed for students to identify relationships between the sine, cosine, and tangent functions; we derive trigonometric identities related to the sum of angles; and we connect trigonometry to other areas of mathematics. The sequence of activities is designed to support students' development of coherent trigonometric meanings by building on students' prior knowledge in an active learning environment. Trigonometry is a branch of mathematics that focuses on relationships between the sides and angles of triangles. However, in the contemporary world the gap of mathematical inclination has emerged into several social dichotomies mostly in the gender based. In context to same, the millennium declaration of September 2000 United Nations, (2000) show the greater concern regarding gender inequalities on the achievement level of mathematics and the organisation fix its goal "The promotion of gender equity, the empowerment of women and the elimination of gender inequality in mathematics by 2005 and at all levels by 2015". However, same condition is existing in India also. Unfortunately, gender inequality in mathematics has remained a rampant problem of global scope. Since independence India is trying to make utmost efforts to drag the attention of women towards STEM (Science, technology and engineering) however, at the ground level results are adverse. Though, in science, technology and engineering India has got success to some extent but in the field of mathematics the problem is still constant. In context to same, large number of researchers has reported gender inequalities are existing in the field of modern concepts of mathematics. Notable among them are; Padma, A. L. (2005), Berlin, A. K. (2002), Thoker, A. A. (2016), Hyde & Geiringer, (1975); Mann, S., Sakuma, & Masaki, (1990), Fennema, K. L. (1974), Leder, (1985)<sup>[18]</sup>, Hedges & Nowell, (1995)<sup>[5]</sup>, Peterson &

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Fennema, (1985) [44]; Randhawa, (1994) [5] Aanad, A. K. & Fennema, (1985) [1]. Leder (1992) [18], Bronholt, Goodnow, & Conney, (1994) [2] Ma, K. (1995) Guiso, Monte, Sapienza, & Zingales, (2008); Hyde, *et al.*, (2009) [6]. Keeping in view, the investigator intended to explore the inclination of male and female students towards trigonometric attitude. The detailed statement of the problem is as under:

**1.2: Research problem:** The statement of the research problem is as under:

“Exploration of Trigonometric concepts Among Male and Female Students”

**1.3: Objectives of the study:** The objectives of the present study are as under:

To explore the inclination of trigonometric concept among male and female students.

**1.4: Hypothesis:** Following hypothesis has been framed for the present study:

There exists no significant difference between male and female students on their level of trigonometric concepts.

**1.5: Operational definition:** The operational definitions of terms and variables are as under:

**1. Trigonometric concepts:** Trigonometric concepts in the present study refer the set of achievement obtained by respondents on sub-test (Trigonometry dimension) of the modern mathematical concepts scale developed by Seema Setia and S. C. Gakhar (2016).

**2. Male and female students:** In the present study, male and female students refers dichotomy of the respondents made on the basis of their sex.

**1.6: Delimitations of the study:** The present study will be delimited four Districts *viz.* Anantnag, Kulgam Pulwama, and Shopian of Union Territory of Jammu and Kashmir. The study will be delimited to trigonometric concepts only. Besides, the study will be delimited to 400 respondents of 10<sup>th</sup> class only.

**1.7: Methodology:** The intention behind the present study was to explore the trigonometric concepts of the respondent in current setting. Accordingly, present study was carried with the help of descriptive method. The parameters involved in methodology and procedure are as under:

**1.7.1: Sample:** The sample for the present study consists of 400 respondents with due representation of gender. The age groups of the subjects were ranged 14-18 years. Whole data was selected by using Random Sampling Technique (RST) from 10<sup>th</sup> standard of selected schools. The below mentioned table indicates the precise explanation of sample:

**Table 1.1:** Showing the selection of sample with dichotomy representation.

Category	MS	FS
Sample	200	200
Total= 400		

**Index**

- MS= Male Students
- FS= Female Students

**1.7.2: Test Used:** The sub test (trigonometric test) of modern mathematical concept test developed by Seema Setia and S. C. Gakhar (2016). The test consists of some trigonometric questions on the basis of same the inclination of the respondents was reported.

**1.8: Statistical treatment:** The collected data was put to suitable statistical treatment by using descriptive and inferential techniques. The detailed procedure of statistical treatment is analysed as under:

**1.8.1: Descriptive Analysis:** In this domain the data was analysed with the help of frequency and percentage analysis. The measuring criterion was analyses as under:

In the below mentioned tables measuring criteria was calculated with the help of below mentioned procedure:

$$F = \left( \frac{\sum x}{N} \right) 100$$

Here F= Frequency

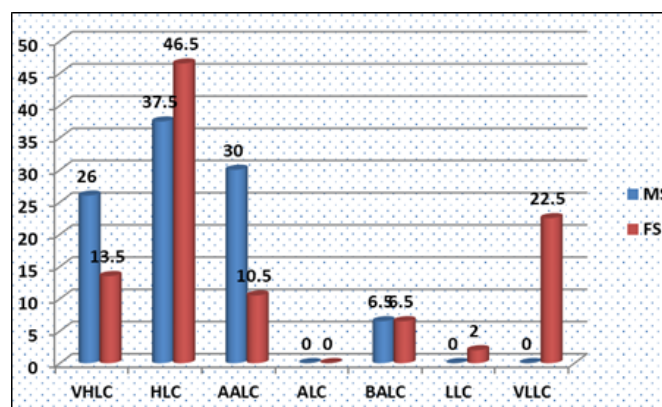
$\sum x$ = Sum of score obtained by respondents on particular level of trigonometric concepts.

**Table 1.2:** Showing the frequency and percent wise distribution of the male and female students on various levels of trigonometric concepts.

Levels	MS		FS	
	%	Frequency	%	Frequency
VHLC	26.00	52	13.5	26
HLC	37.5	75	46.5	93
AALC	30.00	60	10.5	21
ALC	0.00	0	0.00	0
BALC	6.50	13	6.5	13
LLC	0.00	0	2.00	4
VLLC	0.00	0	22.5	43
Total	100	200	100	200

**Index**

- MS= Male students.
- FS=Female students
- VHLC=Very High level trigonometric concepts
- HLC=High level trigonometric concepts
- AALC=Above average level trigonometric concepts
- ALC=Average level trigonometric concepts
- BALC=Below average level concepts
- LLC= Low level trigonometric concepts
- VLLC=Very low level trigonometric concepts



**Fig 1.2:** Showing the graphical representation of male and female students on various levels of trigonometric concepts.

**Index:**

- ❖ MS= Male students.
- ❖ FS=Female students
- ❖ VHLC=Very High level trigonometric concepts
- ❖ HLC=High level trigonometric concepts
- ❖ AALC=Above average level trigonometric concepts
- ❖ ALC=Average level trigonometric concepts
- ❖ BALC=Below average level concepts
- ❖ LLC= Low level trigonometric concepts
- ❖ VLLC=Very low level trigonometric concepts

**Discussion (1.2):** The perusal of the table 1.2 (Please Refer Table 1.2, Fig. 1.2) gives information about the frequency and percent wise distribution of male and female students on various level of trigonometric concepts. The obtained results indicate that among male students 26% (F=55) were seen with very high level of trigonometric concepts. Besides, from the same table, it was seen that 37.5 (F=75) were reported with high level of trigonometric concepts. In pursuance to same, it was observed that 30% (F=60) were observed with above average level of trigonometric concepts. Further, it was seen that 00% (F=00%) were found with average level of trigonometric concepts. In context to same, it was found that 6.5% (F=13) were observed with low level of trigonometric concepts. In the same table, it was found that only 00% (F=00) were reported with very low level trigonometric concepts. Coming to towards their counter parts (female secondary school students), it was found that only 13.5% (F=26) were reported with very high level of trigonometric concepts. Moreover, the results reported in the same table,

reveal that among female secondary school students 46.5% (F=93) were seen with high level of trigonometric concepts. In addition to this, it was found that among female students 10.5% (F=21) were seen above average level of trigonometric concepts. The results indicate that female secondary school students 0.00% (F=00) were seen with average level of trigonometric concepts. Additionally, from the obtained results, it was found that 6.5% (F=13) below average level of trigonometric concepts. In pursuance to same, it was reported that 4.00% (F=2.00) were seen with low level of trigonometric concepts. The descriptive analysis in the same table reveal that 22.5% (F=43) female students were seen with very low level of trigonometric concepts.

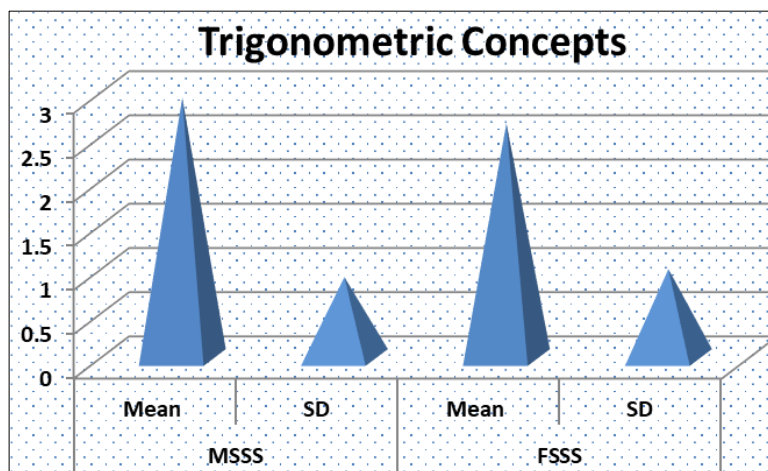
**1.8.2: Comparative analysis:** In this dimension the investigator made the comparative analysis of the respondents on the basis of independent ‘t’ test. The detailed procedure is reported as under:

**Table 1.3:** Showing the significance of difference between male and female students on trigonometric concepts. (N=200 each)

DIMENSION-IX	MS		FS		‘t’ value
	Mean	SD	Mean	SD	
Trigonometry	2.94	0.91	2.65	1.00	<b>3.00@@@</b>

**Index**

- MSSS= Male students.
- FSSS=Female students
- @@@=Significant at 0.01 level of confidence



**Fig 1.3:** Showing the graphical representation of the male and female students on Trigonometric concept.

**Index**

- MS= Male students.
- FS=Female students

**Discussion:** The results presented in table 1.3 (Please Consult table 1.3, Fig. 1.3) gives information about the comparative analysis of the male and female students on trigonometry concepts. As per the perusal of the obtained the mean score of male students is higher (M=2.94, SD=0.91) then the mean score of female students (M=2.65, SD=1.00). When the both groups were comparatively analysed, the ‘t’ value came out to be significant at 0.01 level of confidence (3.00> table value at 0.01 level). Thus, from the above reported results, it can be inferred that male students hold high concept of real numbers as compared to female students. Thus, from the above reported results significant difference has been found between male and female students. Thus, investigator can inferred that

impact of gender seems significant on the conceptual; understanding of trigonometry. Significant difference has been reported between male and female students on their level of trigonometric concepts. Male students were seen with high level of trigonometric inclination as compared to female students. Therefore, the status of the hypothesis is reported as under:

**H<sub>0</sub>:** “There exists no significant difference between male and female students on their level of trigonometric concepts”.  
**REJECTED**

**Rejected:** The results are carried in consonance of the host of the researchers like; “Hyde & Geiringer, (1975); Mann, S., Sakuma, & Masaki, (1990), Fennema, K. L. (1974), Leder, (1985) [18], Hedges & Nowell, (1995) [5], Peterson & Fennema, (1985) [44];



Randhawa, (1994) <sup>[5]</sup> Aanad, A. K. & Fennema, (1985) <sup>[1]</sup>. Leder (1992) <sup>[18]</sup>, Bronholt, Goodnow, & Conney, (1994) <sup>[2]</sup> Ma, K. (1995) Guiso, Monte, Sapienza, & Zingales, (2008) <sup>[4]</sup>; Hyde, *et al*, (2009) <sup>[6]</sup>”

**1.9: Conclusions of the study:** It the present study it was inferred that there exists significant difference between male and female students on their level of trigonometric concepts. Male respondents were seen with high level of trigonometric concepts as compared to female students.

**1.10: Conflict of interests:** During the entire research process, no any conflict of interest has been declared.

**1.11: Suggestions of the study:** Efforts should be made to make the integration of mathematical concepts with the general curriculum. Besides, problem solving ability should be developed among children, so that their creativity may be fostered. Further, seminars, workshops and conferences should be organised on mathematical awareness.

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