SCHOOL: **Your school name**

SENIOR THREE MATHEMATICS

END OF TERM EXAMINATION · FREE SAMPLE

Academic year: 20..... – 20..... **Date:** ...../...../20.....

Name: ..... Class: .....

Duration: 2 hours **Total marks:** 37

Content covered: Unit 4: Algebraic fractions · Unit 5: Simultaneous linear inequalities · Unit 6: Linear and quadratic functions · Unit 7: Compound interest, reverse percentage and compound proportional change · Unit 9: Circle and related theorems · Unit 10: Collinear points and orthogonal vectors in 2D · Unit 13: Interpretation of statistical data · Unit 14: Probability with Venn diagrams

INSTRUCTIONS

1. A full paper has THREE sections and 100 marks: A 55 marks (all questions), B 30 marks (any three of four), C 15 marks (one of two).
2. This free sample shows one extract of each section.
3. Silent non-programmable calculators may be used.
4. Write your answers in the answer booklet provided.
5. Show all your working clearly.

SECTION A (extract of 55 marks)

Attempt ALL questions.

1. Solve $\frac{3}{x-1}=\frac{2}{x+1}$. (3 marks)

2. Show that $A(1,2)$, $B(3,6)$, $C(4,8)$ are collinear. (3 marks)

3. A and B are mutually exclusive with $P(A)=0.3$ and $P(B)=0.45$. Find $P(A\cup B)$ and $P(\text{neither})$. (3 marks)

4. After a 12% pay rise, a salary is 168 000 FRW. What was it before? (3 marks)

5. Matching. Match each item in column A with the correct answer in column B. Write the letter in the answer column. (4 marks)

Column A	Answer	Column B
1. Solve $2x-1>x+3$ and $3x-2<2x+5$.		**a.** $4<x<7$
2. To check which side of $2x+y=4$ satisfies $2x+y<4$, test (0, 0). The result is:		**b.** (2, 1)
3. Which point satisfies $x+y<5$ and $x>1$?		**c.** the side containing the origin is the solution
4. Solve $3x-2<x+4<2x+6$.		**d.** $-2<x<3$

6. Fill in the blanks. Use the words in the box to complete the sentences. One word in the box is not needed. (3 marks)

4 · **6** · **the region satisfying all inequalities** · **15 shirts and 10 trousers**

(i) The feasible region of a system of inequalities is ..... .

(ii) A shop stocks x shirts and y trousers with $x\geq 10$, $y\geq 5$ and $x+y\leq 30$. Which is possible? → .....

(iii) How many integer pairs (x, y) satisfy $x\geq 1$, $y\geq 1$, $x+y\leq 4$? → .....

SECTION B (extract of 30 marks)

Attempt any THREE questions.

7. **(10 marks)**

(a) An arc of length 11 cm lies on a circle of radius 7 cm. Find the angle at the centre ($\pi=\frac{22}{7}$). (3 marks)

(b) Find k if $\begin{pmatrix} k \\ 2 \end{pmatrix} \parallel \begin{pmatrix} 3 \\ 6 \end{pmatrix}$. (3 marks)

(c) $|\vec{u}|=3$, $|\vec{v}|=4$ and $\vec{u} \perp \vec{v}$. Find $|\vec{u}+\vec{v}|$. (4 marks)

SECTION C (extract of 15 marks)

Attempt only ONE question.

8. Simultaneous linear inequalities **(15 marks)**

A farmer plants x ha of maize and y ha of beans. She has at most 10 ha, needs at least 2 ha of beans, and wants at least twice as much maize as beans.

(a) When is the boundary line drawn dashed? (1 mark)

(b) Why do we test a point such as $(0,0)$? (2 marks)

(c) Write the three inequalities. (3 marks)

(d) Find the vertices of the region. (3 marks)

(e) Is the plan "5 ha maize, 4 ha beans" allowed? (3 marks)

(f) Profit is 50 000 FRW/ha for maize and 80 000 FRW/ha for beans. Which vertex gives the most profit? (3 marks)

END