

# HARRISON COLLEGE



## END OF YEAR EXAMINATION

2022

## FIRST FORM MATHEMATICS

**DURATION: 1 HOUR and THIRTY minutes**

### INSTRUCTIONS TO CANDIDATES

1. This paper consists of nine (9) pages, inclusive of the cover page.
2. There is one (1) extra page at the end of this paper for additional working or rough working.
3. There are two sections. Section A consists of fourteen (14) multiple choice questions and Section B consists of sixteen (16) free response questions.
4. Calculators are NOT ALLOWED.
5. Answer ALL questions.
6. The maximum mark is 89.
7. Write your NAME and FORM below.

NAME OF STUDENT: \_\_\_\_\_

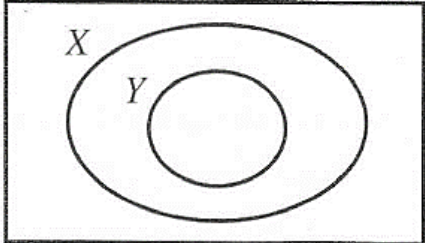
FORM: \_\_\_\_\_

**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO**

## Section A

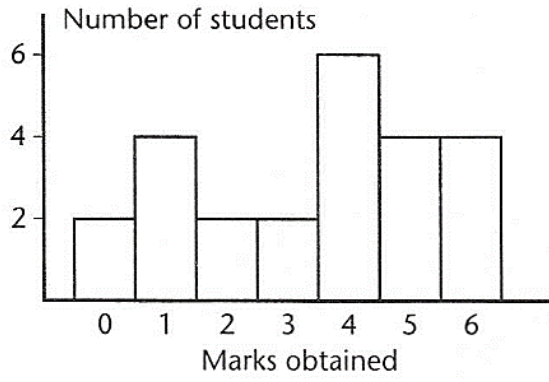
**For Questions 1 to 14, CIRCLE the letter corresponding to your answer**

1. The numbers which can be written in the form  $\frac{p}{q}$ , where  $p, q \in \mathbb{Z}$  and  $q \neq 0$  are
  - A. rational numbers
  - B. irrational numbers
  - C. complex numbers
  - D. whole numbers
2.  $\pi$  is
  - A. rational
  - B. irrational
  - C. a natural number
  - D. none of the above
3.  $1\frac{1}{7} + 2\frac{2}{3} =$ 
  - A.  $\frac{17}{21}$
  - B.  $2\frac{17}{21}$
  - C.  $3\frac{2}{10}$
  - D.  $3\frac{17}{21}$
4.  $72 + 98 - 17 =$ 
  - A. 143
  - B. 153
  - C. 163
  - D. 170
5.  $16 - 3 \times 4 \div 2 =$ 
  - A. -8
  - B. 2
  - C. 10
  - D. 26
6. Which of the following numbers written to 3 decimal places and 3 significant figures is the same?
  - A. 8.3714
  - B. 3.3333
  - C. 0.4781
  - D. 0.0066
7. Dave is 46 years old, twice as old as Rajeeve. How old is Rajeeve?
  - A. 23 years old
  - B. 28 years old
  - C. 18 years old
  - D. 30 years old
8. A piece of string 120 cm long is cut in 2 pieces with one-piece 20 cm longer than the other. The ratio of the shorter to the longer piece of string is
  - A. 1:6
  - B. 1:5
  - C. 2:5
  - D. 5:7
9. The number of litres in 1 ml is
  - A. 0.001
  - B. 0.1
  - C. 10
  - D. 1,000
10. The number  $40_8$  written in base 10 is
  - A. 50
  - B. 48
  - C. 42
  - D. 32
11. The total number of subsets that can be formed from the set  $\{x, y, z\}$  is
  - A. 1
  - B. 8
  - C. 5
  - D. 2
12. The Venn diagram below illustrates two finite sets X and Y. Which of the following statements are true?

$U$   


  - I.  $X \subset Y$
  - II.  $Y \subset X$
  - III.  $X \cap Y = Y$
  - IV.  $X \cup Y = X$
  - A. I and IV only
  - B. II and III only
  - C. II, III and IV only
  - D. All of the above

13. The below diagram shows the marks obtained by students in a test.

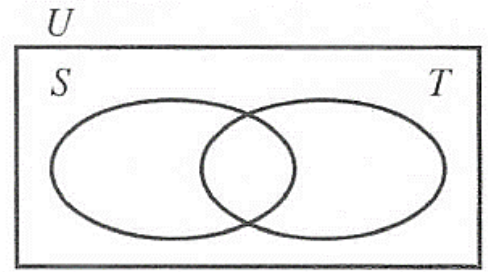


The number of students who wrote the test is

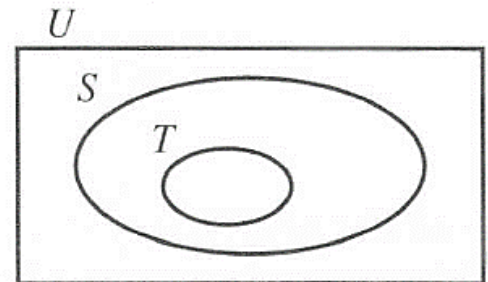
- A. 21
- B. 22
- C. 24
- D. 36

14. If  $S = \{\text{odd numbers}\}$  and  $T = \{\text{even numbers}\}$ , then the Venn diagram below, which illustrates the relationship between  $S$  and  $T$  is

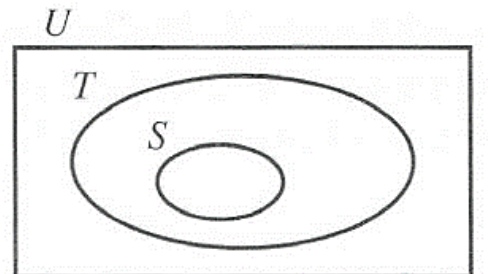
A.



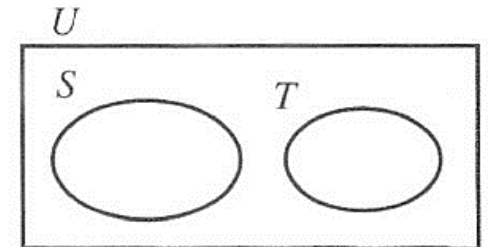
B.



C.



D.



[1 x 14]

**Section B**

For Questions 15 to 30, answer each question in the SPACE provided. Show your working.

15. Solve the following. Write any resulting fraction in its **lowest terms**.

a.  $5.12 \times 0.41$  [2]

b.  $\frac{1}{6} + \frac{7}{12} + \frac{2}{3}$  [2]

c.  $\frac{1}{3} \times \frac{3}{4}$  [2]

16. Complete the table below. Write any fraction in its **lowest terms**. [1 x 6]

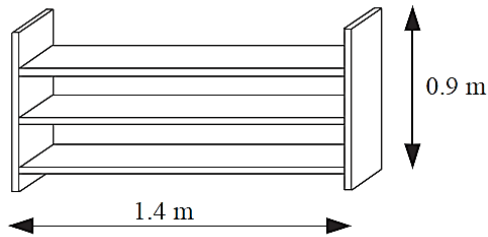
Fraction	Decimal	Percentage
$\frac{7}{100}$		
	0.99	
		80%

17. From the list of numbers, **4**      **6**      **10**      **16**      **40**      **88**, state

a. all the factors of 20. [2]

b. all the multiples of 5. [2]

18. Edna is making a shelf unit as shown below.



She needs three pieces of wood, each of length 1.4 m, for the shelves.

She needs two pieces of wood, each of length 0.9 m, for the ends.

The wood is sold only in 3 m lengths.

Calculate how many 3 m lengths Edna needs to buy.

[5]

19. Six girls competed in the long jump at their school Sports Day. Their best jumps were as follows.

Anne	6.08 m	Donna	6.12 m
Beth	5.93 m	Emma	5.98 m
Candy	5.87 m	Fatima	● m

a. Fatima finished in second place. Write down a possible length for Fatima's jump. [1]

b. Arrange the six competitors in order of merit. [2]

c. Write down the length of Anne's jump in centimetres. [1]

20. Adil bought a table tennis table for \$240. After two years, he decided to sell it.

He managed to sell it to his friend Tom for \$108.

a. How much was the loss? [2]

b. Calculate the loss percentage. [2]

21. A jacket was originally priced at \$120 but was marked as '25% off' during a sale.

a. How much was the discount on the jacket? [2]

b. What was the new sale price? [2]

22. Albert is observing pulsars, a type of star which emit a beam of radiation at regular intervals.

He sees two pulsars 'flash' together and notes that one pulsar flashes every 4 seconds and the other every 7 seconds. How long will he have to wait before they flash together again? [2]

23. Simplify EACH of the following expressions.

a.  $3a + b + 2a - 4b =$  [2]

b.  $c \times 5d =$  [1]

c.  $\frac{16ab}{4a} =$  [2]

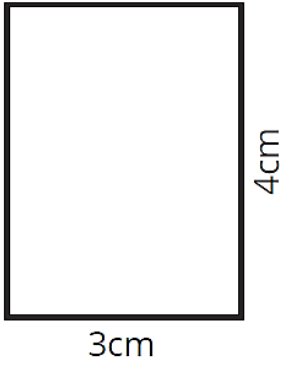
24. Given that  $x = 2$ ,  $y = -5$ , and  $z = 3$ , find the value of

a.  $x - 2y =$  [3]

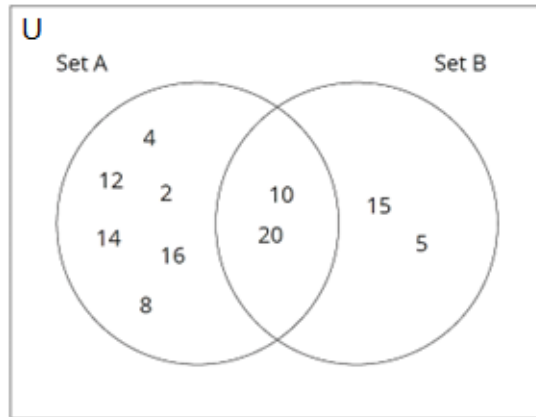
b.  $xz^2 =$  [3]

c.  $\frac{7x+2z}{y} =$  [3]

25. Calculate the area of the rectangle. Give your answer in square millimeters. [3]



26. The Venn diagram shows some information about sets **A** and **B**.

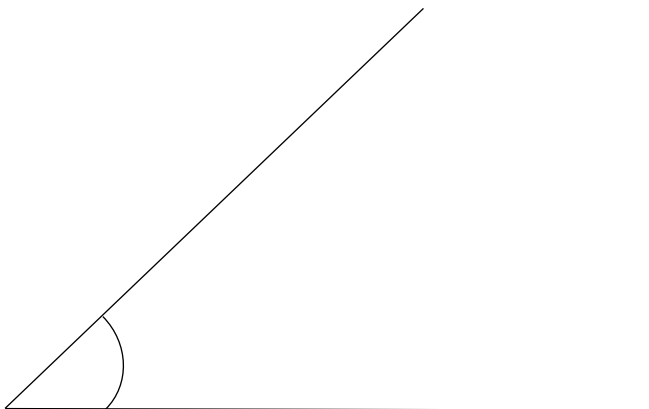


a. Write down the elements in set **A**. [2]

b. Write down the elements for  $A \cup B$ . [2]

c. Determine  $n(B)$ . [1]

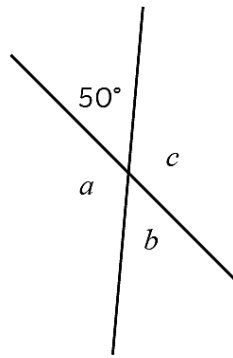
27. a. Measure and state the size the angle below. [1]



b. Name the type of angle at a. above. [1]

28. Calculate angles  $a$ ,  $b$  and  $c$ . Explain your reasoning for each letter.

[6]



Angle  $a$ :

Reason for angle  $a$ :

Angle  $b$ :

Reason for angle  $b$ :

Angle  $c$ :

Reason for angle  $c$ :

29. The table below shows the number of goals scored in a football match by Twinkl FC over five weeks.

Week	Goals scored
1	15
2	5
3	6
4	8
5	7

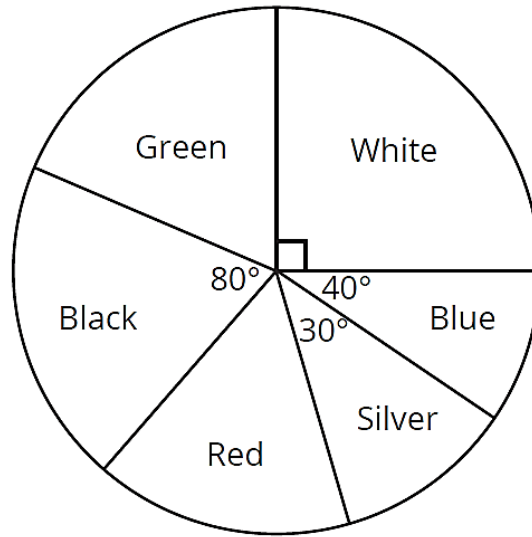
a. In which week was the highest number of goals scored? [1]

b. In which week was the lowest number of goals scored? [1]

c. What was the mean average number of goals scored per week? [3]



30. The pie chart below shows the different coloured cars observed in a car park.



a. If 40 black cars were observed, calculate the number of blue cars in the car park. [2]

b. In total, 180 cars were observed. How many white cars were there? [2]

c. How many silver cars were there? [2]

- END OF EXAMINATION -

**EXTRA PAGE**

If you use this extra page, you **MUST** write the question number clearly in the box provided.

**Question No.**