



CHUMEY HIGHER SECONDARY SCHOOL
BUMTHANG DZONGKHAG
ANNUAL EXAMINATION, 2022



CLASS: IX

TOTAL MARKS: 100

SUBJECT: Mathematics

TIME: 3 hrs.

Index code:

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Read the following directions carefully

1. Do not write for the first 15 minutes .This time is to be spent for reading the questions.
2. In this booklet there are two Sections, A and B. Section A is compulsory. From section B, you have to attempt ANY SIX out of Eight questions.
3. All answers should be written in the separate answer sheet provided by the school.
4. Remember to write quickly but neatly
5. Do not leave the examination hall before you made sure that you answered all questions.

Section - A (20 Questions- 40 marks)

QUESTION 1

Directions: For each question there are four alternatives A, B, C and D. Choose the .the correct answer and write in the answer sheet provided.

- i. If $9^7 \div 9^b = 9$, then find the value of b
 - A. 0
 - B. 1
 - C. 6
 - D. 7

- ii. Which of the following is an example of a binomial?
 - A. $3x + y - xy$
 - B. $4x^2 + 4x + 2$
 - C. $3x + 4y + x$
 - D. $3y + 2y^2 + x^2$

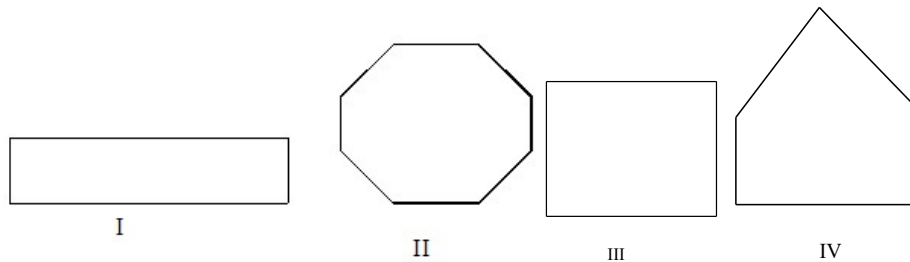
- iii. Which of the following is written in the standard form?
 - A. $Ax + By = 0$
 - B. $Ax + By = C$
 - C. $Ax - By = C$
 - D. $Ax - By = 0$

- iv. Which of the following is an empty set?
 - A. $\{\text{prime numbers less than } 10\}$
 - B. $\{\text{whole number less than } 1\}$
 - C. $\{\text{natural numbers less than } 1\}$
 - D. $\{\text{seventh day in a week}\}$

- v. The theoretical probability of rolling prime numbers in a die is
 - A. $\frac{1}{2}$
 - B. $\frac{1}{3}$
 - C. $\frac{2}{3}$
 - D. $\frac{5}{6}$

- vi. To which whole number is nearest to $\sqrt{915}$
 - A. 29
 - B. 30
 - C. 31
 - D. 32

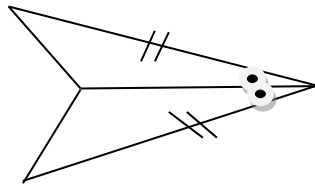
- vii. Which of the following is **NOT** a polynomial?
- $\frac{3}{4}x^3$
 - $5x^6$
 - $-4x^6$
 - $2x^{-3}$
- viii. Converting 13929 into number with 3 significant figures, the result is
- 139
 - 13900
 - 13400
 - 13000
- ix. The product of $(2x - 1)(2x + 1)$ is
- Binomial
 - Trinomial
 - Monomial
 - Polynomial
- x. The intersection of the sets $\{1,2,8,9,10,5\}$ and $\{1,2,6,10,12,15\}$ is the set
- $\{1,2,10\}$
 - $\{5,6,12,15\}$
 - $\{2,5,10,9\}$
 - $\{1,6,12,9,8\}$
- xi. Which of the following figures is the most efficient figure, provided all the figures are having the same perimeter?



- I
 - II
 - III
 - IV
- xii. If the slope of a line is -4 and y -intercept is 3 , then the equation of the line in the slope and y -intercept form is
- $y = -3x + 4$
 - $y = 4x + 3$
 - $y = -4x + 3$
 - $y = 3x - 4$

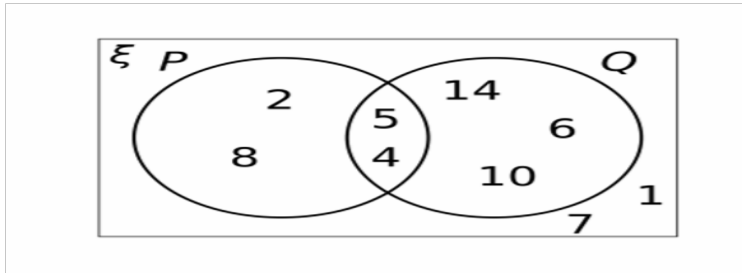
- xiii. A _____ is a plan for spending your available funds
- Income
 - Expenses
 - Expenditures
 - Budgets
- xiv. Which of the following statement is not always TRUE?
- Similar triangle are the same shape
 - Corresponding angles in similar triangles are always equal
 - Similar triangles are the same size
 - In similar triangles, corresponding sides have the same ratio.
- xv. Which of the following is an example of quotient law of exponents?
- $3^2 \times 3^4 = 3^7$
 - $(7^2)^4 = 7^8$
 - $4^5 \div 4^3 = 4^2$
 - $5^{-3} = \frac{1}{5^3}$

- xvi. What condition of congruence tells you that the following pair of triangles are congruent?



- AAS
 - SAS
 - ASA
 - SSS
- xvii. The following data shows the weight of eight students in kilogram.
35 37 32 40 37 42 28 30
- 35
 - 36
 - 37
 - 38.5

xviii. From the following Venn diagram find 'P' (complement of P)

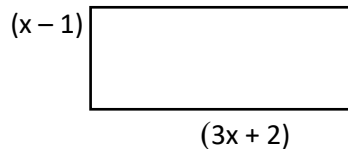


- A. {5,4}
- B. {6,10,14}
- C. {7,1}
- D. {1,6,7,10,14}

xix. To buy a new car I need to borrow Nu 200000 for 3 years at a rate of 10% per annum. What will my total repayment be?

- A. Nu 20000
- B. Nu 60000
- C. Nu 220000
- D. Nu 260000

xx. Find the perimeter of the following rectangle.



- A. $4x + 3$
- B. $4x + 1$
- C. $8x + 2$
- D. $4x - 3$

SECTION B [60 marks]

Directions: Attempt ANY SIX questions.

Question 2a

Solve for p: $4^p \times 2^{-18} = 1$

[2]

Question 2b

- i. Categorize the following numbers into rational and irrational numbers. [2]
- a. $2 + \sqrt{2}$: _____
 - b. $\sqrt{8}$: _____
 - c. $\sqrt{\frac{9}{49}}$: _____
 - d. 2.343434344.....: _____
- ii. Calculate $4 + (7 - 10 \times 2)^2 + 10 \div (5 - 7)$. [2]

Question 2c

Given universal set $S = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18\}$

$$A = \{2, 4, 6, 8, 10, 12, 14, 16, 18\}$$

$$B = \{3, 6, 9, 12, 15, 18\}$$

$$C = \{1, 3, 5, 7, 9, 11, 13, 15, 17\}$$

Determine the elements of the following sets:

i. $A \cup B \cup C$ [2]

ii. $A \cap B \cap C$: [2]

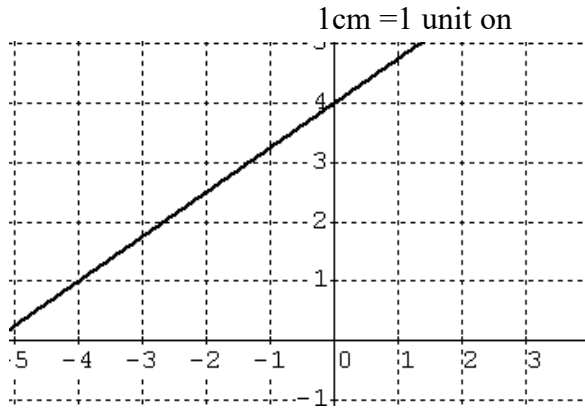
Question 3a

Fill in the blanks [2]

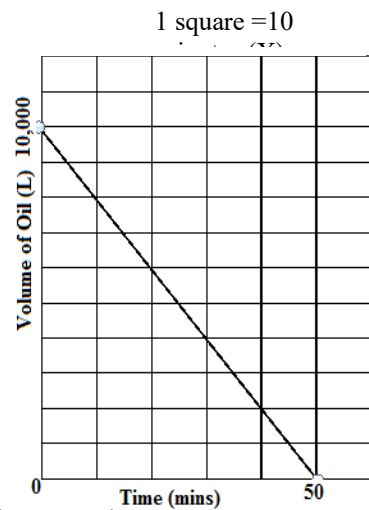
- i. The _____ of the polynomial is determined by highest power.
- ii. Polynomial with two terms is called _____
- iii. The terms with exactly same variables is called _____ terms.
- iv. A _____ is an algebraic expression that includes at least one variable.

Question 3b

- i. Write the Slope and Y- intercept form of equation for the graph below. [2]



- ii. The graph shows the amount of oil remaining in a storage tank. [2]
- a. Why is it appropriate to use a solid line instead of a dashed line for the graph?



- b. Interpolate to find the amount of oil remaining after 20 minutes.

Question 3c

Karma works at two different jobs. One pays him Nu 500 per hour and the other pays him Nu 600 per hour. He wants to earn a total of Nu 4500 and work exactly 8 hours.

a. Write the equation to describe Karma's income. [1]

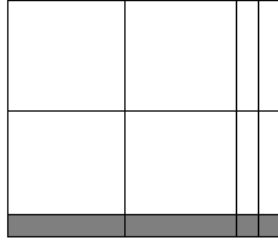
b. Write an equation to describe the number of hours he should work. [1]

c. Solve the equations to determine the hours he should spend on each job to earn a total of Nu 4500. [2]

Question 4a

What division does the algebra model below show?

[3]

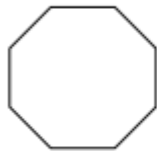


Question 4b

If the perimeter remains constant for the figures given below, which of the two shapes is more efficient? Explain.

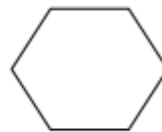
[2]

Figure 1



Octagon

Figure 2

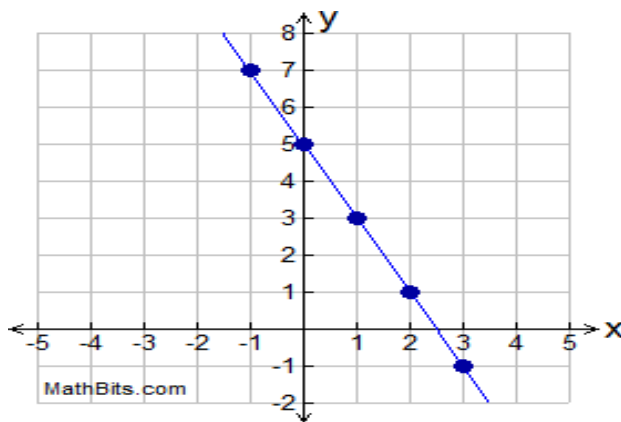


Hexagon

Question 4c

- i. A photographer charges a sitting fee of Nu. 250 and then charges Nu. 60 for each photograph ordered. Dawa can only afford to spend Nu. 1060. How many photograph can Dawa order?
 - ii. [3]

- iii. Determine the slope and y- intercept for the graph. Then write the equation of the graph. [2]



Question 5a

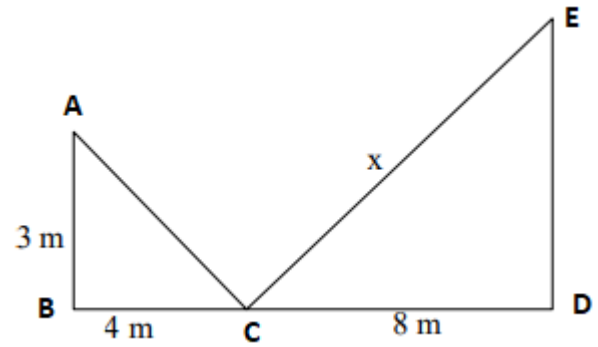
Therchu is buying materials for fencing a new garden. He buys two strands of barbed wire and a post for every 3 meters of fence. Each post costs Nu. 300 and barbed wire costs Nu. 20 per meter. If Therchu spends Nu. 3000 on fencing materials, what should be the shape to enclose largest area? [3]

Question 5b

A boy of height 1.7m is standing 20m away from a flag pole on the same level ground. He observes that the angle of elevation of top of the flag pole is 24° . Calculate the height of the flag pole. [4]

Question 5c

In the figure given aside, given that $\triangle ABC \sim \triangle CDE$, calculate the side marked 'x'. [3]

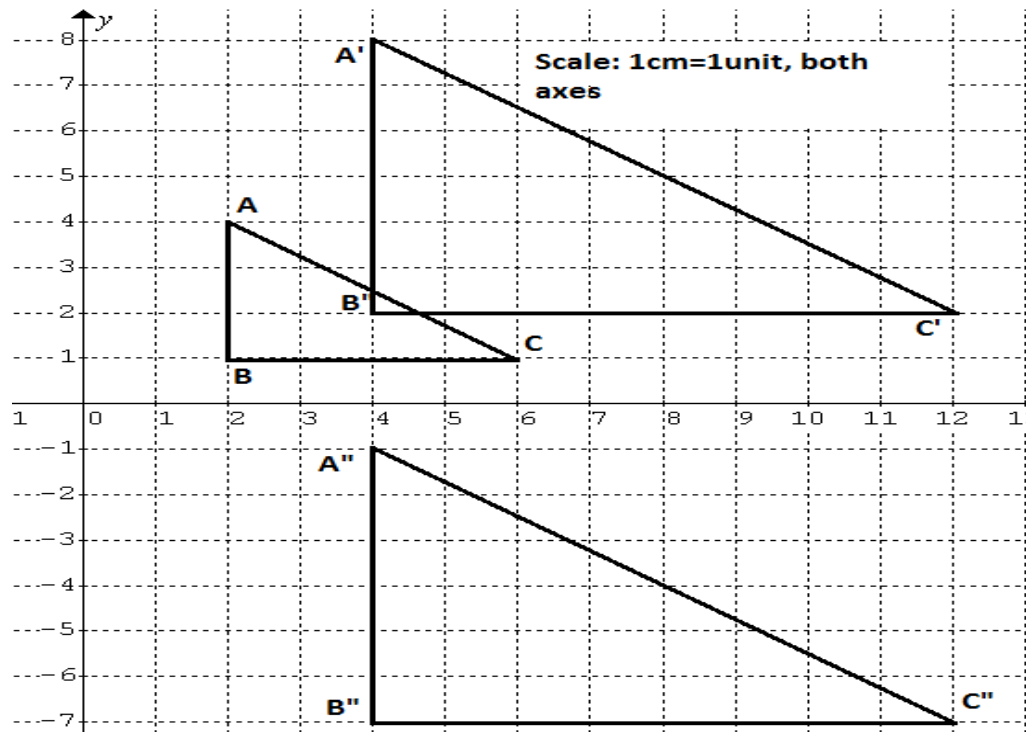


Question 6a

Create any two congruent triangles and show how they are congruent. [2]

Question 6b

With reference to the diagram given below, answers the following questions:



i. Describe the transformation shown in the diagram from $\triangle ABC$ to $\triangle A'B'C'$.

[2]

ii. Describe the transformation shown in the diagram from $\triangle A'B'C'$ to $\triangle A''B''C''$.

[2]

Question 6c

The data below shows distance travelled (in KM) by 21 students to go to school every day.

| | | | | | | | | | | |
|----|----|----|----|----|-----|-----|----|----|----|----|
| 52 | 50 | 35 | 25 | 20 | 120 | 100 | 37 | 5 | 4 | 25 |
| 36 | 56 | 72 | 72 | 82 | 36 | 2 | 5 | 48 | 55 | |

i. Organize the data and construct the box plot.

[3]

ii. Make one conclusion from the box plot about the data.

[1]

Question 7a

Study the Stem and Leaf Plot below and answer questions that follows:

| Test scores out of 100 | |
|-------------------------------|--------------------------|
| Stem | Leaves |
| 4 | 4 |
| 5 | 2 8 |
| 6 | |
| 7 | 0 1 2 2 3 5 5 5 8 9 9 |
| 8 | 0 5 8 8 9 |
| 9 | 2 2 4 8 9 |

i. Find the median, mode & the range of the data.

[1 ½]

ii. What is the Mean scores?

[½]

Question 7b

A die numbered 1 – 6 is rolled and a coin with Tashi Tagye and Khorlo Mebar on its faces is tossed.

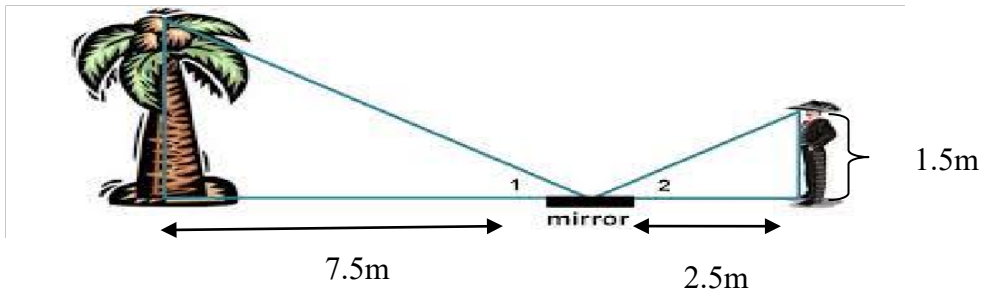
Answer the following questions:

- i. Create an outcome chart to show number of equally likely outcome on a roll of a die and toss of a coin. [2]

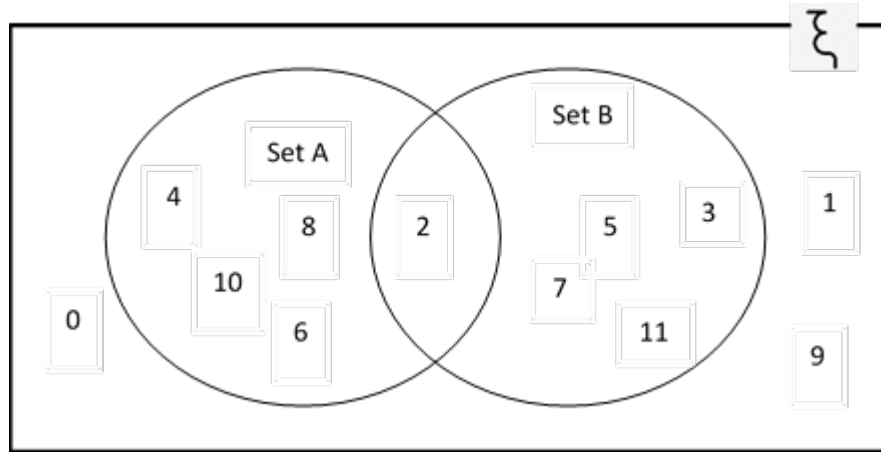
- ii. Determine the probability of tossing Tashi-Tagye and rolling prime numbers. [1]

Question 7c

- i. Rajesh places a mirror on the ground to help him measure the height of a tree. Use similar triangles to find the height of a tree. [2.5]



ii. Study the Venn diagram below and answer the questions below:



a) Find $n(A \cup B)$

[1]

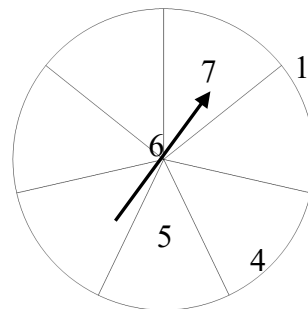
b) Find $n(A \cap B)'$

[1]

Question 8a

The spinner below is spun and the coin is flipped.

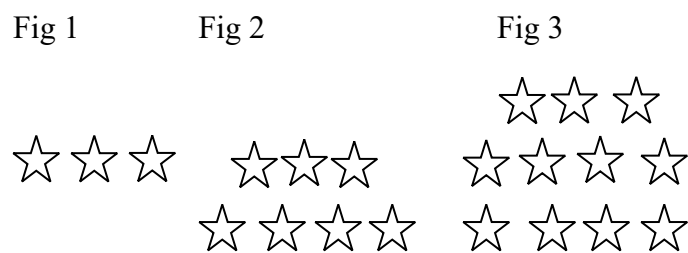
i. Create an outcome chart. [2]



- ii. Determine the probability of spinning an even number and flipping Tashi-tagye? [1]

Question 8b

The first three figures in a pattern are shown



- i) Copy and complete the table of values [2]

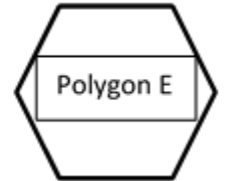
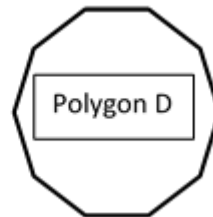
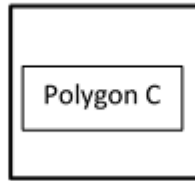
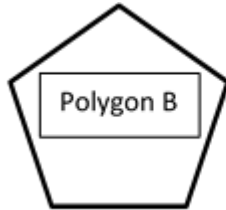
| Fig. no | Number of stars |
|---------|-----------------|
| 1 | 3 |
| 2 | 7 |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

- ii) Is this data discrete or continuous? How do you know? [1]

iii) Draw a scatter plot to show the relation between figure number and number of stars. [1]

Question 8c

All the regular polygons below have same perimeter. Name them and arrange in the order least to most efficient. [3]



Question 9a

Determine the coordinates of the image of triangle XYZ having X (-1, 2), Y (-3, 0) and Z (-1, 4).

- i. Upon rotation of 90° ccw about the origin. [2]

- ii. Upon reflection on X-axis. [2]

Question 9b

Given the equation $5x + 2y = 10$, answer the question that follow:

- i. Change the equation to slope and y-intercept form. [1]

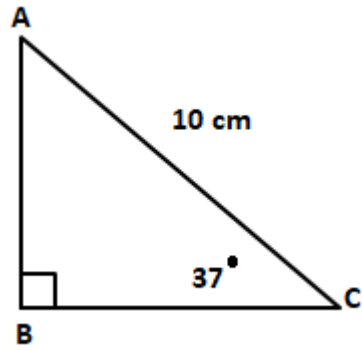
- ii. Plot the graph of the equation. [2]

Question 9c

- i. List at least two possible ways of writing 3^8 as a product of powers of 3. [1]

ii. Calculate the area of the triangle given below.

[2]



iii.