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**SA EXAM  
PAPERS**

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			$\frac{1}{2}$	SIGN	MODERATED			$\frac{1}{2}$	SIGN	RE-MARKING			$\frac{1}{2}$	SIGN
1															
2															
3															
4															
TOTAL															
	2	0	0			2	0	0			2	0	0		

FINAL CONVERTED MARK

100

CHECKED BY

COMPLETE THE FOLLOWING:

CENTRE NUMBER

CENTRE NUMBER

EXAMINATION NUMBER

EXAMINATION NUMBER

STAPLE

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.

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 /C 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.

15900

12400

2600

3300

8000

4100

5000

ANSWER 19. Show ALL calculations.

EXAMINATION NUMBER

EXAMINATION NUMBER

2

STAND 18

2000 BL

RE

IE

IE

IE

IE

RE

PROPOSED NEW HOUSE

NEW GARAGE

2000 BL

NEW Ø100 SEWER LINE LAID AT 1 : 30

1

IC

1,8 m CONCRETE WALL

8400

2000 BL

DEMOLISH EXISTING OUTBUILDING

2000 BL

2000 BL

STAND 30

2000 BL

5

RE

IE

IE

EXISTING HOUSE

EXISTING DRIVEWAY

5200

5000 BL

3

2

NEW 3,6 m DRIVEWAY FOR SUB-B

2000 BL

STAND 34

3 m PAVEMENT

EXISTING SEWER LINE LAID AT 1 : 40

AUSTEN STREET 6 m WIDE

MH

MH

SITE PLAN

SCALE 1 : 350

2

2021-02-14

ADD NEW STORM WATER DRAIN AT LOWEST CORNER

1

2021-01-23

INCREASE WIDTH OF DRIVEWAY

REVISION

DATE

DESCRIPTION

CLASSIC DESIGN ARCHITECTS

459 CONCORD RD

CAPE TOWN

www.clasdes.co.za

PRINTED BY:

DUPLEX PRINTING

DATE OF PRINT:

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:

JBV-500W

DRAWING NUMBER:

AAG-2121

DATE:

2021-01-10

DRAWN:

JOHN

CHECKED:

WAYNE

SCALE:

1 : 350

REFERENCE CODE:

Q1R-2021

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BASIC EDUCATION

Please turn over

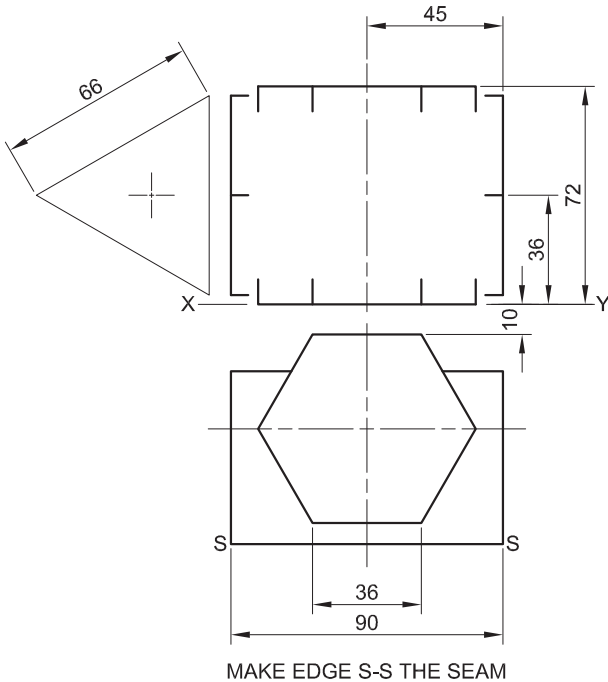


QUESTION 2: INTERPENETRATION AND DEVELOPMENT

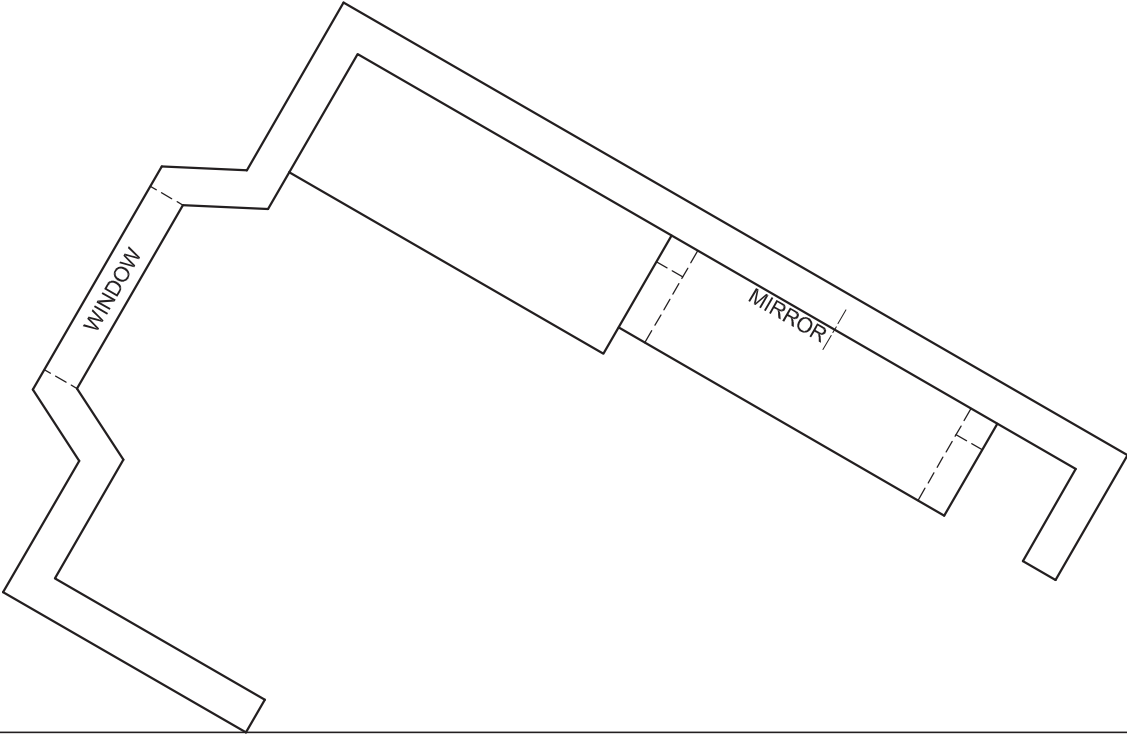
- Given:**
- The top view and incomplete front view of a connecting piece for a ventilation system. The connecting piece consist of a right equilateral triangular tube and a right regular hexagonal tube. The axes of both tubes lie in a common vertical plane.
  - An auxiliary view of the triangular tube.

- 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]**



ASSESSMENT CRITERIA				
1	TOP VIEW	6		
2	RIGHT VIEW	5		
3	FRONT VIEW	16 <sup>1</sup> / <sub>2</sub>		
4	DEVELOPMENT	10 <sup>1</sup> / <sub>2</sub>		
PENALTIES (-)				
TOTAL		38		
EXAMINATION NUMBER				
EXAMINATION NUMBER				3

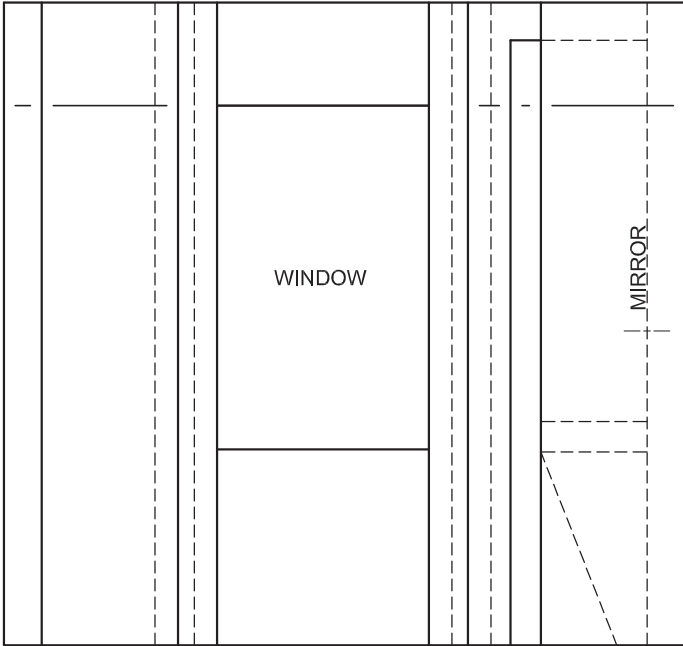
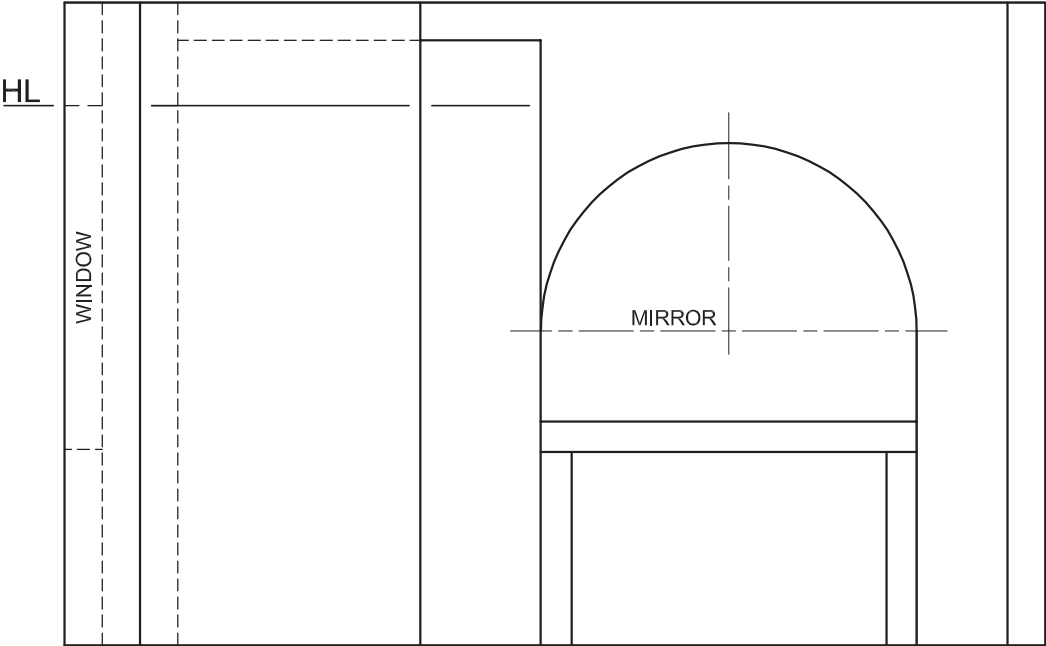


QUESTION 3: PERSPECTIVE

**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

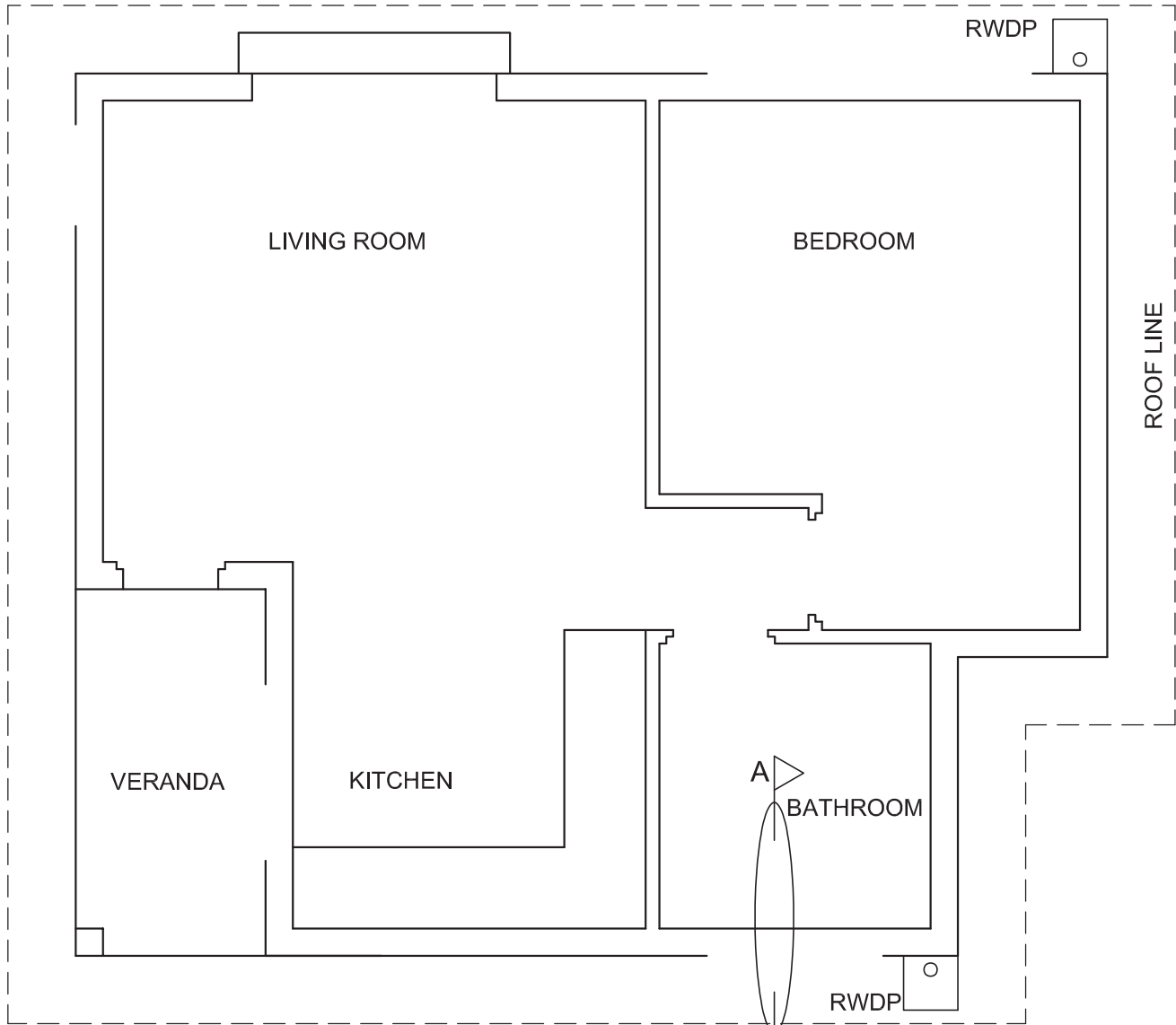
ASSESSMENT CRITERIA				
1	CONSTRUCTION	6		
2	WALLS + CUPBOARD + WINDOW	20		
3	TABLE + MIRROR	14		
PENALTIES (-)				
TOTAL		40		
EXAMINATION NUMBER				
EXAMINATION NUMBER				4







GL



FLOOR PLAN  
SCALE 1 : 50



SECTION A-A  
SCALE 1 : 20

MARK ALLOCATION FOR SECTION OF ROOF		FOR OFFICIAL USE ONLY	
A		INCORRECT SCALE(S) USED	
B		NON-ALIGNMENT OF VIEWS	
C		VIEW(S) ROTATED	
D		SECTION VIEWED INCORRECTLY	
E		INCORRECT LETTERING	
F			
G			
H			
TOTAL		TOTAL	

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