



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF

EDUCATION

CAPRICORN SOUTH DISTRICT

MATHEMATICS
INVESTIGATION
MARKING GUIDELINES

GRADE 12

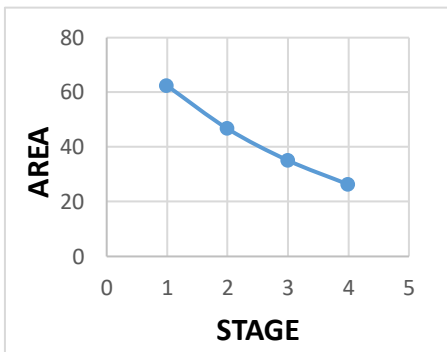
MARKS: 50

DUE DATE: 31 JANUARY 2020

Activity 1																			
1.1	$Area = \frac{1}{2} \times 12 \times 12 \times \sin 60^\circ$ $= 36\sqrt{3}$					✓ using the sine rule ✓ correct substitution ✓ answer (3)													
1.2	4					✓ 4 (1)													
1.3	$\frac{3}{4}$					$\sqrt{\frac{3}{4}}$ (1)													
Activity 2																			
2.1	$\frac{3}{4} \times 36\sqrt{3}$ $= 27\sqrt{3}$					$\sqrt{\frac{3}{4}} \times 36\sqrt{3}$ $\sqrt{27\sqrt{3}}$ (2)													
2.2	9					✓ 9 (1)													
2.3	$4 \times 4 = 16$					✓ 16 (1)													
2.4	$\frac{9}{16}$					$\sqrt{\frac{9}{16}}$ (1)													
Activity 3																			
3.1	$\frac{9}{16} \times 36\sqrt{3}$ $= \frac{81\sqrt{3}}{4}$					$\sqrt{\frac{9}{16}} \times 36\sqrt{3}$ $\sqrt{\frac{81\sqrt{3}}{4}}$ (2)													
3.2	27					✓ 27 (1)													
3.3	64					✓ 64 (1)													
3.4	$\frac{27}{64}$					$\sqrt{\frac{27}{64}}$ (1)													
Activity 4																			
4.1	$\frac{27}{64} \times 36\sqrt{3}$ $= \frac{243\sqrt{3}}{16}$					$\sqrt{\frac{27}{64}} \times 36\sqrt{3}$ $\sqrt{\frac{243\sqrt{3}}{16}}$ (2)													
4.2	<table border="1"><tr><th>Stages</th><th>0</th><th>1</th><th>2</th><th>3</th><th>4</th></tr><tr><td>Number of shaded triangles</td><td>1</td><td>3</td><td>9</td><td>27</td><td>81</td></tr></table> (a) The numbers are increasing powers of 3					Stages	0	1	2	3	4	Number of shaded triangles	1	3	9	27	81	✓ Correct table(1) ✓ powers of 3 (1)	
Stages	0	1	2	3	4														
Number of shaded triangles	1	3	9	27	81														

	(b) $T_n = 3^n$ (c) $T_n = 2187$	✓ $T_n = 3^n$ (1) ✓✓ $T_n = 2187$ (2)
4.3	$36\sqrt{3} + 27\sqrt{3} + \frac{81\sqrt{3}}{4} + \frac{243\sqrt{3}}{16} + \dots$ $= 62.4 + 46.8 + 35.1 + 26.3 + \dots$	✓✓ correct series (2)
4.4	Geometric series, because... $\frac{T_2}{T_1} = \frac{T_3}{T_2} = \frac{3}{4}$ or Common ratio $= \frac{3}{4}$	✓ Geometric ✓ reason (2)
4.5	$T_8 = ar^7$ $= 36\sqrt{3} (0,75)^7$ $= 8,32$	✓ Correct formula ✓ Substitution ✓ Answer (3)

ACTIVITY 5

5.1	<table><tr><th>Stage (n)</th><th>Area(T_n)</th></tr><tr><td>1</td><td>62.4</td></tr><tr><td>2</td><td>46.7</td></tr><tr><td>3</td><td>35.1</td></tr><tr><td>4</td><td>26.3</td></tr></table>	Stage (n)	Area(T_n)	1	62.4	2	46.7	3	35.1	4	26.3	
Stage (n)	Area(T_n)											
1	62.4											
2	46.7											
3	35.1											
4	26.3											
5.2		✓Correct axes (1) ✓Coordinates (1) ✓Shape (1)										
5.3	Trend: Decreasing function Conclusion: The series is converging	✓✓Answer (2)										

ACTIVITY 6

6.1.1	$S_n = \frac{a(1-r^n)}{1-r}$ $S_{16} = \frac{36\sqrt{3}\left(1 - \left(\frac{3}{4}\right)^{16}\right)}{1 - \frac{3}{4}}$ $= 246,9$	✓ Correct formula ✓ Substitution ✓ Answer (3)
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6.1.2	$S_{51} = \frac{36\sqrt{3} \left(1 - \left(\frac{3}{4}\right)^{51}\right)}{1 - \frac{3}{4}}$ $= 249,4$	✓ Substitution ✓ Answer (2)
6.1.3	$S_{101} = \frac{36\sqrt{3} \left(1 - \left(\frac{3}{4}\right)^{51}\right)}{1 - \frac{3}{4}}$ $= 249,4$	✓ Substitution ✓ Answer (2)
6.2	Sum of areas tends to 249,4 or Series converges	✓✓ reason (2)
6.3	Sum to infinity $S_{\infty} = \frac{a}{1 - r}$ $= \frac{36\sqrt{3}}{1 - \frac{3}{4}}$ $= 249,4$	✓ Sum to infinity ✓ Correct formula ✓ Substitution ✓ Answer (4)
		[37]