

**REPUBLIC OF SOUTH AFRICA  
DEPARTMENT OF MINERALS AND ENERGY  
EXAMINATION FOR THE MINE SURVEYORS CERTIFICATE OF COMPETENCY**

DATE: 17 April 2009  
TIME: 12:30 to 15:30 (3 Hours)

TOTAL MARKS: 100  
TO PASS: 50

**SURVEY III**

- Note:**
- (1) Work to 1 second of arc and 0,001m.
  - (2) Trigonometrical functions must be shown to six (6) decimal places.
  - (3) All steps and checks must be shown.
  - (4) All calculations and answers to be shown clearly.
  - (5) Sketches have been reduced and are not to scale and attached herewith.
  - (6) The make and model number of your calculator **must** be written on the front cover of your answer book.

An estimated gold reserve area exists on the farm Kromdraai 342 RT. To assist a Mining Company it is necessary to calculate the reef tons in the area A1,A2,A3,A4,A5,A6,A7,A8,A9 and A1 using the following information below as well as on the attached plans:

- Density for solid rock = 2,78t/m<sup>3</sup>
- 1 metre = 3,176059373 Cape feet
- 

	Y CO ORD	X CO ORD	Collar Elevation	Depth Below Collar	Reef Width
	(m)	(m)	(m)	(m)	(m)
BH1	-69 170,876	2 900 077,574	-297,100	1 093,800	1,549
BH2	-75 543,920	2 895 300,005	-273,800	1 312,200	1,610
BH3	-77 053,864	2 905 726,859	-261,467	1 573,267	

Borehole 3 (BH3), intended to be vertical was sunk through a reef. The reef obtained in the core measured 2,134m. In a subsequent survey of the borehole, the readings taken at the reef horizon gave the following results:

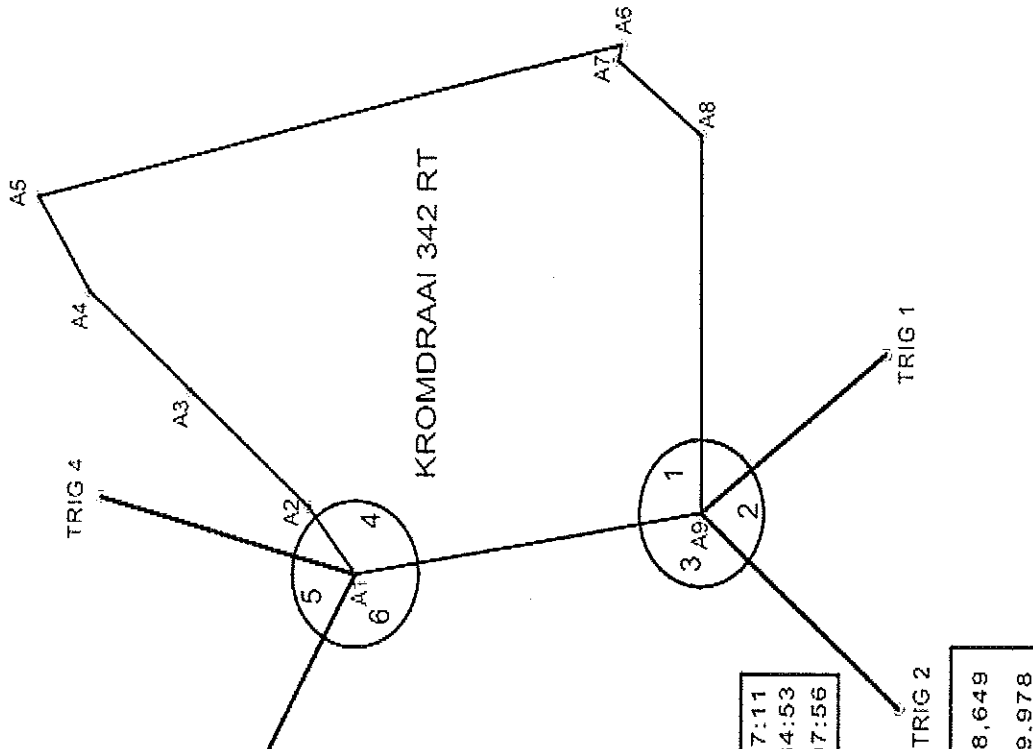
1. Deflection from the vertical 10:30:00
2. Direction of deflection 198:00:00 (zero South)

From the information given, calculate the estimated reef tons on the farm Kromdraai 342 RT to the nearest ton.

[100 marks]

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BH 2  
 0



BH 3  
 0

TRIG 3

ANGLE @ 4 = 156:54:18
ANGLE @ 5 = 074:34:40
ANGLE @ 6 = 128:31:02

BH 1  
 0

TRIG 2

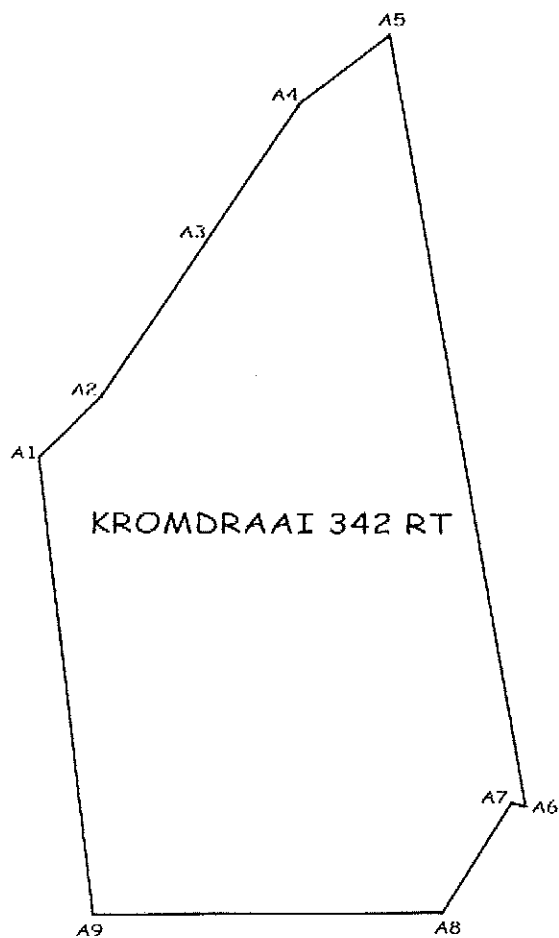
ANGLE @ 1 = 152:17:11
ANGLE @ 2 = 076:34:53
ANGLE @ 3 = 131:07:56

TRIG 1 Y = -73348.682 X = 2904368.649
TRIG 2 Y = -70455.397 X = 2904509.978
TRIG 3 Y = -69361.594 X = 2898055.976
TRIG 4 Y = -72160.789 X = 2896819.351

PLAN - NOT TO SCALE

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SG DIAGRAM KROMDRAAI 342 RT

	SIDES		ANGLES	LOCAL SURVEY SYSTEM	
	CAPE FEET			Y	X
A1 - A2	2253,026	A1	120:18:22	A1	-27189,901 208327,099
A2 - A3	4738,524	A2	191:37:19	A2	-28937,363 206904,952
A3 - A4	4039,801	A3	180:00:00	A3	-31934,689 203234,850
A4 - A5	2938,560	A4	161:55:21	A4	-34490,039 200105,923
A5 - A6	18244,958	A5	69:53:37	A5	-36963,300 198519,066
A6 - A7	409,893	A6	66:47:11	A6	-40936,474 216326,154
A7 - A8	3192,435	A7	243:35:24	A7	-40533,622 216250,503
A8 - A9	9781,521	A8	127:29:30	A8	-38610,341 218798,567
		A9	98:23:16		



SCALE: 1 : 200 000