Numeracy Inventory Device (NID): Basis for Crafting Strategic Intervention Materials (SIM) in Mathematics

Rico A. Herrero*

rico.herrero@deped.gov.ph
Punta Integrated School, Department of Education, SDO Calamba City, Philippines 4027

Abstract

Numeracy, like literacy, is key for students to access and make sense of their world (Unrwa, 2011). The main purpose of this study was to determine the numeracy level of the randomly selected grade seven students from two big schools in West District of SDO Calamba City during school year 2018 – 2019. In order for the researchers to gather necessary data, the researchers deviced a tool called the Numeracy Inventory Device (NID) which measured the students' numeracy skills. After establishing the device's validity and reliability, the researchers conducted the inventory to the respondents. Students have found to have basic numeracy knowledge and skills such as concepts, properties, and theoretical knowledge. However, they lack on analytical skills which is very significant in performing operations and solving word problems. Moreover, fraction is one of the most difficult areas in basic Mathematics as revealed in this study. However, it is the most utilized area in higher Mathematics. These findings helped out the researchers to identify students' strengths and weaknesses in terms of numbers which served as basis in designing intervention materials to improve the students' mathematics skills.

Keywords: Numeracy Inventory Device; Numeracy Level; Mathematics Skill; Mathematics Intervention Materials

1. Introduction and Rationale

Mathematics education in the Philippines is one of the priority concerns of the Department of Education (DepEd). The dismal state of mathematics achievement of high school students was evident in the results of international, national and regional mathematics tests. For instance, the performance of Filipino students in the 2003 Trends in International Mathematics and Science Study (TIMSS) in which the Filipino second year high school students ranked 41st in math out of 46 participants, stuck at the bottom while struggling at a passing level locally. Students' performance in the National Achievement Test (NAT) was even more discouraging. Some one million fourth year students' NAT in 2003-2005 had only ten percent mastery in mathematics. Students' NAT for four succeeding years (2006-2009) in both elementary and secondary levels registered below mastery level of 75 percent (Imam, 2013).

The Third International Mathematics and Science Study (TIMSS) 1995 and recently, Trends in Mathematics and Science Study (TIMSS) and International Association for the Evaluation of Educational Achievement (IEA) 2003 data revealed the alarming facts for the participating countries most especially the Philippines. The recent TIMMS 2003 data showed that Filipino students' poor mathematical performance has placed the country in the 36th rank out of 38 nations worldwide. (Sangcap, 2010).

Locally speaking, as revealed by the previous National Achievement Test (NAT), Punta Integrated School (the former Punta National High School) placed last among 21 public schools in the Schools Division of Calamba City in Mathematics to be particular which is a fact that drives the researcher to conduct this study.

Numeracy, like literacy, is key for students to access and make sense of their world. Being able to quantify and measure their environment in different ways will help them to make wiser judgements about the kind of actions to take in their lives (Unrwa, 2011). It is in high school that much of mathematics is formally introduced. High school mathematics prepares students for university and college as well as provides them with the comprehensive set of mathematical concepts and skills that they need should they decide to find employment right after year 10 or 11. At these grade levels, the mathematics taught is formal, highly structural, highly symbolic and high level. This means that the kind of instruction that is most effective depends on how much foundational and preparatory knowledge students gain from the elementary grades. They would benefit most from a formal mathematics instruction if they have gone through the exploratory and experimental phases of learning mathematics in their elementary grades. These phases provide the most important foundational ideas that hopefully get consolidated, strengthened and deepened in high school. It does benefit students in high school if mathematics instruction focuses on: Problem Solving, Reasoning and Proof, Structure of Mathematics, Developing Fluency in procedures and algorithms. (SEI-DOST & MATHTED, 2011).

These drive the researchers to conduct a numeracy inventory among grade seven students of Punta Integrated School and Integrated School of Lawa for school year 2018 – 2019. The results of this study might be used in crafting an intervention material in order to enhance the foundational mathematics skills of the students to further improve mathematics performance.

2. Literature Review

The following literatures are believed to be related on the current study.

Leongson (2010)as cited by Andaya reveals that Pilipino students excel in knowledge acquisition but fare considerably low in lessons requiring higher order thinking skills. This disappointing condition is evident in the performance of students in national and international surveys on mathematics and science competencies. Performance of pre-service teachers and mathematics teachers in the Professional Board Examination reveals the same picture of poor competencies (Philippine Daily Inquirer, 1986; Ibe,1995). The Third International Mathematical Science Study (TIMMS,2000) examined patterns of students achievement in mathematics and found out that the school effectiveness and teachers competency impact learning and promote higher level of achievements (Acer, 2018). The quality of instruction and effective instructional design are necessary to alleviate problems related to teaching and learning mathematics (Dursun& Dede,2004).

Numeracy is not limited to the ability to use numbers, to add, subtract, multiply and divide. Numeracy encompasses the ability to use mathematical understanding and skills to solve problems and meet the demands of day-to-day living in complex social settings. To have this ability, a young person needs to be able to think and communicate quantitatively, to make sense of data, to have a spatial awareness, to understand patterns and

sequences, and to recognise situations where mathematical reasoning can be applied to solve problems. (Quinn, 2011).

Just as children develop literacy skills at different rates, their development of mathematical understanding also varies. We need to ensure that the teaching of numeracy in the post-primary school builds upon the learning that children have acquired in the primary school years, so that over the course of compulsory education, they master the essential ability to understand and use mathematics in every-day life and in further learning. (LITERACY AND NUMERACY FOR LEARNING AND LIFE The National Strategy to Improve Literacy and Numeracy among Children and Young People, 2011)

Numeracy—i.e., one's practical understanding of mathematics in context—is one of the strongest predictors of people's general decision making skill, independent of other cognitive abilities (e.g., intelligence, working memory, attentional control). Despite notable scientific progress on the nature of numeracy and decision making, the cognitive and decision sciences have yet to investigate individual differences in numeracy components (e.g., algebra versus probability) (Ghazal, 2014)

Theoretically, at the more basic levels numeracy is said to involve an understanding of the "real number line, time, measurement, and estimation" whereas higher levels often emphasize an "understanding of ratio concepts, notably fractions, proportions, percentages, and probabilities" (Reyna et al., 2009). More generally, mathematical knowledge has been classified in number of ways that vary depending on one's reference class. Steen (1990) defined numeracy in terms of six broad categories: quantity, dimension, shape, pattern, uncertainty and change. Gal et al., (2005) who conducted the Adult Literacy and Life Skills (ALL) survey, defined and assessednumeracy as a set of five fundamental ideas that characterize mathematical knowledgeincluding: quantity and number, dimension and shape, pattern, function and relationship, data and chance, and change. Another well-established framework presented by Golbeck(2005) defined numeracy in the context of health.Golbeck's elements of numeracy included four overlapping categories of numerical information, namely: basic (e.g.,ability to identify and read numbers), computational (e.g., counting and arithmetic), analytical (e.g., inference, estimation, proportion, percentage, frequencies, basic graphs), and statistical (e.g., basic probability, statistics, and risk assessment).

These related studies only reveal that there is really a problem as regards to students' numeracy skills. The level of numeracy does not fit their age level that leads to challenges on solving more complicated word problems. Hence, it must be addressed by assessing the students' level of numeracy skills and determine their strengths and weaknesses to have a direct intervention and remediation with these weaknesses.

3. Research Questions

This study aimed to assess the numeracy skills of the Grade seven students of Calamba West District 1.

Specifically, this seeks answers to the following questions:

1. What is the performance of the grade seven students in the following areas:
   1.1. Whole Numbers,
   1.2. Signed Numbers,
   1.3. Fractions,
   1.4. Decimals, and
   1.5. Percentages? 2.
2. In what particular topics do they perform well?
3. What are the difficulties encountered in solving the given problem?
4. Based on the results of the study, what proposed intervention materials can be utilized?

5. Scope and Limitations

The aim of this study was to determine the level of numeracy skills of grade seven students of West 1 particularly in Punta Integrated School and Integrated School of Lawa, school year 2019 - 2020.

These student-respondents were chosen through Stratified Random Sampling in order to have a well-represented group of respondents.

This study covered the test that will measure the students' basic skills in math such as Whole Numbers, Signed Numbers, Fractions, Decimals, and Percentages.

6. Research Methodology

6.1. Sampling

The student-respondents of this study came from grade seven classes of Punta Integrated School and Integrated School of Lawa, which comprised the first district of Calamba West, school year 2019 – 2020.

The researchers used Stratified Random Sampling in order for them to have a representation of each group or stratum. This method is applied when the population is divided into different strata or classes and each class must be represented in the study.

Table 1. Distribution of Respondents per School and Section

Schools	Sections	Population (N)	Percentage	Sample size (n)
Punta Integrated School	A	35	4.70%	12
	B	54	7.26%	19
	C	46	6.18%	16
	D	49	6.59%	17
	E	51	6.85%	18
	F	51	6.85%	18
	G	54	7.26%	19
	H	40	5.38%	14
	I	43	5.78%	15
	J	51	6.85%	18
	K	49	6.59%	17
	L	43	5.78%	15
	M	49	6.59%	17
	N	40	5.38%	14
Integrated School of Lawa	A	40	5.38%	14
	B	49	6.59%	17
TOTAL		**744**	**100.00%**	**260**

6.2. Data Collection

In order for the researchers to gather necessary data, the researchers deviced a tool called the Numeracy Inventory Device (NID) which measured the students' numeracy skills. This was composed of 80 items test which underwent validation by the mathematics experts such as master teachers, head teachers, etc. Moreover, in order to establish not only the validity of the device but also the reliability, sophisticated item analysis was also conducted. Out of these 80 items, 50 good questions were retained and became part of the device. The

questions covered the following areas: Whole Numbers, Signed Numbers, Fractions, Decimals, and Percentages.

After establishing the device's validity and reliability, the researchers conducted the inventory to randomly selected student-respondents from grades seven of Punta Integrated School and Integrated School of Lawa.

After the administration, the researchers interpreted the students' numeracy skills as to advanced, proficient, basic and below basic.

Through these data, the researchers also found out the students' strengths and weaknesses in terms of numbers made them the basis in designing intervention materials to improve the students' mathematics skills.

6.3. Ethical Issues

In order to address ethical considerations on this study, the researchers asked permission to conduct this study from the school head of the desired schools. The researchers also asked the respondents' consent to participate in the study through a written letter and verbal consent. Anonymity of the respondents and the confidentiality of their scores and responses were kept confidential and private.

7. Results and Discussion

Table 2 shows the performance of student-respondents based on the numeracy skills tested by the Numeracy Inventory Device. Based on the results, the area Whole Numbers ranked the highest with 67.6 mean percentage score interpreted as Advanced. This indicates that most of the Grade 7 students have already mastered the fundamentals of Whole Numbers. These competencies involving whole numbers include identifying place value of numbers, writing numbers in numerals, rounding off, solving equations and word problem involving the four fundamental operations.

Second to the rank is the area Decimals. With 45.8 mean percentage score interpreted as Basic, this area is already below the mastery level of 50 percent. Competencies in this area include rounding off numbers, changing whole numbers to fractions to decimals, solving equations and word problems involving decimals.

Thirdly, student-respondents are found to be at the Basic level in Signed Numbers with 42.1 mean percentage score. This area includes competencies in the properties of Signed Numbers and solving equations involving signed numbers.

Fourth to the rank is the Percentages with 35.7 mean percentage score and interpreted as Basic. Among the competencies in this area is solving word problems involving percentages.

On the other hand, the area Fractions marked the lowest score with 27.5 mean percentage score interpreted as Below Basic. This means that many Grade 7 students are having difficulty solving equations or word problems involving fractions. Competencies under this area include arranging fractions based on its value, solving word problems, simplification, and applying the four fundamental operations to solve for an equation.

Table 2. Numeracy Skill of the Student-Respondents Per Area

Areas	Mean	MPS	STDEV	MIN	MAX	Interpretation	Rank
Whole Numbers	6.76	67.6	2.17	0	10	Advanced	**1**
Signed Numbers	4.21	42.1	2.25	0	10	Basic	3
Fractions	2.75	27.5	1.73	0	9	Below Basic	**5**
Decimals	4.58	45.8	2.03	0	10	Basic	2
Percentages	3.57	35.7	1.89	0	10	Basic	4

The table 3 below shows the summary of Numeracy Level of Grade 7 student-respondents based on the results of the Numerical Inventory Device.

The NID revealed that student-respondents garnered an average of 21.88 out of 50-item test or 43.76 mean percentage score. This sets below the mastery level of 50%. In general, student-respondents were identified to be at the Basic level of the numeracy skills.

Table 3. Numeracy Skill of Student-Respondents

Mean	MPS	STDEV	MIN	MAX	Interpretation
21.88	43.76	6.32	6	47	Basic

The table 4 below yields the frequency of distribution of student-respondents based on their Numeracy Level.

Table 4. Distribution of Student-Respondents in terms of their Numeracy Level

Numeracy Level	Frequency	Percentage
Advanced	5	1.92%
Proficient	18	6.92%
Basic	140	53.85%
Below Basic	97	37.31%
Total	**260**	**100.00%**

As illustrated above, there are a total of 260 student-respondents who took the Numeracy Inventory. Most of the NID takers or 140 out of 260 were assessed to be at the Basic level. Meaning, the students do only have the basic skills in Mathematics like knowledge about the concept and simple computations. However, Grade 7 Mathematics focuses on Algebra, Geometry, and Statistics which require proficiency if not advanced of the numeracy skills.

The following tables present the frequency of correct responses of student respondents. It also discloses the competencies where students perform well and the difficulties encountered by the student-respondents.

Table 5. Performance of the student-respondents in Whole Numbers

Competency Number	Correct Response	Percentage	Rank
Competency 1	211	81.15%	1
Competency 2	207	79.62%	2
Competency 3	196	75.38%	3.5
Competency 4	195	75.00%	5
Competency 5	196	75.38%	3.5
Competency 7	189	72.69%	6
Competency 8	189	72.69%	7.5
Competency 9	103	39.62%	7.5
Competency 10	82	31.54%	9
			10

In the area Whole Numbers, the competency Determining the place value of a digit ranked first with 81.15 percent correct response of the total population. On the contrary, Solving word problems involving whole numbers ranked last with only 31.54 percent of correct response. This indicates that student-respondents are

well-versed with the concepts of Whole Numbers but lack of skills in analyzing and solving word problems involving whole numbers.

Table 6. Performance of the student-respondents in Signed Numbers

Competency Number	Correct Responses	Percentage	Rank
Competency 1	173	66.54%	1
Competency 2	121	46.54%	3
Competency 3	113	43.46%	5
Competency 4	95	36.54%	7.5
Competency 5	90	34.62%	9
Competency 6	82	31.54%	10
Competency 7	95	36.54%	7.5
Competency 8	99	38.08%	6
Competency 9	104	40.00%	4
Competency 10	123	47.31%	2

Meanwhile, the area Signed Numbers got a lower percentage of correct responses than the Whole Numbers. The competency Illustrating positive signed numbers gained the highest correct responses with 173 out of 260 or 66.54%. Quite the reverse, Adding and Subtracting signed numbers marked with the lowest rate with only 31.54% correct responses. In view of this, it can be concluded that student-respondents are still confused on the law of signed numbers.

Table 7. Performance of the student-respondents in Fractions

Competency Number	Correct Responses	Percentage	Rank
Competency 1	115	44.23%	1
Competency 2	107	41.15%	2
Competency 3	94	36.15%	3
Competency 4	89	34.23%	4
Competency 5	77	29.62%	5
Competency 6	74	28.46%	6
Competency 7	45	17.31%	7
Competency 8	43	16.54%	8
Competency 9	40	15.38%	9
Competency 10	32	12.31%	10

In Fractions, Illustrating fractions scored the highest among the other competencies with 44.23% of correct responses. Inversely, Arranging fractions from least to greatest and vice versa ranked last with only 12.31%. This indicates that student-respondents lack of skill in simplifying.

Table 8. Performance of the student-respondents in Decimals

Competency Number	Correct Responses	Percentage	Rank

Competency 1	159	61.15%	1
Competency 2	148	56.92%	5
Competency 3	149	57.31%	3.5
Competency 4	156	60.00%	2
Competency 5	149	57.31%	3.5
Competency 6	110	42.31%	6
Competency 7	92	35.38%	7
Competency 8	88	33.85%	8
Competency 9	85	32.69%	9
Competency 10	56	21.54%	10

Compared to Fractions, Decimals are way much easier. Competencies above mastery level include Rounding off decimal numbers, Writing decimals into phrases, Comparing decimals, Determining the place value of a digit, and Changing decimals to fractions with correct responses of 61.15%, 60.00%, 57.31%, 57.31%, and 56.92% respectively. However, Solving word problems involving decimals ranked last with 21.54% correct responses. This means that students lack of skills in analyzing word problems and applying solutions to word problems including decimals.

Table 9. Performance of the student-respondents in Percentages

Competency Number	Correct Responses	Percentage	Rank
Competency 1	126	48.46%	1
Competency 2	122	46.92%	3
Competency 3	120	46.15%	4
Competency 4	116	44.62%	5
Competency 5	125	48.08%	2
Competency 6	78	30.00%	6.5
Competency 7	52	20.00%	9
Competency 8	78	30.00%	6.5
Competency 9	67	25.77%	8
Competency 10	45	17.31%	10

In terms of Percentages, the competency Illustrating percentage gained the first spot with 48.46% correct responses. Though it ranked first among the competencies, still, majority of the student-respondents found it difficult to understand. Furthermore, Solving word problems involving percentage has been very hard for the students since it only garnered 17.31% of correct responses.

8. Conclusions

1. Student-respondents have found to have basic numeracy knowledge and skills such as concepts, properties, and theoretical knowledge. However, they lack of analytical skills which is very significant in performing operations and solving word problems.
2. Fraction is one of the most difficult areas in basic Mathematics as revealed in this study. However, it is the most utilized area in higher Mathematics.

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Appendices

Items	Whole Numbers	Signed Numbers	Fractions	Decimals	Percentages
Q1	Determining the place value of a digit	Illustrating positive signed numbers	Illustrating fractions	Rounding off decimal numbers	Illustrating percentage
Q2	Determining the place value of a digit	Comparing signed numbers	Simplifying fractions	Changing decimals to fractions	Illustrating percentage
Q3	Writing numbers in numerals	Adding and Subtracting signed numbers	Adding mixed numbers	Comparing decimals	Determining the percentage of a number
Q4	Rounding off whole numbers	Adding and Subtracting signed numbers	Adding dissimilar fractions	Writing decimals into phrases	Determining the percentage of a number
Q5	Adding whole numbers	Adding and Subtracting signed numbers	Multiplying fractions	Determining the place value of a digit	Solving word problems involving percentage
Q6	Subtracting whole numbers	Adding and Subtracting signed numbers	Dividing fractions	Comparing decimals	Solving word problems involving percentage
Q7	Subtracting whole numbers	Multiplying signed numbers	Dividing fractions	Writing decimals into phrases	Solving word problems involving percentage
Q8	Multiplying whole numbers	Multiplying signed numbers	Applying PEMDAS rule in fractions	Adding and subtracting decimals	Solving word problems involving percentage
Q9	Dividing whole numbers	Dividing signed numbers	Applying PEMDAS rule in fractions	Adding and subtracting decimals	Solving word problems involving percentage

Q10	Solving word problems involving whole numbers	Dividing signed numbers	Arranging fractions from least to greatest and vice versa	Solving word problems involving decimals	Solving word problems involving percentage

NUMERACY INVENTORY DEVICE

By: Rico A. Herrero

Whole Numbers

1) In the number 84569, which digit is in the hundreds place?

A. 8
B. 5
C. 9
D. 6

2) In the number 9765, what is the value of the digit 7?

A. Tens
B. Hundreds
C. Units
D. Thousands

3) Write the following number in numerals: four million, six hundred fifty thousand, two hundred fifty six.

A. 4,065,256
B. 4,605,256
C. 4,650,256
D. 4,652,560

4) Round 6285 to the nearest hundred.

A. 6000
B. 6300
C. 6200
D. 7000

5) Add 864 + 35 + 144 + 9

A. 1,520
B. 1,502
C. 1,052
D. 1,250

6) When subtracting 25 from 104, the answer is ____

A. 79
B. 78
C. 77
D. 81

7) Subtract:

8 0 0 0
- 7, 2 6 8

A. 732
B. 742
C. 723
D. 743

8) Multiply:

5, 6 4 1
x 4 2 9

A. 2,419,989
B. 2,491,899
C. 2,491,999
D. 2,419,899

9) How many times 25 goes into 2275? (Hint: divide 2275 by 25)

A. 94
B. 93
C. 92
D. 91

10) Mark sells ice cream for a living Monday through Friday. This week, he sold ice cream for 245, 180, 200, 95, and 150 pesos. Mark spent 450 pesos to make those ice creams. What is Mark's profit?

A. 425
B. 420
C. 415
D. 410

Fraction

1) Find fraction F with denominator less than 8 such that $\frac{2}{8} + F = 1$

a) $\frac{3}{4}$
b) $\frac{2}{8}$
c) $\frac{1}{8}$
d) $\frac{8}{8}$

2) Find two fractions F1 and F2 with same denominator equal to 6 such that F1 + F2 = 1 and F1 – F2 = $\frac{2}{3}$.

a) $F1 = \frac{1}{6}; F2 = \frac{1}{6}$
b) $F1 = \frac{6}{6}; F2 = \frac{2}{6}$
c) $F1 = \frac{5}{6}; F2 = \frac{5}{6}$

d) $F1 = \frac{5}{6}; F2 = \frac{1}{6}$

3) Which fraction is equivalent to 16%?

a) $\frac{16}{25}$

b) $\frac{4}{25}$

c) $\frac{4}{16}$

d) $\frac{16}{16}$

4) Which fraction is equivalent to $\frac{300}{1000}$?

a) $\frac{3}{100}$

b) $\frac{3}{1000}$

c) $\frac{3}{10}$

d) $\frac{300}{10}$

5) $3\frac{3}{5} + 5\frac{1}{2} =$ _____

a) $9\frac{1}{10}$

b) 9

c) $10\frac{1}{10}$

d) $8\frac{4}{7}$

6) $\frac{1}{2} + \frac{1}{5} + \frac{1}{6} =$ _____

a) $\frac{3}{2}$

b) $\frac{13}{15}$

c) $\frac{15}{13}$

d) $\frac{13}{13}$

7) $\frac{1}{7} \times 2\frac{2}{5} =$ _____

a) $\frac{4}{35}$

b) $\frac{2}{35}$

c) $\frac{12}{35}$

d) $\frac{1}{35}$

8) $\frac{1}{12} \times 2 =$ _____

a) $\frac{1}{6}$

b) $\frac{1}{120}$

c) $\frac{1}{600}$

d) $\frac{1}{60}$

9) $\frac{2}{5} \div 6 =$ _____

a) $\frac{12}{5}$

b) $\frac{1}{15}$

c) $\frac{5}{12}$

d) $\frac{12}{30}$

10) $\frac{9}{7} + 2 =$ _____

a) $3\frac{2}{7}$

b) $\frac{11}{7}$

c) $\frac{9}{9}$

d) $3\frac{9}{7}$

11) $2\frac{1}{3} + \frac{4}{2} =$ _____

a) 3

b) $\frac{7}{5}$

c) $4\frac{1}{3}$

d) $2\frac{5}{5}$

12) $3\frac{1}{5} \div 5 =$ _____

a) $3\frac{1}{25}$

b) 4

c) $\frac{16}{25}$

d) $15\frac{1}{5}$

13) $\frac{1}{2} + 4\frac{1}{3} - 3\frac{2}{5} =$ _____

a) $1\frac{13}{30}$

b) 1

c) $2\frac{13}{30}$

d) 2

14) $\frac{5}{2} \div \frac{7}{2} - \frac{1}{5} =$ _____

a) $\frac{18}{35}$

b) $2\frac{11}{20}$

c) $\frac{35}{18}$

d) $8\frac{11}{20}$

15) $\left(\frac{1}{5} + \frac{1}{5}\right) \times \frac{2}{7} =$ _____

a) $\frac{2}{35}$

b) $\frac{3}{35}$

c) $\frac{4}{35}$

d) $\frac{5}{35}$

16) $\left(3\frac{1}{2} + \frac{3}{5}\right) \times \frac{1}{7} =$ _____

a) $3\frac{1}{4}$

b) $\frac{41}{70}$

c) 34

d) $\frac{1}{12}$

17) $\left(\frac{1}{2} + \frac{2}{3}\right) \div \frac{1}{5} =$ _____

a) $\frac{7}{30}$

b) 3

c) $5\frac{5}{6}$

d) $6\frac{5}{6}$

18) Order from least to greatest: $3\frac{4}{7},\ 3\frac{3}{5},\ 3\frac{1}{2},\ 3\frac{11}{20}$

a) $3\frac{1}{2},\ 3\frac{11}{20},\ 3\frac{4}{7},\ 3\frac{3}{5}$

b) $3\frac{1}{2},\ 3\frac{3}{5},\ 3\frac{11}{20},\ 3\frac{4}{7}$

c) $3\frac{1}{2},\ 3\frac{3}{5},\ 3\frac{4}{7},\ 3\frac{11}{20}$

d) $3\frac{3}{5},\ 3\frac{1}{2},\ 3\frac{11}{20},\ 3\frac{4}{7}$

Decimals

1) Round 15.725 to the nearest tenth.

a) 15.8

b) 15.7
c) 15
d) 16

2) Change 0.41 to an ordinary fraction.
a) $\frac{41}{10}$
b) $\frac{41}{100}$
c) $\frac{41}{1000}$
d) $\frac{100}{41}$

3) Which of the following is more than 0.45?
a) 0.075
b) 0.395
c) 0.55
d) 0.080

4) Which decimal represents one hundred and seventy five hundredth?
a) 100.175
b) 100.75
c) 101.075
d) 101.0075

5) What does 8 represent in the decimal 478.92?
a) Tenths
b) Hundredths
c) Dozens
d) Units

6) Change 0.8 to a fraction in its simplest form.
a) $\frac{8}{10}$
b) $\frac{8}{100}$
c) $\frac{4}{5}$
d) $\frac{6}{8}$

7) Fill in the blank with the correct symbol $\frac{3}{4}$ _____ 0.70
a) <
b) >
c) =
d) ?

8) Which one is 25 hundredths?
a) 0.025
b) 2500
c) 25.00
d) 0.25

9) Find the difference: 1.45 – 0.78 = _____
a) 1.21
b) 0.67

c) 2.23
d) 0.77

10) Find the difference 754.6 – 233.7 = _____
a) 520.9
b) 519.9
c) 530.9
d) 529.9

11) Find the sum: 4.75 + 2.5 + 0.906 = _____
a) 8.256
b) 8.146
c) 8.156
d) 6.156

12) Find the quotient in decimal form: 764 ÷ 10 = _____
a) 7.064
b) 76.4
c) 7640
d) 7.64

13) What does the 7 represent in 235.067?
a) $7 \times \frac{1}{1000}$
b) $7 \times \frac{1}{100}$
c) 7×1000
d) 7×10

14) Derek buys a honey stick for P7.95 and one roll of tape for P3.59. He pays with a twenty peso bill. How much change will he receive?
a) P8.36
b) P8.64
c) P8.56
d) P8.46

Percentages

1) 40 squares are shaded in a 100-square grid. What percentage of the grid is shaded?
a) 4%
b) 14%
c) 40%
d) 24%

2) There are 35 squares shaded in a 50-square grid. What percentage of the grid is shaded?
a) 35%
b) 70%
c) 75%
d) 65%

3) What is 40% of 90 people?
a) 36
b) 38
c) 40

d) 42

4) What is 35% of 210?
   a) 70
   b) 73.5
   c) 75.5
   d) 76
5) There is 15% off the price of clothes in a shop. A sweater's original price is P36.00. What is its price after the reduction?
   a) P22.60
   b) P30.60
   c) P33.60
   d) P34.60
6) The number of participants in a cycling competition has increased by 20% since last year. If there were 1,240 competitors last year, how many are competing this year?
   a) 1,260
   b) 1,428
   c) 1,488
   d) 1,482
7) Ben gets $\frac{14}{20}$ in his Geography test. What percentage is this?
   a) 14%
   b) 70%
   c) 77%
   d) 80%
8) In a class of 30 pupils, 12 are boys. What percentage of the class are boys?
   a) 30%
   b) 40%
   c) 45%
   d) 50%
9) Dianne eats 4 pieces of a 16 piece chocolate bar. What percentage of the bar has she eaten?
   a) 25%
   b) 35%
   c) 40%
   d) 45%
10) If 27 out of 60 cars are red, what is the percentage of non-red cars?
   a) 55%
   b) 60%
   c) 65%
   d) 70%

Signed Numbers

1) Which of these is the positive number?
   A. 5
   B. -1
   C. 0
   D. None of these
2) -36 is greater than -35.

A. True
B. False
C. Maybe
D. None of these

3) Calculate: 9 – 10 + 3
A. 4
B. -1
C. 2
D. 5

4) Calculate: -6 + 9 – 5 + 4
A. 14
B. -6
C. 2
D. -12

5) Calculate: 15 + (-9)
A. 6
B. 24
C. 23
D. 12

6) Calculate: 6 – (-10)
A. -4
B. 4
C. 16
D. -16

7) Calculate: -8 × -3
A. 24
B. -24
C. -11
D. 11

8) Calculate: -6 × 9
A. -15
B. -54
C. 54
D. 15

9) Calculate: -25 ÷ (-5)
A. 5
B. -5
C. -20
D. 20
E.

10) Calculate: 40 ÷ (-8)
A. -5
B. 5
C. -32
D. 32