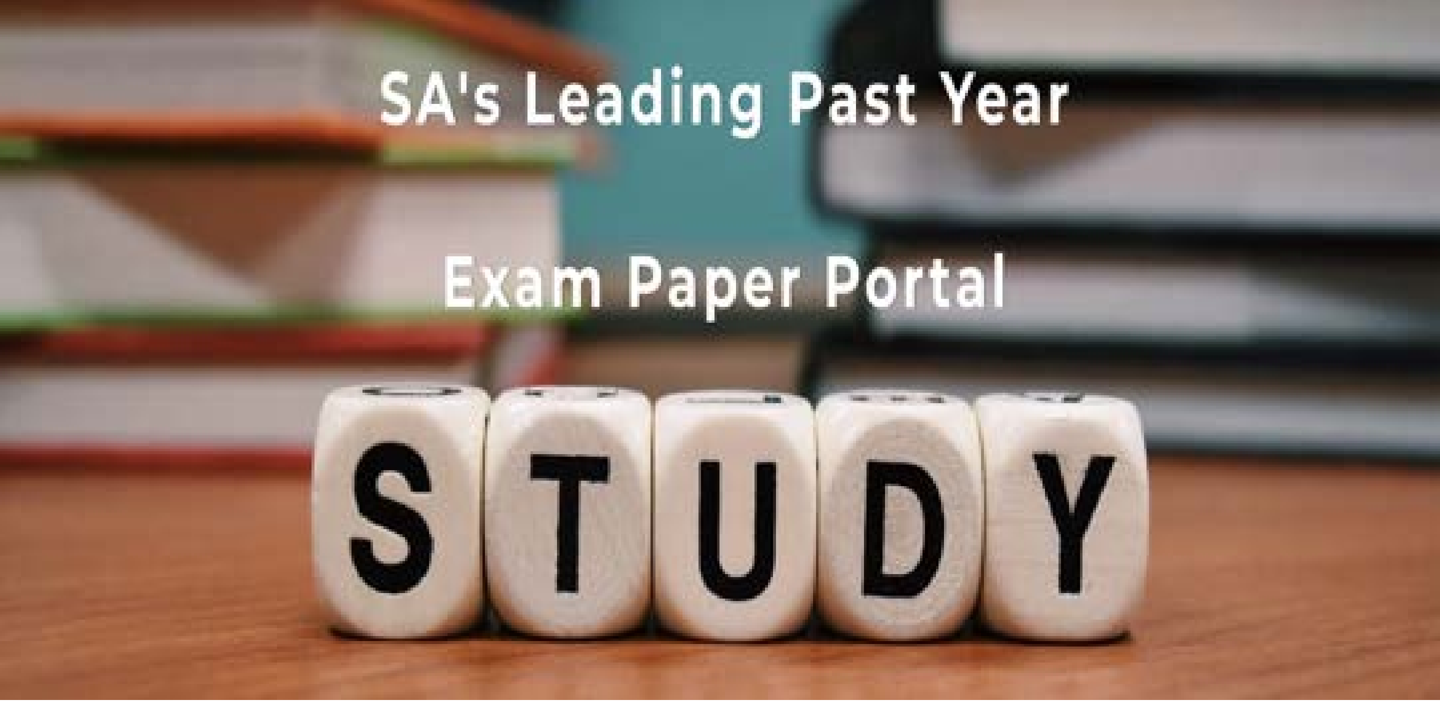


You have Downloaded, yet Another Great Resource to assist you with your Studies ☺

Thank You for Supporting SA Exam Papers

Your Leading Past Year Exam Paper Resource Portal

Visit us @ www.saexampapers.co.za

SA EXAM PAPERS

education

Department of Education

FREE STATE PROVINCE

GRADE 12

MARKING GUIDELINE

MARKS: 100

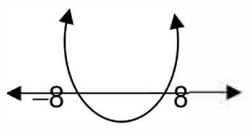
These marking guidelines consists of 9 pages.

Copyright reserved

NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.

QUESTION 1

1.1.1	$x(x+6)=0$ $x=0$ or $x=-6$	✓ $x=0$ ✓ $x=-6$ (2)
1.1.2	$3x^2+8x=-2$ $3x^2+8x+2=0$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $x=\frac{-8\pm\sqrt{(8)^2-4(3)(2)}}{2(3)}$ $x=0,23$ or $x=-2,90$	✓standard form. ✓substitution into the correct formula. ✓ $x=0,23$ ✓ $x=-2,90$ (4)
1.1.3	$x^2-64\le 0$ $(x+8)(x-8)\le 0$ Critical Values: -8 and 8  $-8\le x\le 8$ OR $[-8;8]$	✓ factors ✓ diagram ✓ Answer (3)
1.1.4	$x\ \sqrt{x+5}+1=x$ $\sqrt{x+5}=x-1$ $\left(\sqrt{x+5}\right)^2=(x-1)^2$ $x+5=x^2-2x+1$ $x^2-3x-4=0$ $(x-4)(x+1)=0$ $x=4$ or $x=-1$ $\therefore x=4$ but $x\neq -1$	✓isolate $\sqrt{x+5}$ ✓squaring both sides ✓standard form ✓factors ✓conclusion (5)

Copyright reserved

1.2	$6x+5xy-5y=8$ and $x+y=2$ $x=2-y$...(3) $6(2-y)+5(2-y)y-5y=8$ $12-6y+10y-5y^2-5y=8$ $5y^2+y-4=0$ $(5y-4)(y+1)=0$ $y=\frac{4}{5}$ or $y=-1$ $x=\frac{6}{5}$ or $x=3$	✓ x – subject of the formula ✓substitution ✓standard form ✓factors ✓ y – values ✓ x – values (6)
		[20]

QUESTION 2

2.1.1	$-20;-9;0;7;...$ 11 9 7 -2 -2 $2a=-2$ $3(-1)+b=11$ $-1+14+c=-20$ $a=-1$ $b=14$ $c=-7$ $\therefore T_n=-n^2+14n-7$	✓value of a ✓ value of b ✓ value of c ✓T_n (4)
2.1.2	$n=\frac{-b}{2a}$ $=\frac{-14}{2(-1)}$ $n=7$ $\therefore T_7=-(7)^2+14(7)-7$ $=42$	✓$\frac{-14}{2(-1)}$ ✓value of n ✓Value of T_7 (3)
		[7]

Copyright reserved

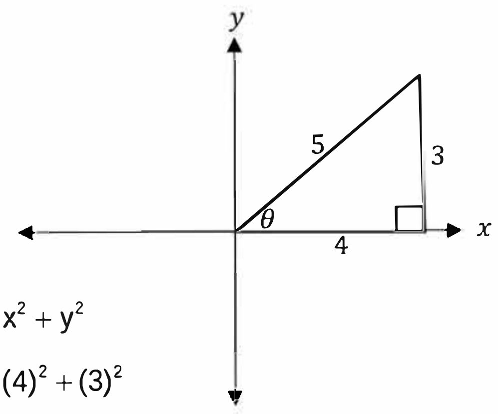
QUESTION 3

3.1.1	$13;8;3;...$ $a=13$ and $d=-5$ $T_n = a+(n-1)d$ $T_{50} = 13+(50-1)-5$ $T_{50} = 57$	✓$d=-5$ ✓substitution from the correct formula ✓Answer (3)
3.1.2	$S_n = \frac{n}{2}[2a+(n-1)d]$ $S_{50} = \frac{50}{2}[2(13)+(50-1)(-5)]$ $S_{50} = -5475$	✓Substitution from the correct formula ✓Answer (2)
3.2	$S_n = a+(a+d)+(a+2d)+...+(l-2d)+(l-d)+l...(1)$ $S_n = l+(l-d)+(l-2d)+...(a+2d)+(a+d)+a...(2)$ $2S_n = (a+l)+(a+1)+(a+l)+...(a+l)+(a+l)+(a+l)$ $\therefore 2S_n = n(a+l)$ $\therefore S_n = \frac{n}{2}(a+l)$ $\therefore S_n = \frac{n}{2}[a+a+(n-1)d]$ $\therefore S_n = \frac{n}{2}[2a+(n-1)d]$	✓equation 1 and 2 ✓$2S_n = n(a+l)$ ✓dividing by 2 ✓substitution of l (4)
3.3.1	$3+m+\frac{m^2}{3}+\frac{m^3}{9}+...$ $r=\frac{m}{3}$ $-1<r<1$ $-1<\frac{m}{3}<1$ $-3<m<3$	✓$r=\frac{m}{3}$ ✓substitution of r ✓Answer (3)

Copyright reserved

3.3.2	$S_\infty = \frac{a}{1-r}$ $\frac{27}{7} = \frac{3}{1-\frac{m}{3}}$ $27 - \frac{27m}{3} = 21$ $27 - 9m = 21$ $6 = 9m$ $\therefore m = \frac{6}{9} = \frac{2}{3} = 0,67$	✓substitution ✓simplification ✓Answer (3)
3.4	$\sum_{r=1}^{n} 5.2^{1-r} = 5 + \frac{5}{2} + \frac{5}{4} + ...$ $S_n = \frac{a(1-r^n)}{1-r}$ $\frac{630}{64} = \frac{5\left[1-\left(\frac{1}{2}\right)^n\right]}{1-\frac{1}{2}}$ $\frac{63}{64} = 1-\left(\frac{1}{2}\right)^n$ $\therefore \left(\frac{1}{2}\right)^n = \frac{1}{64}$ $\left(\frac{1}{2}\right)^n = \left(\frac{1}{2}\right)^6$ $n = 6$	✓ expansion to THREE terms ✓ a = 2 and r = $\frac{1}{2}$ ✓ subst into the correct formula ✓ simplification: $\frac{63}{64} = 1-\left(\frac{1}{2}\right)^n$ ✓ same bases: $\left(\frac{1}{2}\right)^n = \left(\frac{1}{2}\right)^6$ ✓ answer (6)
		[21]

QUESTION 4

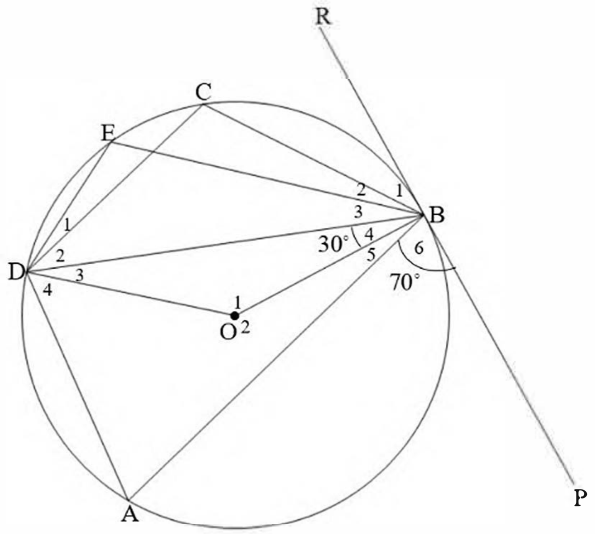
4.1.1	 $r^2 = x^2 + y^2$ $r^2 = (4)^2 + (3)^2$ $r = 5$ $\sin\theta = \frac{3}{5}$	✓diagram ✓$r = 5$ ✓Answer (3)
4.1.2	$\cos^2(90^\circ - \theta) - 1$ $= \sin^2\theta - 1$ $= \left(\frac{3}{5}\right)^2 - 1$ $= \frac{-16}{25}$	✓ $\cos(90^\circ - \theta) = \sin\theta$ ✓Answer (2)
4.1.3	$1 - \sin 2\theta$ $= 1 - 2\sin\theta\cos\theta$ $= 1 - 2\left(\frac{3}{5}\right)\left(\frac{4}{5}\right)$ $= \frac{1}{25}$	✓double angle ✓substitution ✓Answer (3)
4.2	$\frac{\sin^2(90^\circ + \alpha) + \sin(180^\circ + \alpha)\sin(-\alpha)}{\sin 180^\circ - \tan 135^\circ}$ $= 4\sin\theta\cos\theta = \frac{\cos^2\alpha + (-\sin\alpha)(-\sin\alpha)}{0 - (-\tan 45^\circ)}$ $= \frac{\cos^2\alpha + \sin\alpha\sin\alpha}{0 + 1}$ $= \frac{\cos^2\alpha + \sin^2\alpha}{1}$ $= 1$	✓ $\cos^2\alpha$ ✓ $-\sin\alpha$ ✓ $\sin^2\alpha$ ✓ $\cos^2\alpha + \sin^2\alpha = 1$ ✓Answer (5)

Copyright reserved

4.3	$\sin 2\theta + \cos(2\theta - 90^\circ)$ $= \sin 2\theta + \sin 2\theta$ $= 2(2\sin\theta\cos\theta)$ $= 4\sin\theta\cos\theta$	✓ $\sin 2\theta$ ✓ $2\sin\theta\cos\theta$ ✓Answer (3)
4.4	$20^{\sin x} + 20^{\sin x+1} = 420$ for $-360^\circ \leq x \leq 360^\circ$ $\therefore 20^{\sin x}(1+20) = 420$ $\therefore 20^{\sin x} = 20$ $\therefore \sin x = 1$ $x = 90^\circ$ ref $\angle$ $x = -270^\circ$ or $x = 90^\circ$	✓split into a product of 2 bases ✓simplification / factorisation ✓dividing by 21 ✓equating exponents ✓both solutions (5)
		[21]

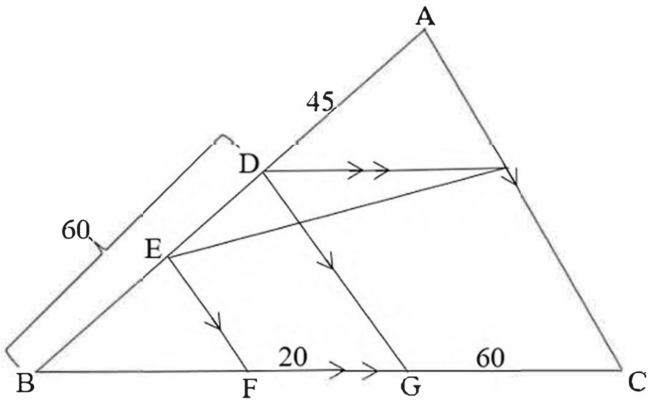
Copyright reserved

QUESTION 5

5.1			
	STATEMENT	**REASON**	
5.1.1	$\hat{B}_4 = \hat{D}_2 = 30°$ $\therefore \hat{O}_1 = 120°$	$\angle's$ opp = sides (OB = D0) radii Sum of $\angle's$ of Δ	✓S and R ✓S and R (2)
5.1.2	$\hat{A} = 60°$	$\angle$ at centre $= 2 \times \angle$ at the circum.	✓$\hat{A} = 60°$ ✓R (2)
5.1.3	$\hat{C} = 120°$	opp. $\angle's$ of a cyclic quad	✓ $\hat{C} = 120°$ ✓R (2)
5.1.4	$A\hat{D}B = 70°$	tan-chord theorem	✓ $A\hat{D}B = 70°$ ✓R (2)
			[8]

Copyright reserved

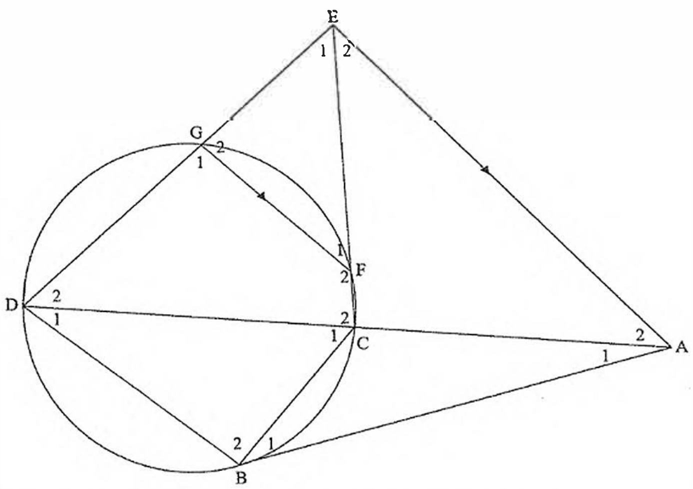
QUESTION 6



	STATEMENT	REASON	
6.1	$\frac{BG}{60}=\frac{60}{45}$ $BG=80$ $\therefore BF=60$	Line ‖ one side of Δ	✓S ✓R ✓ $BG=80$ ✓answer (4)
6.2	$\frac{ED}{60}=\frac{20}{80}$ $\therefore ED=15$	Line ‖ one side of Δ	✓S ✓R ✓answer (3)
6.3	Area of $\Delta ABC=\frac{1}{2}AB.AC\sin B$ $=\frac{1}{2}(60+45)(60+20+60)\sin 30^{\circ}$ $=3675\text{units}^2$		✓ $AB=60+45$ ✓ $AC=60+20+60$ ✓substitution of Area ✓Answer (4)
			[11]

Copyright reserved

QUESTION 7



	STATEMENT	REASON	
7.1		tangent-chord theorem	✓Reason (1)
7.2	In △ ABC and △ ADB $\hat{A}_1 = \hat{A}_1$ $\hat{B}_1 = \hat{D}_1$ $\therefore \Delta ABC \mid\mid\mid \Delta ADB$	 common proven ∠; ∠; ∠	 ✓S ✓ S ✓R (3)
7.3	$\hat{E}_2 = \hat{F}_1$ $\hat{F}_1 = \hat{D}_2$ $\therefore \hat{E}_2 = \hat{D}_2$	alternate ∠s; EA ∥ GF ext ∠ of cyc quad DGFC	✓S ✓R ✓S ✓R (4)
7.4	In △ AEC and △ ADE : $\hat{A}_2 = \hat{A}_2$ $\hat{E}_2 = \hat{D}_2$ $\therefore \triangle AEC \mid\mid\mid \Delta ADE$ $\therefore \frac{AE}{AD} = \frac{AC}{AE}$ $\therefore AE^2 = AD \times AC$ $\therefore AE = \sqrt{AD \times AC}$	 Common proven ∠; ∠; ∠ from |||Δs	 ✓S ✓S ✓S ✓Answer (4)
			[12]