STAPLE

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

ENGINEERING GRAPHICS AND DESIGN P1

NOVEMBER 2021

MARKS: 100

TIME: 3 hours

This question paper consists of 6 pages.

Barcode label

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions.
2. Answer ALL the questions.
3. ALL drawings are in first-angle orthographic projection, unless otherwise stated.
4. ALL drawings must be prepared using pencil and instruments, unless otherwise stated.
5. ALL answers must be drawn accurately and neatly.
6. ALL the questions must be answered on the QUESTION PAPER, as instructed.
7. ALL the pages, irrespective of whether the question was attempted or not, must be re-stapled in numerical sequence in the TOP LEFT-HAND CORNER ONLY.
8. Time management is essential in order to complete all the questions.
9. Print your examination number in the block provided on every page.
10. Any details or dimensions not given must be assumed in good proportion.

FOR OFFICIAL USE ONLY															
QUESTION	MARKS OBTAINED			½	SIGN	MODERATED			½	SIGN	RE-MARKING			½	SIGN
1															
2															
3															
4															
TOTAL															
	2	0	0			2	0	0			2	0	0		

FINAL CONVERTED MARK	CHECKED BY
100	

COMPLETE THE FOLLOWING:
CENTRE NUMBER
CENTRE NUMBER
EXAMINATION NUMBER
EXAMINATION NUMBER

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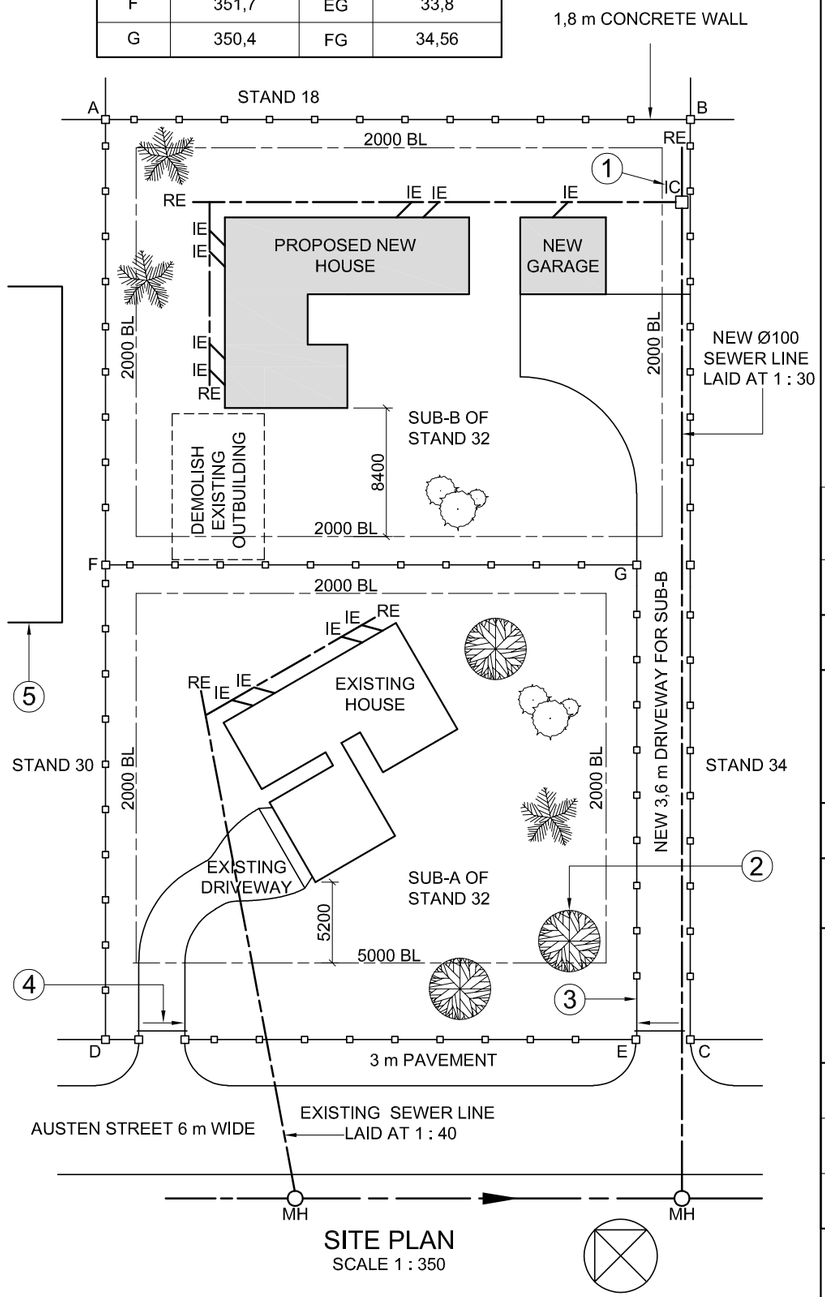
LAND SURVEYOR'S CERTIFICATE OF THE CORNER HEIGHTS AND BOUNDARY LENGTHS OF SUB-A AND SUB-B OF STAND 32.			
CORNER HEIGHTS IN METRES		BOUNDARY LENGTHS IN METRES	
A	351,5	AB	38,16
B	349,2	BC	60
C	351,5	CD	38,16
D	352,2	DA	60
E	351,5	FD	33,8
F	351,7	EG	33,8
G	350,4	FG	34,56

SYMBOL LEGEND:

1. SHRUBBERY
2. PALM TREES
3. DECIDUOUS TREES



NOTE:
Contractors must verify all dimensions and levels on site before commencing work. Architects to be notified immediately of any discrepancies.

ARCHITECT'S SIGNATURE .....

CLIENT'S SIGNATURE .....

ANSWER 20

In the space below, draw, in neat freehand, the front view and top view of the *SANS 10143* graphical symbol for a BIDET.

REVISION	DATE	DESCRIPTION
2	2021-02-14	ADD NEW STORM WATER DRAIN AT LOWEST CORNER
1	2021-01-23	INCREASE WIDTH OF DRIVEWAY

CLASSIC DESIGN ARCHITECTS
459 CONCORD RD
CAPE TOWN
www.clasdes.co.za

PRINTED BY:	DATE OF PRINT:
DUPLEX PRINTING	2021-02-21

DRAWING TITLE: SITE PLAN

PROJECT: PROPOSED NEW HOUSE AND GARAGE ON SUBDIVISION B OF STAND 32 FOR ROSS WATSON, 25 AUSTEN STREET, PIKETBERG, 1965

PROJECT NUMBER:	DRAWING NUMBER:		
JBV-500W	AAG-2121		
DATE:	DRAWN:	CHECKED:	SCALE:
2021-01-10	JOHN	WAYNE	1 : 350
REFERENCE CODE: Q1R-2021			

QUESTION 1: ANALYTICAL (CIVIL)

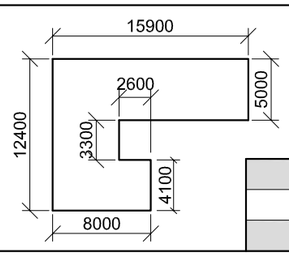
Given:
The site plan of newly subdivided STAND 32 with new boundary and building lines as well as a proposed new house and garage, a title panel and a table of questions. The drawing is not presented to the indicated scale.

Instructions:
Complete the table below by neatly answering the questions, which refer to the accompanying drawing, title panel and civil content. **[30]**

	QUESTIONS	ANSWERS			
1	What is the project number?		1		
2	Who prepared the drawing?		1		
3	What is the date of the first revision?		1		
4	Name the company that printed the drawing.		1		
5	What size pipe is used for the new sewer line?		1		
6	What does the abbreviation *IC* at 1 stand for?		1		
7	What type of tree is indicated at 2?		1		
8	Name the constructed feature at 3.		1		
9	What is indicated by the arrow at 4?		1		
10	Name the feature at 5.		1		
11	How many inspection eyes are there on the proposed new house?		1		
12	In what colour should drain and soil pipes be indicated on drainage installation drawings?		1		
13	With reference to the building regulations, why should the existing outbuilding be demolished now?		2		
14	What is the fall of the existing sewer line?		1		
15	What is the shortest distance from the existing house to Austen Street in metres?		2		
16	With reference to the second revision, closest to which corner of SUB-B of STAND 32 should a new stormwater drain be placed?		1		
17	With reference to the north point, what is the direction of flow of the municipal sewer line?		2		
18	In the space below (ANSWER 18), determine the perimeter of SUB-B of STAND 32, including the new driveway, in metres.		3		
19	In the space below (ANSWER 19), determine the total area of the proposed new house in square metres.		3		
20	In the space in the title panel (ANSWER 20), draw, in neat freehand, the front view and top view of the *SANS 10143* graphical symbol for a BIDET.		4		
		TOTAL	**30**		

ANSWER 18. Show ALL calculations.

ANSWER 19. Show ALL calculations.



EXAMINATION NUMBER	
EXAMINATION NUMBER	2

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QUESTION 2: INTERPENETRATION AND DEVELOPMENT

Given:

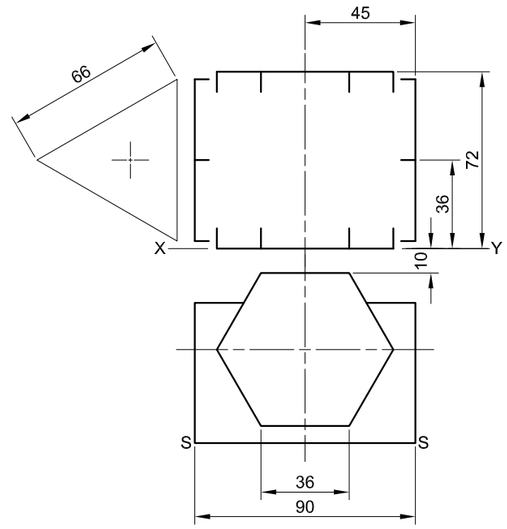
- The top view and incomplete front view of a connecting piece for a ventilation system. The connecting piece consist of a right equilateral triangular tube and a right regular hexagonal tube. The axes of both tubes lie in a common vertical plane.
- An auxiliary view of the triangular tube.

Instructions:

Draw, to scale 1 : 1, the following views of the two tubes:

2.1 The given top view
2.2 The right view
2.3 The complete front view, clearly showing the curve of interpenetration
2.4 The development of the triangular tube. Make edge 'S-S' the seam.

- Planning is essential.
- Show ALL hidden detail and folding lines.
- Show ALL construction. **[38]**



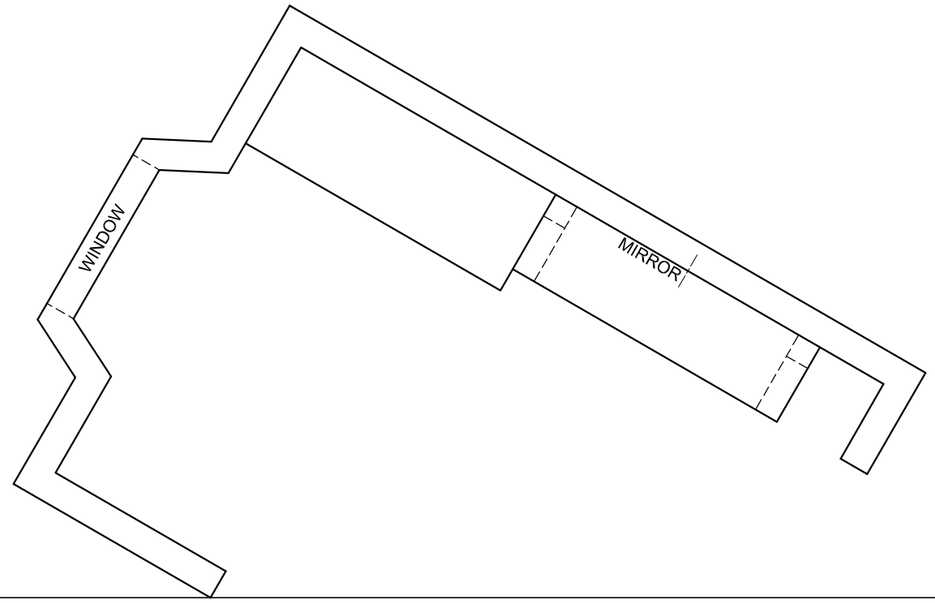
MAKE EDGE S-S THE SEAM

ASSESSMENT CRITERIA						
1	TOP VIEW	6				
2	RIGHT VIEW	5				
3	FRONT VIEW	16 ½				
4	DEVELOPMENT	10 ½				
PENALTIES (-)						
	TOTAL	**38**				

EXAMINATION NUMBER

EXAMINATION NUMBER 3

STAPLE



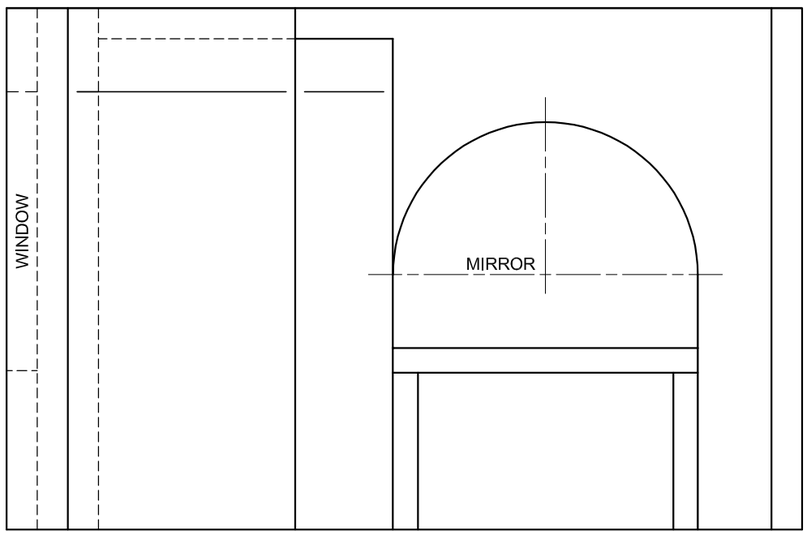
QUESTION 3: PERSPECTIVE

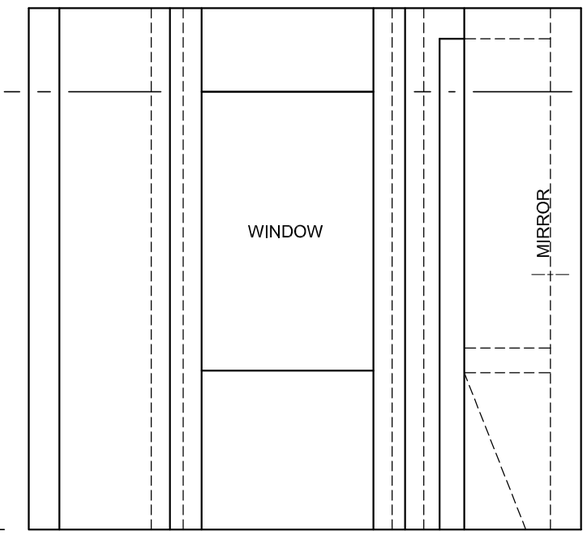
Given:
Three views of the inside of a dressing room and the information needed to draw a two-point perspective drawing
PP – Picture plane
HL – Horizon line
GL – Ground line
SP – Station point

Instructions:
Complete the perspective drawing.

- Align the drawing sheet with the ground line (GL).
- Determine and label the vanishing points.
- Show ALL construction.
- NO hidden detail is required. **[40]**

PP



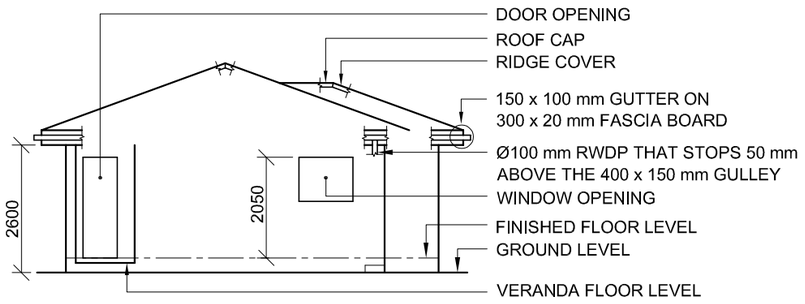


SP

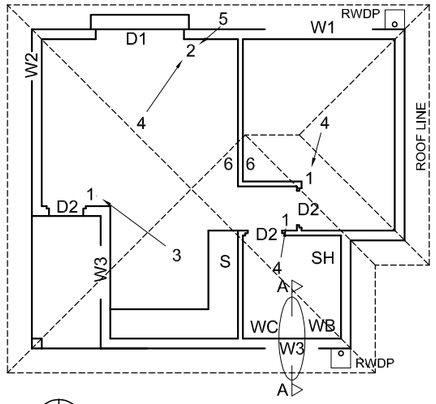
ASSESSMENT CRITERIA						
1	CONSTRUCTION	6				
2	WALLS + CUPBOARD + WINDOW	20				
3	TABLE + MIRROR	14				
PENALTIES (-)						
	TOTAL	**40**				

EXAMINATION NUMBER

EXAMINATION NUMBER 4



INCOMPLETE NORTH ELEVATION



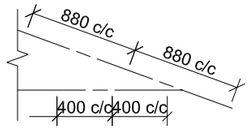
INCOMPLETE FLOOR PLAN

FEATURES
D1 SLIDING DOOR
D2 DOOR
W1 WINDOW
W2 WINDOW
W3 WINDOW

FIXTURES
WC TOILET
WB WASH BASIN
SH SHOWER
S SINK

ELECTRICAL FITTINGS
1. ONE-WAY SWITCH - SINGLE-POLE
2. ONE-WAY SWITCH - DOUBLE-POLE
3. FLUORESCENT LIGHT 3 x 45 W
4. CEILING LIGHT
5. WALL-MOUNTED LIGHT
6. SWITCHED SOCKET OUTLET

NOTE:
THE ARROW SHOWS THE LIGHT CONNECTION TO THE SWITCH.



SCHEMATIC DIAGRAM OF A ROOF TRUSS AT A-A

ROOF NOTES:
20° ROOF PITCH

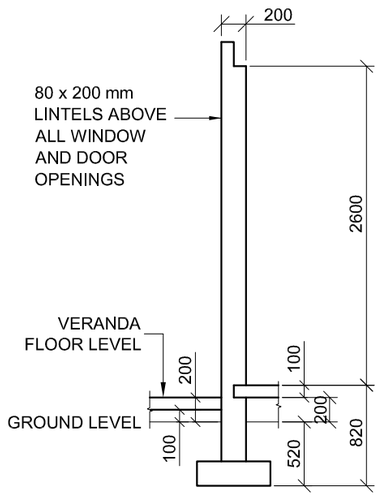
114 x 40 mm ROOF TRUSSES ON
114 x 40 mm WALL PLATES

500 mm ROOF OVERHANG TO END OF ROOF TRUSS

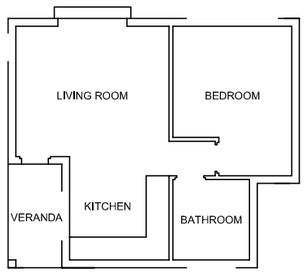
20 mm FIBRE CEMENT ROOF SHEET ON 75 x 50 mm PURLINS @ 880 mm c/c

300 x 20 mm FASCIA BOARD WITH 150 x 100 mm GUTTER ON ALL SIDES

10 mm CEILING BOARD ON 40 x 40 mm BRANDERING STRIPS @ 400 mm c/c



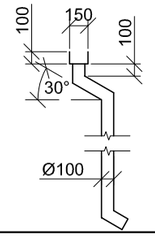
INCOMPLETE FOUNDATION, EXTERNAL WALL AND VERANDA DETAIL



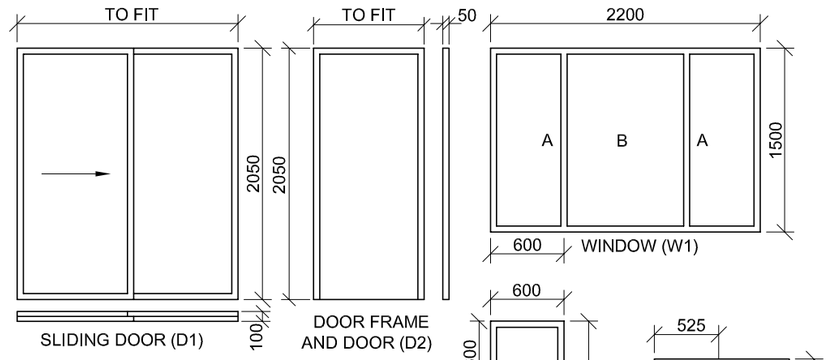
ROOM AND AREA DESIGNATIONS

FLOOR FINISHES
BEDROOM: CARPET
BATHROOM: TILES
LIVING ROOM: WOOD
KITCHEN: TILES
VERANDA: TILES

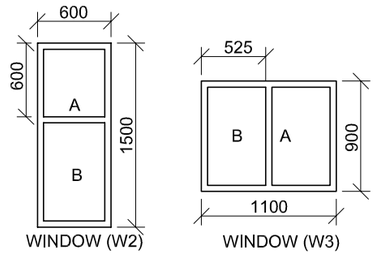
RAINWATER ITEMS



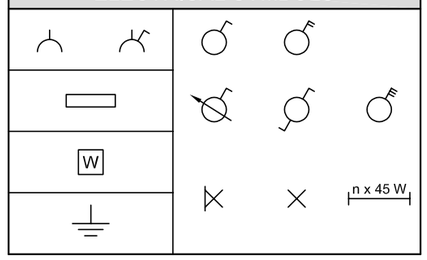
DOOR AND WINDOW SCHEDULE



WINDOW NOTES:
- A = OPENING SIDE
- B = FIXED PANEL
- ALL FRAMES = 50 mm
- 150 x 20 mm FIBRE CEMENT SILL UNDER ALL WINDOWS



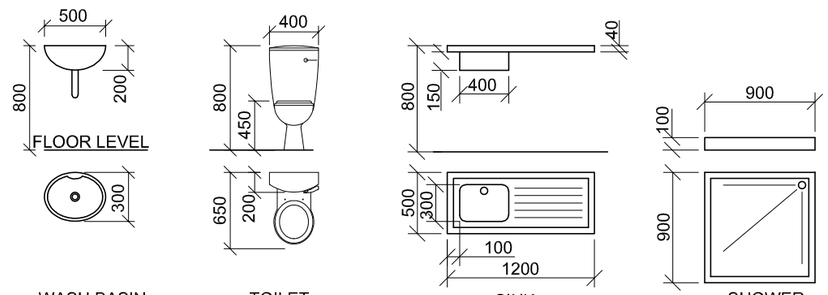
ELECTRICAL SYMBOLS



ROOF COMPONENTS

	300 x 20 mm FASCIA BOARD
	150 x 100 mm GUTTER
300	ROOF CAP AND RIDGE COVER

FIXTURES



QUESTION 4: CIVIL DRAWING

Given:
- The incomplete north elevation of a **new house**, showing the walls, the window and door openings, the veranda, the roof and labels
- The incomplete floor plan showing the walls, positions of the doors, windows, fixtures and electrical layout
- A schematic diagram of a roof truss at A-A and roof notes
- The incomplete foundation, external wall and veranda detail
- Room and area designations as well as floor finishes
- A table of rainwater items
- A door and window schedule
- A table of electrical symbols
- A table of roof components
- A table of fixtures
- The incomplete floor plan and the ground line of the **new house**, drawn to scale 1 : 50, and the incomplete foundation and a break line for the detailed section, drawn to scale 1 : 20, on page 6.

Instructions:
Answer this question on page 6.

4.1 Using the given incomplete floor plan, draw, to scale 1 : 50, the following views of the **new house**:

4.1.1 **THE COMPLETE FLOOR PLAN**
Add the following features to the drawing:
- ALL doors and windows
- ALL fixtures as indicated by the abbreviations
- ALL electrical fittings as indicated by the numbers
- The complete roof lines
- ALL hatching detail

4.1.2 **THE COMPLETE NORTH ELEVATION**
Show the following features on the drawing:
- The outside walls, veranda, window and door detail
- The roof detail, including the fascia boards, gutters, rainwater down-pipe and gulley
- The finished floor level

4.2 Using the given foundation and break line on page 6, draw, to scale 1 : 20, a **DETAILED SECTION** on cutting plane A-A of the area in the ellipse shown on the incomplete floor plan.
Show the following features on the drawing:
- The complete foundation, external wall and window detail
- The roof detail, including the fascia board, gutter, rainwater down-pipe and gulley
- The wash basin to the west of cutting plane A-A
- ALL hatching detail. ONLY the substructure hatching may be drawn in neat freehand.

Label the following:
- The north elevation
- The floor finishes
- Ground level, finished floor level and damp-proof course (use the correct abbreviations and show it on ALL the relevant views)

NOTE:
ALL drawings must comply with the **guidelines** and **graphical symbols** as contained in the *SANS 10143.* **[92]**

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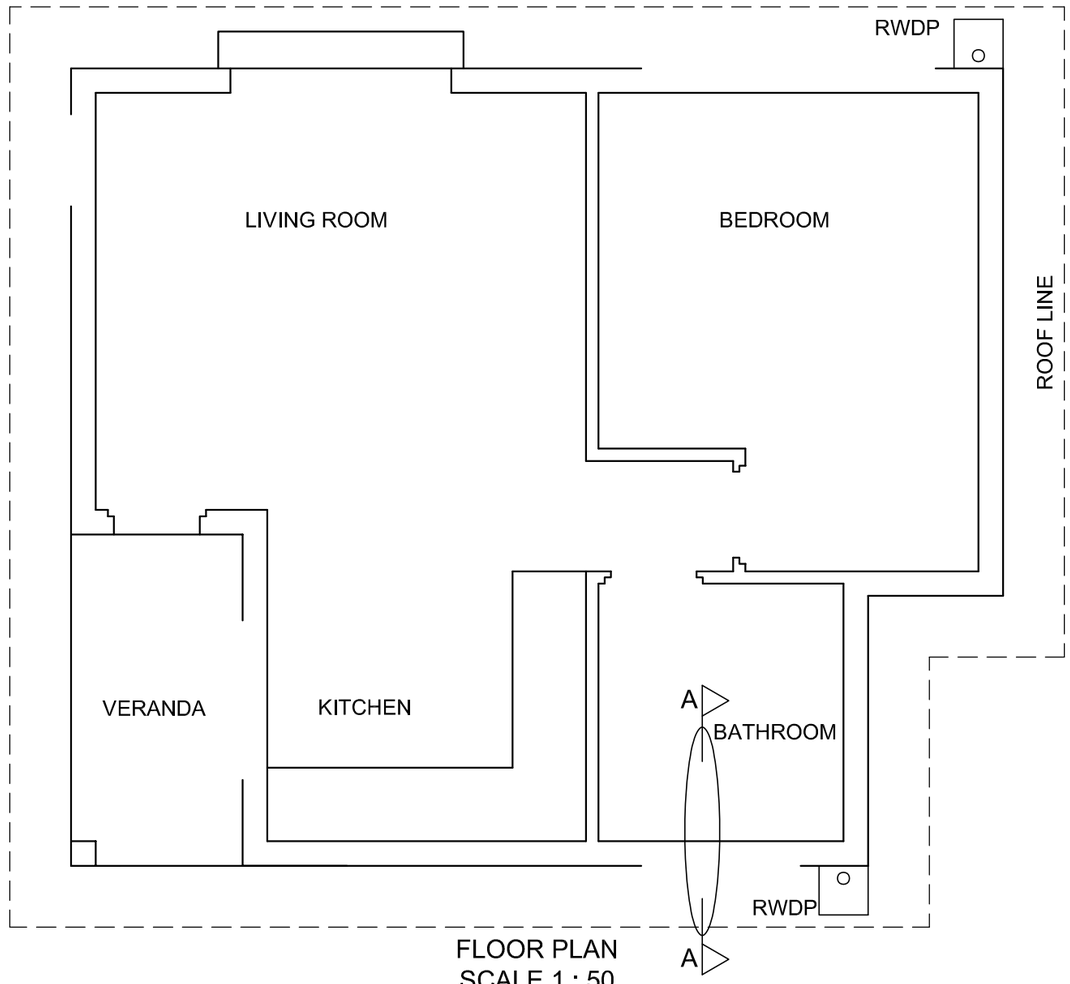
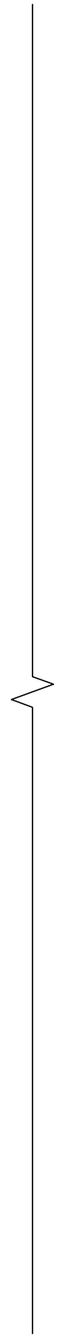
GL



FLOOR PLAN
SCALE 1 : 50



SECTION A-A
SCALE 1 : 20

MARK ALLOCATION FOR SECTION OF ROOF	
A	
B	
C	
D	
E	
F	
G	
H	
TOTAL	

FOR OFFICIAL USE ONLY	
INCORRECT SCALE(S) USED	
NON-ALIGNMENT OF VIEWS	
VIEW(S) ROTATED	
SECTION VIEWED INCORRECTLY	
INCORRECT LETTERING	
TOTAL	

ASSESSMENT CRITERIA					
FLOOR PLAN					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	DOORS + WINDOWS	13			
2	FIXTURES + ROOF LINES	11			
3	ELECTRICAL	8 ½			
4	HATCHING	3			
5	LABELS	2 ½			
SUBTOTAL		**38**			
NORTH ELEVATION					
1	ROOF + RWDP + GULLEY	10 ½			
2	WALLS + STEP + FFL	4			
3	DOOR + WINDOW	6			
4	LABELS	1			
SUBTOTAL		**21 ½**			
DETAILED SECTION					
1	ROOF DETAIL	13 ½			
2	SLAB, WALL, WINDOW + BASIN	12			
3	HATCHING	5 ½			
4	LABELS	1 ½			
SUBTOTAL		**32 ½**			
TOTAL		**92**			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					6