

Cross Cultural Comparison of Rural Education Practice in China, Taiwan, and the United States

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Abstract

The purpose of this research is to compare the rural education practices of China, Taiwan, Canada and the United States. International comparisons of mathematics achievement find that students in Asian countries outperform those from the USA. Excluded from these studies, however, are students from rural areas in China. This study compares the math abilities of 272 selectively chosen 5th grade students from rural, central China, 361 students from rural, northern Taiwan and 95 students from rural, central Pennsylvania. The test instrument was the same as used in previous China vs. USA comparisons and focused on four subtopics: computation, number concepts, geometry and problem solving. The results showed that rural Chinese and Taiwanese students outperformed similar American students in the area of mathematics achievement. The rural Chinese and Taiwanese students were also found to be more focused on school and academics and less on social aspects of school life. Their parents held higher expectations for them to do well in school. However, these cultural differences were not able to explain away the overall math achievement gap among the Chinese, Taiwanese and American students. It is recommended that further study be conducted to explore possible factors that contribute to different math achievement among the countries by interviewing students, teachers, and the parents.

A. Purpose of the Research

The purpose of this research is to compare the rural education practices of China, Taiwan, Canada and the United States. Although many cross cultural studies comparing student achievement exist, none of them seem to focus on rural education. Thus, there is a lack of understanding of how education systems deal with children who come from farming, and often low-education family backgrounds.

Some studies have shown that students from the United States do not perform as well in math and science as compared to students from around the world. Especially notable is how Japanese and Singaporean students outperform US students (Beaton et al. 1996a 1996b; Schmidt et al). Chinese students also display high levels of achievement. However the principal studies showing Chinese versus US performance do not include students who live in rural parts of China. Thus, this research project focuses on comparing rural education practices and outcomes in Asian and the western countries. This study first, attempts to evaluate which students perform better. Then it seeks to uncover the practices within the family and/or school that lead to superior performance.

B. Theoretical Framework and Research Questions

The topics of interest for this research project come from a careful review of the literature comparing Asian and US education. Topics were chosen for a number of reasons. First, the topics cover important explanations for the advantages that Asian students display over American students. Second, the comparative education research does not include these topics. Finally, the topics represent findings tied to effective educational practices in the United States. The framework of each topic and why they are important are briefly described below.

1. Cram Schools

For many students in Taiwan and Japan, learning does not stop when the school bell rings in the afternoon. Those who want to secure entrance to the best middle and high schools--and then to the best colleges--enroll in special evening education schools. In Taiwan's capital, Taipei, an area of the city is packed with cram schools. Students can be seen returning home from evening cram schools (or the bushiban) on the public buses at 9:30 at night. Cram schools receive no attention in the studies on US. vs. Chinese education.

2. Organization of the School Days

When comparing Japanese and American, researchers find that Japanese schools divide the day into many more periods of instruction and then recess. It is believed that this practice gives Japanese students more opportunity to start fresh throughout the day. The Asian students are also more disciplined when in school. Thus, less time needs to be spent off task and more can be spent on task—actual learning (Stevenson and Stigler 1992).

3. Attitude Towards Learning

Some studies find that Asian students have a different orientation towards failure. In the United States students are more likely to blame a lack of smarts for their academic failure. In Asia, students are more likely to blame lack of effort (Stevenson and Stigler 1992). This study will test for similar differences. If they are found, it will also explore what are the factors - historical, cultural, or global- that produce the differences in attitude.

4. Social Environment

Sociologists have found that students in the United States focus more on the social aspects of school rather than the academic ones (Coleman 1961; Goodlad 1984). They would like to be remembered as being popular and athletic. School is about friends. No comparative studies of what is most important to Asian students seem to have been done on this topic.

5. Performance in Mathematics

Since the first international studies of mathematics achievement in 1967, Japanese students have been outperforming Americans. When Chinese students were then compared with American students in the 1980's a similar Asian advantage was found (Stevenson and Stigler 1992). However, the Chinese sample of students was drawn from the capital of China—Beijing. The comparison groups in the United States were drawn from either Chicago or Minneapolis. Students from small towns or rural areas were simply not included in the groundbreaking studies on international mathematics performance. Thus, this study focuses specifically on doing comparisons of education in rural areas as well as cities.

6. Creativity

Although Asian education is often thought of as superior at producing high achievement, American education is thought to be better at producing creativity. It seems necessary to perform objective tests to measure the level of creativity across cultures. No tests of creativity across cultures appear in the comparative education literature. An exploratory attempt will be made to analyze this dimension of education.

7. Home environment

Numerous sociological studies have found that the home environment has an impact on achievement in the United States (Epstein 1987; Riordan 2004). The success of Asian students in the United States compared to their white, black and Hispanic peers often is attributed to differences in the home environment and parent involvement (Coleman 1988). Comparative studies of educational achievement often include aspects of the home environment as predictors of achievement differences (Simons 1989).

8. Teacher

The Third International Mathematics Study found a host of teacher practices as being responsible for the superior achievement of Japanese students over American students (National Center for Education Statistics 1997; Stigler and Hiebert 1999). Most of these practices are listed above and thus will be an important part of the investigation.

9. Principal

The literature on effective schools in the United States has identified strong, motivating leadership and high expectations as a common characteristic in high performing schools (Chub and Moe 1990; Wilson and Corcoran 1988). Thus, the principals of all of the schools under investigation will be interviewed to understand the context within which the teachers work, the students learn, and the school occupies in society.

C. Method

Instrument:

The Mathematic Achievement Test was created by Dr. James W. Stigler (Stigler et al. 1990). The instrument was slightly modified to fit the purpose of our study. This instrument was also translated into Chinese and back-translated into English to ensure the comparability of the instrument in two languages. A questionnaire including the topics mentioned above was also created (see appendix A).

Subjects and procedures:

The subjects consist of grade 5 students in a rural area school in Taiwan, in China, and in the state of Pennsylvania. Students were given the math achievement test and the questionnaire to fill out. U.S. data was collected in May, 2005 and Taiwan and China data were collected in June, 2005.

School personnel were approached by the principal investigators about participating in the comparative study. The schools were chosen based mainly on contact with and proximity to the principal investigators. One of the targeted schools in Pennsylvania is located in one of the most rural parts of the state. One of the schools in China was also chosen because it was located in the middle of the rice paddies and far away from major towns and cities. One of the schools in Taiwan was also chosen because it was located in the northern part of Taiwan outside of the major city. Although the study did not employ a random sample of schools, it is expected that the rural PA school is similar to many other rural public elementary schools in the state. Likewise, the rural Chinese school is believed to be typical of the kind found in the rural areas of Central China. Similar situation applied to Taiwanese sample.

D. Results/Discussions

School Social Context

There were large qualitative differences between the Chinese, Taiwanese and American elementary schools.

First, the Chinese schools were very old and plain. Their playgrounds consisted of a concrete rectangle with a basketball hoop or two. The classrooms typically had only a blackboard at the front of the room and bare walls the rest of the way around. Students often sat two to a desk and seats consisted of what American would label as 'saw horses'. This school furniture was made of wood and appeared to be decades old, full of markings and scratches, and often simply falling apart in some cases. The Taiwanese elementary schools had similar settings except that the buildings were a lot newer and the facility was more modern than in China. The seating arrangement was similar to that was in China. However, the decorations of the classroom were similar to those found in the American elementary schools. The American public elementary schools contained clean,

steel and plastic furniture. The classrooms typically contained a blackboard, walls lined with educational/informational posters, cabinets with teaching tools, a personal computer and a large teacher's desk with another personal computer. The playgrounds were set in grassy fields and included ball fields, swings, monkey bars, etc.

Second, the Chinese classrooms were very crowded. The classrooms typically contained about fifty students. In Pennsylvania, the classrooms were stretched if they contained more than twenty students. The Taiwanese classroom size was somewhere between the Chinese classroom and the U.S. classroom, which contained about 30 students.

Third, the Chinese teachers did not all have a college degree. Some of the teachers only had what would be called a high school diploma in the US. In Taiwan, all of the teachers had at least an associate degree in teaching. Most of them had 4-year college degrees. Not too many teachers in the elementary school held master's degree in Taiwan. The public school teachers in the rural Pennsylvania schools all had 4-year college degrees or a master's degree.

Mathematics Achievement Comparisons

This analysis compared the math abilities of 272 selectively chosen 5th grade students from rural, central China, 95 students from rural, central Pennsylvania and 361 students from rural northern Taiwan. The test instrument was the same as used in previous China vs. USA comparisons and focused on four subtopics: computation, number concepts, geometry and problem solving. Rural Chinese students were hypothesized to perform worse than others because of their simple, peasant family/community background and lack of access to modern, Western-type educational resources.

Table I showed the mean achievement test scores and standard deviations of the three countries. Overall, the results indicate that Taiwanese students outperformed Chinese students and American students in all areas. Chinese students outperformed those in USA in all areas except Geometry, where the USA students exceeded the Chinese students. Table II tested the mean difference between the countries. The results showed that Taiwanese students exceeded Chinese and U.S. students in all areas except that there is no significant difference in math concept between Taiwanese students and Chinese students. It is also noted that in Geometry and Problem Solving Chinese students performed similarly to U.S. students.

Table 1. Mean Achievement Test Scores and Standard Deviations by Country

Topic	China (N=272)	USA (N=95)	Taiwan (N=361)
Computation			
mean	35.6581	28.2947	37.9280
Standard deviation	5.2274	8.2731	6.6729
Number Concepts			
mean	10.8272	9.0211	11.3740
Standard deviation	2.9888	3.6727	3.1730
Geometry			
mean	2.9743	3.2421	7.1080
Standard deviation	1.8947	2.0921	2.1297
Problem solving			
mean	.8603	.4947	2.2438
Standard deviation	1.1179	.7973	1.7405
Overall			
mean	50.3199	41.0526	58.6537
Standard deviation	8.9085	12.1798	11.6975

Table II: Mean Difference between Countries

Topic	Country		Mean Difference (I-J)	Std. Error	Sig.
computation	China	U.S.	7.3634	.765	.000
		Taiwan	-2.2699	.515	.000
	U.S.	China	-7.3634	.765	.000
		Taiwan	-9.6332	.740	.000
	Taiwan	China	2.2699	.515	.000
		U.S.	9.6332	.740	.000
Number concept	China	U.S.	1.8062	.379	.000
		Taiwan	-.5468	.255	.081
	U.S.	China	-1.8062	.379	.000
		Taiwan	-2.3529	.366	.000
	Taiwan	China	.5468	.255	.081
		U.S.	2.3529	.366	.000
Geometry	China	U.S.	-.2678	.243	.513
		Taiwan	-4.1338	.164	.000
	U.S.	China	.2678	.243	.513
		Taiwan	-3.8659	.235	.000
	Taiwan	China	4.1338	.164	.000
		U.S.	3.8659	.235	.000
Problem solving	China	U.S.	.3656	.171	.082
		Taiwan	-1.3835	.115	.000
	U.S.	China	-.3656	.171	.082
		Taiwan	-1.7490	.165	.000
	Taiwan	China	1.3835	.115	.000
		U.S.	1.7490	.165	.000
MATHTOTTA	China	U.S.	9.2672	1.288	.000
		Taiwan	-8.3339	.868	.000
	U.S.	China	-9.2672	1.288	.000
		Taiwan	-17.6011	1.246	.000
	Taiwan	China	8.3339	.868	.000
		U.S.	17.6011	1.246	.000

* The mean difference is significant at the .05 level.

Cram Schools

As expected, Chinese students are more likely to attend cram schools for mathematics (Chi sq.=32.3). Some 35% of Chinese students reported having attended such a cram school at least one night a week while about 27% of Taiwanese students did. Nearly 1 out of 10 Chinese students reported that they attended cram school for math *five or more* days a week. Only 5% of the United States students reported attending a math class after school. .

It was hypothesized that cram school attendance is related to math achievement. Students who attended cram school for math more often scored higher on overall mathematics achievement. Unfortunately, the statistical analysis did not support this hypothesis ($r=.042$, $p=.365$).

Table III: Math Class after School * Country

	China	U.S.A.	Taiwan	total
None	177	90	263	530
1 day	39	1	12	52
2 day	17	1	42	60
3 day	9	0	16	25
4 day	6	0	7	13
5 day	15	2	16	33
6 day	1	0	5	6
7 day	8	1	0	9
Total	272	95	361	728

Sports

Students were asked if they had any other activities beyond academic and arts that they were involved with learning after school. In this area, about half of the US students indicated that they were involved. A majority of these respondents wrote that they were involved in some type of sport team such as baseball, swimming, soccer, etc. Far fewer--only 18%--of the Chinese students indicated that they were involved in additional activities such as these (Chi sq.=63.8).

Although there is a negative correlation between the math achievement and playing sport, the correlation is not statistically significant. Playing sports is insignificantly related to overall mathematics achievement ($r=-.05$, $p=.285$).

Table IV: Other Activity after School * Country

	China	U.S.A.	Taiwan	total
None	223	49	286	558
1 day	33	11	32	76
2 day	5	9	8	22
3 day	2	12	6	20
4 day	2	2	5	9
5 day	3	7	14	24
6 day	0	2	1	3
7 day	4	3	1	8
Total	272	95	361	728

Best Thing about School

Several sociologists have found that students in the United States highly value their friends at school. Schools are the arena for social relationships. The data from this study show that indeed friendships are the best thing about going to school. Slightly more than half of the American students say that their friends are the best thing about school. Over 60% of Taiwanese students also indicated that the best thing about school is friends. Only 30% says that learning new things is the best thing about school in both U.S. and Taiwan.

Finally, 15% of the American students said something other than teachers, school, friends, and learning new things was the best thing about school. No Chinese student checked this answer. The most common responses written in for the “Other” category included the word “friend” or “boyfriend” (N=3) or else “gym” or “recess” (N=3). One student wrote “nothing”.

Although the Chinese students did not check the “other” category, seventeen of them wrote something into the other response line anyhow. Their top answers were “study” or “get knowledge” (N=4), to use books or computers (N=4), and “father” or “mother” (N=3).

Chinese students were more likely than American students to indicate that the best thing about going to school was to learn new things (Chi sq.=64). About 60% of the Chinese students responded in this manner suggesting that learning is the primary focus of the majority of Chinese students. In sharp contrast, social friendships is the primary focus of American students, similar to what has been found in previous studies here in the United States. However, there is an interesting finding for Taiwanese students. It seems that Taiwanese students are similar to the students in the United States regarding the best thing about school. Perhaps Taiwan is following the U.S. education system closer than is in China. The recent educational reform in Taiwan may have been an impact of this result.

Table V: Best thing about school * Country

	China	U.S.A.	Taiwan	total
Teacher	13	0	8	21
School	5	1	10	16
Friend	79	49	207	335
Learning New Things	154	28	108	290
Other	0	14	8	22
Total	251	92	341	684

When looking at the U.S and China data only, attitudes about the best thing about going to school are related to math achievement ($F=4.01$). Students who say that the best thing about going to school is to learn new things scored the highest-- an average of 54--on the overall mathematics test. Those who said friends were the best thing about school only scored a 51 on average on the same test. Finally, those who said “something other” scored the lowest: a 43 on average. However, when the data included Taiwanese students, the results were slightly different. The average score (average of 54) of students who indicated that the best thing about going to school is to learn new things is similar to those (average of 54 on Math achievement test) who indicated that friends were the best thing about school. As shown above, Taiwanese students have the highest achievement scores among the three countries and Taiwanese students also reported that the best thing about the school is friends. This larger Taiwanese sample may have resulted in the insignificance of the social relationship with math achievement.

Boyfriend or Girlfriend

An indicator of the adolescent subculture is a preoccupation among students with dating members of the opposite sex. Schools where the adolescent subculture is strong have lower achievement in the United States. The results of this study confirm this finding: students who report having a boyfriend or girlfriend score five points lower on the overall mathematics achievement test ($F=4.53$).

Chinese students are less likely to have a boyfriend or girlfriend. Only eight percent of the Chinese students and 11% of the Taiwanese students reported having a close friend of the opposite sex compared to thirty seven percent of the American students.

Table VI : Have a Boy/Girlfriend? * Country

	China	U.S.A.	Taiwan	total
Yes	21	34	40	95
No	218	51	251	520
Somewhat	15	7	62	84
Total	254	92	353	699

Parental Expectations

Research has found that the expectations that parents have for their child in terms of doing well in school is related to the child's academic success. Parents from higher socioeconomic backgrounds have higher expectations and their children are more likely than those from less advantaged backgrounds to succeed in school. The same results were found in this analysis. If students reported that their parents expected them to be very smart students, then they were most likely to score high on the math achievement test ($F=6.31$).

Chinese and Taiwanese students have an advantage over their American counterparts: their parents are more likely to expect them to be smart students. About eight out of ten of the Chinese students and about 73% of Taiwanese students report that their parents expect them to be smart students. Less than half of the American students report the same.

Table VII: Parents Expect Child to be Smart Student * Country

	China	U.S.A.	Taiwan	total
Yes, Very	206	43	256	505
Yes, a Little	39	47	84	170
No, Don't Worry	11	3	11	25
Total	256	93	351	700

Multivariate Analyses

A number of factors have been found to relate to mathematics achievement. First, Chinese students outperform American students on average. Then, various social

background factors are related to overall achievement: taking classes after school, having parents with high education expectations, being motivated about school, and not having a boy or girl friend. If Chinese culture is more pro-school and less adolescent subculture, then this cultural emphasis should be the reason behind the overall difference between Chinese, Taiwanese and American students in mathematics achievement. This proposition is tested next.

When overall mathematics achievement was regressed on a country dummy variable, the coefficient representing China was positive and significant ($t=3.2, p=.001$). When the social and family background factors were added to this base model, the R^2 did not increase. The coefficient for country remained strong and significant. All of the social and family background factors were in the right direction, but remained insignificant in the full model.

Thus, it appears that although there are cultural and behavioral differences among the Chinese, Taiwanese and American students, these differences are not the main factors responsible for the overall achievement differences among the three countries.

Table VIII: Regression of Overall Mathematics Achievement on Social and Family Background Factors

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	47.284	3.777		12.520	.000
	country	3.619	1.131	.161	3.200	.001
	Math Class after School	5.840E-02	.044	.072	1.323	.187
	Other Activity After School	-5.524E-02	.044	-.064	-1.244	.214
	Best Thing About School	4.516E-03	.034	.007	.134	.893
	Have Boy/Girl Friend	.283	.958	.015	.295	.768
	Parent Expectation	-.109	.127	-.046	-.858	.391

a Dependent Variable: MATHTOTAL

E. Conclusion

Rural Chinese and Taiwanese students were found to outperform similar American students in the area of mathematics achievement. The rural Chinese and Taiwanese students were also found to be more focused on school and academics and less on social aspects of school life. Their parents held higher expectations for them to do well in school. However, these cultural differences were not able to explain away the overall math achievement gap among the Chinese, Taiwanese and American students.

School and classroom climate factors need to be examined in closer detail. It could be that the instructional techniques and overall press on academics in the Chinese schools

produce the gap. Also, teaching techniques need to be examined as well. Perhaps the Chinese and Taiwanese students are simply being exposed to more mathematical material and taught how to understand it more thoroughly. Based on a qualitative comparison of the educational environments, school resources do not appear to be related to the superior performance of the Taiwanese and Chinese students. Nor do formal teaching credentials.

In short, this study found that Chinese and Taiwanese students from rural background are outperforming American students from rural backgrounds. This outcome was found despite there being vastly inferior school and family material resources in the Chinese research setting. Although not generalizable, the results suggest that even in the poorest conditions, Chinese students can easily compete with students from American who come from very rural backgrounds. If the United States is to continue to strive for excellence in education, it needs to determine how such disadvantaged students on the other side of the world do so well. It is recommended that further studies may be conducted through interviews with students, parents, and teachers to further examine possible factors that contribute to different achievement among the three countries.

REFERENCES

Beaton, Albert, Michael O. Martin, Ina V.S. Mullis, Eugenio J. Gonzalez, Teresa A. Smith, Dana L. Kelly (1996a). Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study. Chestnut Hill MA: TIMSS International Study Center.

Beaton, Albert, Michael O. Martin, Ina V.S. Mullis, Eugenio J. Gonzalez, Teresa A. Smith, Dana L. Kelly (1996b). Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study. Chestnut Hill MA: TIMSS International Study Center.

Chubb, John E. and Terry Moe (1990). Politics, Markets and America's Schools. Washington: Brookings Institution Press.

Coleman, James S (1961). The Adolescent Society. New York: The Free Press.

Coleman, James S (1988). "Social Capital and the Creation of Human Capital." American Journal of Sociology 94:S95-S120.

Epstein, Joyce (1987). "Parent Involvement: What Research Says to Administrators". Education and Urban Society 19:277-294.

Goodlad, John (1982). A Place Called School. New York: McGraw Hill.

National Center for Education Statistics. (1997). Pursuing Excellence: Eighth-Grade Findings From the Third International Math and Science Study (a video presentation). Washington, D.C.:U.S.. Department of Education: Office of Educational Research and Improvement.

Riordan, Cornelius (2004). Equality and Achievement: An Introduction to the Sociology of Education. New Jersey: Prentice Hall.

Schmidt, William, Curtis C. McKnight and Senta A. Raizen. Splintered Vision: An Investigation of U.S.. Science and Mathematics Education. Michigan State University: U.S.. National Research Center for the Third International Mathematics and Science Study.

Stevenson, Harold W. and James W. Stigler (1992). The Learning Gap: Why Our Schools are Failing and What We Can Learn from Japanese and Chinese Education. New York: Touchstone Books.

Stigler, James W., Shin-Ying Lee and Harold W. Stevenson (1990). Mathematical Knowledge of Japanese, Chinese and American Elementary School Children. Reston, Virginia: National Council of Teachers of Mathematics.

Stigler, James W. and James Hiebert (1999). The Teaching Gap: Best Ideas from the World's Teachers for Improving Education in the Classroom. New York: The Free Press.

Simons, Carol (1989). "Japan's Kyoiku Mamas," p. 281-286 in Seeing Ourselves: Classic, Contemporary and Cross Cultural Readings in Sociology by John J. Macionis and Nicole V. Benokraitis. New Jersey: Prentice Hall.

Wilson, Bruce L. and Thomas B. Corcoran (1988). Successful Secondary Schools. New York: Falmer Press

Appendix A: Math Achievement Test and Questionnaire

Hello,

Thank you for participating in our research project. This project explores the similarities and differences between urban and rural school students. Many aspects of a students' life affect how he or she performs in school. It is these experiences that we would like to measure as well as your math achievement. In the end, the overall results will be summarized and allow teachers and parents to better understand the factors related to school achievement.

We would like you to complete a math test and answer a questionnaire. In the math test there might be questions about things that you have not been taught. Please try your best to answer them anyway. It is okay to leave it blank if you don't know the answer. You will have about 1 hour to complete both the test and the questionnaire. There is no need for you to include your name on the work. Your answers will remain anonymous. If you have any questions, please raise your hand and ask your teacher.

Thanks for your participation. It is very important to our research.

Mathematical Knowledge Test

Part A: Computation (write your answer on the line or in the box.)

1. $5 \times 9 = \underline{\hspace{2cm}}$

2. $\underline{\hspace{2cm}} - 34 = 32$

3.
$$\begin{array}{r} 704 \\ - 268 \\ \hline \end{array}$$
 Answer: $\underline{\hspace{2cm}}$

4. $13 \div 13 = \underline{\hspace{2cm}}$

5. $14 \div 1 = \underline{\hspace{2cm}}$

6. $8 \times 0 = \underline{\hspace{2cm}}$

7. $712 \div 89 = 8$

$8 \times 89 = \underline{\hspace{2cm}}$

8. $42 \div 6 = \underline{\hspace{2cm}}$

9.
$$\begin{array}{r} 198 \\ \times 4 \\ \hline \end{array}$$
 Answer: $\underline{\hspace{2cm}}$

10. $\begin{array}{r} 206 \\ \times 3 \\ \hline \end{array}$ Answer: _____

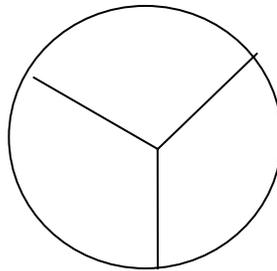
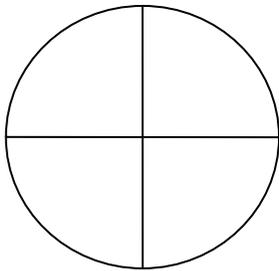
11. $3457 = (3 \times 1000) + (4 \times 100) + (5 \times 10) + 7$

$2683 =$ _____

12. $6 \overline{)432}$ Answer: _____ Remainder _____

13. $5 \overline{)3281}$ Answer: _____ Remainder _____

14.



$$\frac{1}{4}$$

$$\frac{1}{\square}$$

15. $6 \overline{)1586}$ Answer: _____ Remainder _____

16. 98634 _____ 98745
($<$, $>$)

17.
$$\begin{array}{r} 45 \\ \times 26 \\ \hline \end{array}$$
 Answer: _____

18. $5.3 - 4.6 =$ _____

19. $46 \overline{)3572}$ Answer: _____ Remainder _____

20. $\frac{3}{8} + \frac{2}{8} =$ _____

21.
$$\begin{array}{r} 38.15 \\ - 9.43 \\ \hline \end{array}$$

22. $3600 \overline{)843000}$ Answer: _____ Remainder _____

23.
$$\begin{array}{r} 353 \\ \times 477 \\ \hline \end{array}$$
 Answer: _____

24. $2\frac{3}{5}$ $\frac{4}{5}$
($<$, $>$)

25. $\frac{5}{7} - \frac{2}{7} =$ _____

26. $12 \overline{)13.08}$ Answer: _____

27. $2.079 \square 2.465$
($<$, $>$)

28.
$$\begin{array}{r} 0.034 \\ \times 17 \\ \hline \end{array}$$
 Answer: _____

29. $\frac{1}{2} = \frac{\quad}{6}$

30.
$$\begin{array}{r} 46.725 \\ - 23.123 \\ \hline \end{array}$$
 Answer: _____

31. $2\frac{4}{6} + \frac{3}{6} = \underline{\hspace{2cm}}$

32. $.025 \overline{)36}$ Answer: _____

33. $\frac{3}{4} - \frac{1}{6} =$ _____

34. $0.08 \times 10 =$ _____

35. $\frac{3}{8} \div 4 =$ _____

36. $\frac{1}{5}$ $\frac{1}{6}$
($<$, $>$)

37. $\frac{1}{4} = 0.$ _____

38. $2\frac{3}{4} \times \frac{1}{6} =$ _____

39. $\frac{8}{9} \times 4 = \underline{\hspace{2cm}}$

40. $\frac{3}{5} \times \frac{1}{9} = \underline{\hspace{2cm}}$

41. $0.02 = \frac{2}{?}$ Answer: $? = \underline{\hspace{2cm}}$

42. $6 \times \frac{4}{7} = \underline{\hspace{2cm}}$

43. $\frac{1}{3} = 0.\underline{\hspace{2cm}}$

44. $1\frac{2}{3} \div \frac{7}{8} = \underline{\hspace{2cm}}$

45. $\frac{5}{11} \div \frac{1}{9} = \underline{\hspace{2cm}}$

46. $12 \div \frac{8}{9} = \underline{\hspace{2cm}}$

47. $3 : 10 = \underline{\hspace{1cm}} : 100$

48. $4 \frac{1}{7} \div 2 = \underline{\hspace{2cm}}$

49. $0.33 \times \frac{1}{3} = \underline{\hspace{2cm}}$

50. $5 + (-4) = \underline{\hspace{2cm}}$

Part B: Number Concepts and Equations

1. Write the correct sign in the box.

$$6 \boxed{} 3 = 18$$

+ x - \div =

2. What signs would you place between the numbers to complete this problem?

$$5 \underline{\hspace{0.5cm}} 3 \underline{\hspace{0.5cm}} 2$$

3. What sign goes in this box to make this number sentence true?

$$5 \boxed{} 4 = 3 \times 3$$

4. Solve these problems.

a. $4 + 6 + 3 = \underline{\hspace{1cm}} + 3$

b. $(4 + 5) + 2 = 4 + \underline{\hspace{1cm}}$

c. $8 \times 7 = 7 \times \underline{\hspace{1cm}}$

d. $9 \times \underline{\hspace{1cm}} = 0$

5. What is the number before 1? _____

6. Is -3 greater or lesser than -2? _____

7. What sign goes in this box to make this number sentence true?

$$100 \boxed{} 5 > 150 - 5$$

+ x - ÷ >

8. Which of these is a way to find one-half of six? (circle the correct one)

6×2 $6 \div \frac{1}{2}$ $6 - 2$ $6 \times \frac{1}{2}$ $6 + \frac{1}{2}$

9. Put parentheses to show how this problem was solved. Here is an example:

$$8 + (7 + 4) = 8 + 11$$

a. $5 + 4 - 3 = 5 + 1$

b. $48 = 4 \times 2 + 4 \times 2$

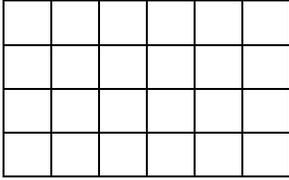
10. a. Here are 5 digits, **2, 6, 3, 5, 1**. How could you arrange these digits to form the biggest number?

b. How could you arrange these digits to form the smallest number?
2, 6, 3, 5, 1

11. Solve $8 - 12 = ?$

Part C: Geometry

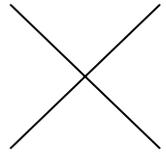
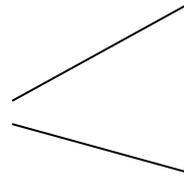
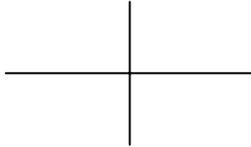
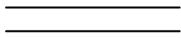
1. Find the area.



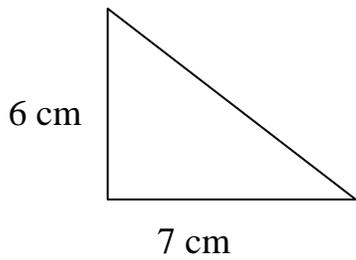
1cm.
 1cm.

_____ cm²

2. Circle the parallel lines.

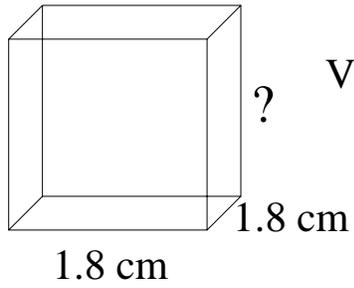


3. Find the area.



_____ cm²

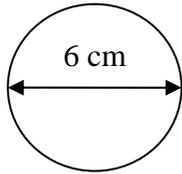
4. Find the height.



Volume = 6.48 cm^3

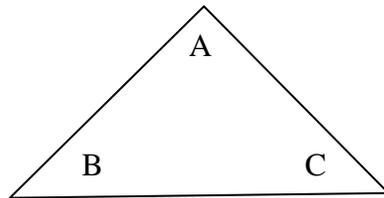
_____cm

5. Find the radius.



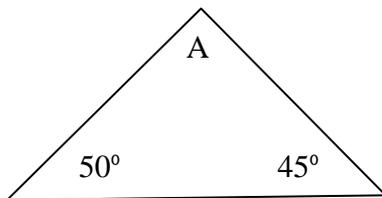
_____cm

6. Find the sum of angles A, B, C.



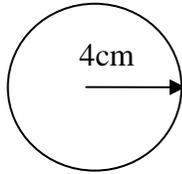
_____degrees

7. Find A



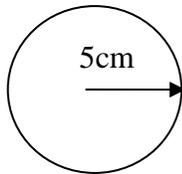
A = _____degrees

8. Find the diameter.



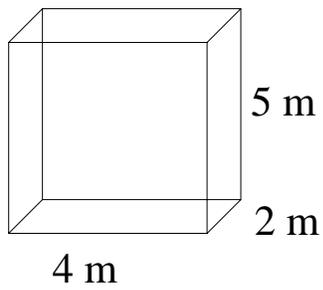
_____cm

9. Find the circumference.



_____cm

10. Find the volume.



_____m³

Part D: Word Problems

1. Kim's weight is 49.7 pounds. Sue's weight is 50.4 pounds.
 - (a) Who is heavier?
 - (b) How much heavier?

2. 8 children went on a picnic. Each child took 2 sandwiches and 3 cookies. Altogether, how many cookies did the children take?

3. The teacher gave 3 sheets of paper to each of 9 people. There are still 2 sheets of paper left. How many sheets of paper did the teacher have when he began?

4. 33 people went to a football game. They went home in 7 cars. In 6 of the cars, there were 5 people each. How many people were in the seventh car?

5. Dad cut a cake into 16 pieces. George ate one fourth of them. How many pieces were left?

6. A field was 20 meters long and 15 feet wide. How long is the fence that goes completely around the field?

7. A stamp collecting club has 24 members. Five-sixths of the members collect only foreign stamps. How many members collect only foreign stamps?

8. John is saving his money to buy a baseball bat that costs \$20.00. For the first four months, he will be able to save \$2.00 a month. Each month after that he will be able to save \$3.00 a month. How many months will it take to save enough money to buy the bat?

9. An apple has 0.4 grams of protein and an orange has 1.5 grams of protein. A girl ate 3 apples and 2 oranges. How many grams of protein did she eat?

10. A truck will hold only 33 boxes of oranges. How many trips will be needed to carry 152 boxes of oranges to a store?

11. A train left Chicago at 1:55 p.m. and arrived at St. Louis 6 hours and 52 minutes later. What time did the train arrive in St. Louis?

12. A farmer has a square tank that needs to be filled with water. The tank holds 125 cubic feet of water. As the farmer fills the tank, the

level of the water rises at the rate of 1 foot per hour. How many cubic feet of water will be in the tank after 1 hour?

13. A bookstore had 1,100 books. Last week, 15% of the books were sold. How many books are left?

14. Diane dropped a special rubber ball from the top of a wall. The wall is 16 feet high. Each time the ball hits the ground it bounces up half as high as the distance it fell. Diane caught the ball when it bounced back to a high point of 1 foot. How many times did the ball hit the ground?

15. A 42-year old father has a 9-year-old son. In how many years will the son's age be one quarter of the father's age?

16. A plumber knows that it takes 12 minutes to saw a piece of copper pipe into 3 pieces. How long would it take to saw it into 4 pieces?

17. A lake resort owner rented a cabin for 14 days on the condition that she would receive 40 dollars a day for every day it did not rain and 10

dollars a day for every day it did rain. At the end of 2 weeks, the resort owner received 380 dollars. How many days did it rain?

THE MATH TEST IS NOW FINISHED. THANKS FOR YOUR HELP!

AFTER SCHOOL LEARNING ACTIVITIES

These questions deal with your *after-school* activities. We would like to know if you take any classes after your regular school day is finished. Please circle your answer choice.

Last week did you go to any classes or structured group activities after the regular school day hours?

- 1. Yes
- 2. No

If you attended a class or activity last week, which of the following did you attend after school?

CHECK IF YOU ATTENDED IT

CHECK HOW MANY DAYS A WEEK YOU WENT TO EACH TYPE OF CLASS
(after school)

SUBJECT		SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Music								
Art								
Dance								
Math								
Science								
Computers								
English								
Other language								
Other _____								
Other _____								

ATTITUDES TOWARD LEARNING

These next questions deal with how motivated you are about learning.

Here are things people say about learning. Do you believe they are true for you? If so, then circle "YES". If not, then circle "NO".

"If I try very hard then I can get all A's on my report card"

1. YES, true for me
2. SOMEWHAT true for me
3. NO, not true for me

"If I get a low test score it is because I did not study hard enough"

1. YES, true for me
2. SOMEWHAT true for me
3. NO, not true for me

"If I get a low test score it is because I am not smart enough"

1. YES, True for me
2. SOMEWHAT true for me
3. NO, not true for me

"I am high motivated to learn as much as I can"

1. YES, True for me
2. SOMEWHAT true for me
3. NO, not true for me

"School stuff isn't that important"

1. YES, True for me
2. SOMEWHAT true for me
3. NO, not true for me

SCHOOL CLASSMATES AND FRIENDS

These next questions ask about how you view school and your friends.

In your mind, what is the **best** thing about going to school? (Please choose only one)

1. the teachers
2. the school
3. my friends
4. learning new things
5. something other (please write what it is: _____)

How would you like your classmates to most remember you? (Please choose only one)

1. as a fun person
2. as a popular person
3. as a smart person
4. as a pretty or handsome person
5. as a tough, strong person
6. something other (please write what it is:_____)

Which one of these following descriptions fits your best friend?

1. fun person
2. popular person
3. smart person
4. pretty or handsome person
5. tough, strong person
6. something other (please write what it is:_____)
7. don't have a best friend

Which one of these following descriptions best describes your second best friend?

1. fun person
2. popular person
3. smart person
4. pretty or handsome person
5. tough, strong person
6. something other (please write what it is:_____)
7. don't have a second best friend

Do you have a boy or girlfriend?

1. Yes
2. No
3. Sort of/a little bit

Do you want to have a boy or girlfriend?

1. Yes
2. No
3. Sort of/a little bit

HOME ENVIRONMENT

The next set of questions asks about your home and family life.

Is there a computer in your home?

1. Yes
2. No

Is the computer hooked up to the internet?

1. Yes
2. No
3. Don't have a computer at home

Do you have your own desk at home for doing writing and homework?

1. Yes
2. No

Do you have your own bookshelf for all of your books?

1. Yes
2. No

Roughly speaking, about how many books do you have at home (not including books from your library)? _____

Do your parents have any bookshelves full of books at home?

1. Yes, many bookshelves
2. Only one or two bookshelves
3. No bookshelves

Do your parents expect you to be a smart student?

1. Yes, *very* smart
2. Yes, *somewhat* smart
3. No, they don't worry about how smart I am

Out of the following family members, circle who actually sits down with you every week to help you become a smarter student. If it is more than one, then circle each one.

1. Mom
2. Dad
3. Sister
4. brother
5. Grandparents
6. an Aunt or uncle
7. Cousins
8. Neighbors
9. Friends

Which one of your family members was a really smart student in school? If it is more than one, then circle each one.

1. Mom
2. Dad
3. Sister
4. brother
5. Grandparents
6. an Aunt or uncle
7. Cousins
8. I'm not sure

How much Television do you watch every day?

1. A lot
2. Some
3. only a little
4. none

Has either of your parents graduated from a college or university?

1. Yes
2. No
3. I'm not sure

CREATIVITY—How creative are students

Can you sing a song completely from start to finish?

1. Yes
2. Sort of
3. No

How many songs can you sing? _____

Do you write poems? 1. Yes 2. No

About how many poems have you written? _____

Can you create a story to tell to people for fun?

1. Yes, I tell a long, interesting stories
2. Somewhat, mainly short stories
3. No, not really

In general, do you like to do what everyone else is doing?

1. Yes, *all* the time
2. Yes, only *sometimes*
3. No

In general, do you like to do things differently than everyone else?

1. Yes, *all* the time
2. Yes, *sometimes*
3. No

Do you tell jokes to people to make them laugh?

1. Yes, all the time
2. Sometimes
3. No

THANKS FOR YOUR HELP IN ANSWERING ALL OF OUR QUESTIONS!

WE HAVE ONE FINAL *EASY AND FUN* REQUEST OF YOU:

On the back side of this page, please use your pen or pencil to draw a picture of what an ALIEN--Creature from outer space-- looks like: