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GRADE 12

MARKING GUIDELINE TERM 1 TEST – 2022

MARKS: 50

TIME: 1 HOUR

This marking guideline consists of 6 pages.

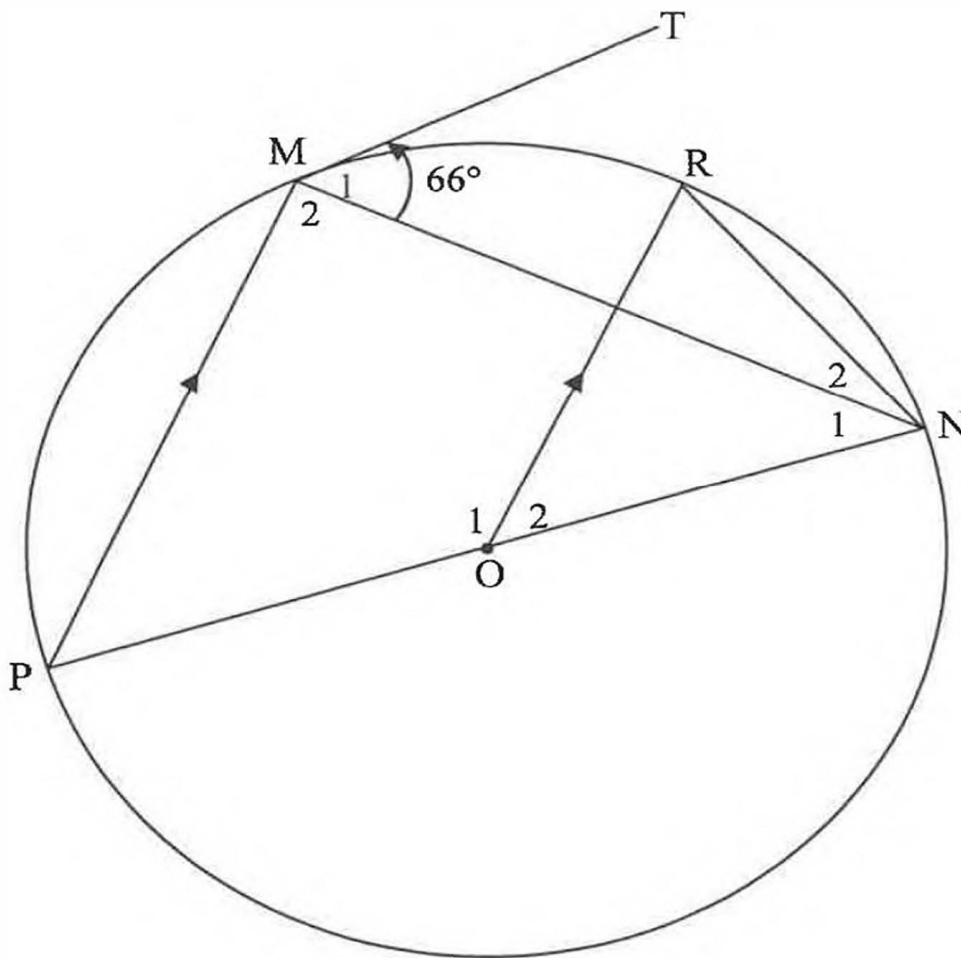
QUESTION 1		
1.1.	$\frac{31}{2}$	✓ answer (1)
1.2.	<p> $2a = 1$ $a = \frac{1}{2}$ $3\left(\frac{1}{2}\right) + b = \frac{5}{2}$ $b = 1$ $\frac{1}{2} + 1 + c = -\frac{1}{2}$ $c = -2$ $T_n = \frac{1}{2}n^2 + n - 2$ </p>	✓ second difference ✓ $a = \frac{1}{2}$ ✓ $b = 1$ ✓ $c = -2$
1.3.	$T_{75} - T_{74} = \frac{1}{2}(75)^2 + 75 - 2 - \left[\frac{1}{2}(74)^2 + 74 - 2\right]$ $= \frac{151}{2}$	✓ correct substitution ✓ answer (2)
		[7]

QUESTION 2		
2.1.	$a = 3$ and $d = 4$ $T_{20} = 3 + (20 - 1)4$ $= 79$	✓ a and d ✓ substitution into correct formula ✓ answer (3)
2.2.	$S_n = \frac{n}{2}[2a + (n - 1)d]$ $S_{20} = \frac{20}{2}[2(3) + (20 - 1)4]$ $= 820$ OR $S_{20} = \frac{20}{2}[3 + 79]$ $= 820$	✓ substitution into correct formula ✓ answer (2)
		[5]

QUESTION 3		
3.1	$T_1 = x(x + 1)^0 = x$ $T_2 = x(x + 1)^1$ $\frac{T_2}{T_1} = \frac{x(x + 1)}{x}$ $= x + 1$	✓ substitution of $n = 0$ and $n = 1$ ✓ $r = x + 1$ (2)
3.2	If a series converges $-1 < r < 1$ $-1 < x + 1 < 1$ $-2 < x < 0$	✓ $-1 < r < 1$ ✓ substitution of r ✓ answer (3)
3.3	$S_\infty = \frac{a}{1 - r}$ $= \frac{x}{1 - (x + 1)}$ $= \frac{x}{1 - x - 1}$ $= -1$	✓ substitution in the correct formula ✓ simplification ✓ answer (3)
3.4	$T_1 = x = 1$ $T_2 = x(x + 1) = 1(1 + 1) = 2$ $T_3 = x(x + 1)^2 = 1(1 + 1)^2 = 4$ $r = 2$ $1 + 2 + 4 + \dots$	✓ ratio $r = 2$ ✓ series (2)

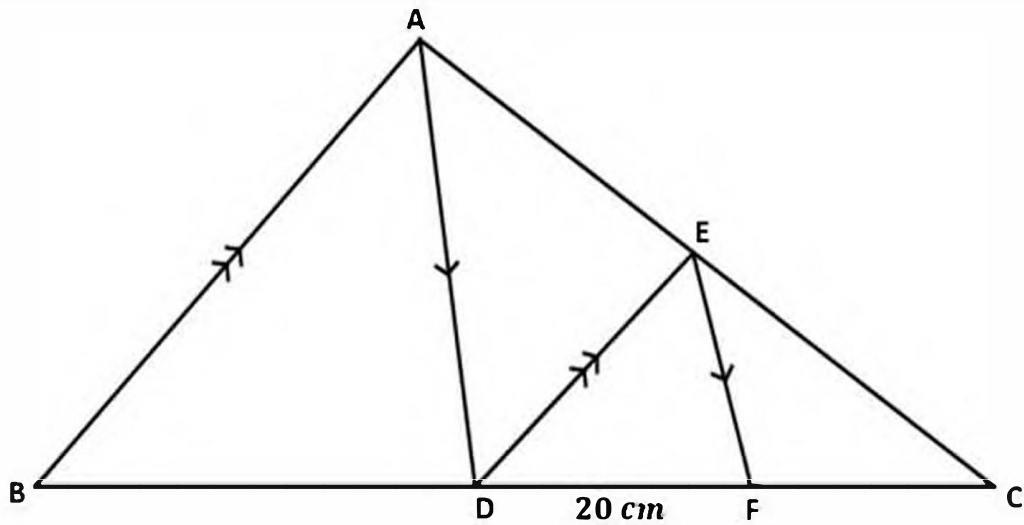
3.5	$S_n = \frac{a(r^n - 1)}{r - 1}$ $S_{25} = \frac{1(2^{25} - 1)}{2 - 1}$ $= 33554432 - 1$ $= 33554431$	✓ substitution in the correct formula ✓✓ answer (3)
		[13]

QUESTION 4



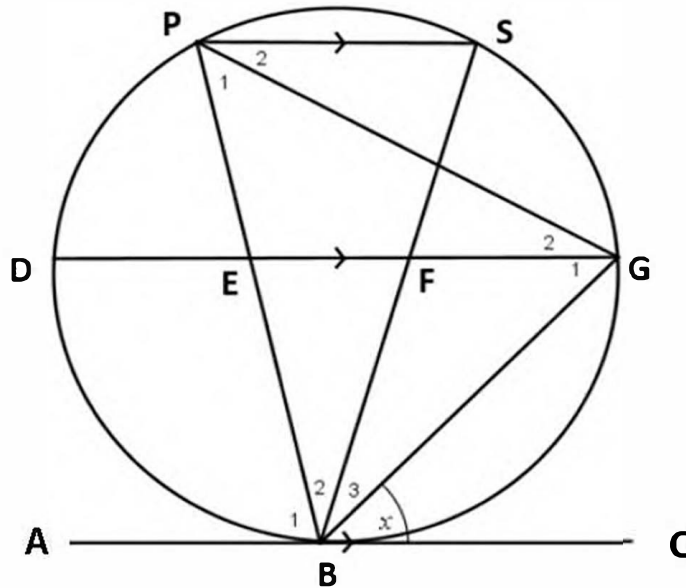
4.1	$\hat{P} = \widehat{M}_1 = 60^\circ$ [tan chord theorem]	✓S ✓R (2)
4.2	$\widehat{M}_2 = 90^\circ$ [angle in semi-circle]	✓S ✓R (2)
4.3	$\widehat{N}_1 = 180^\circ - (90^\circ + 66^\circ)$ $= 24^\circ$ [sum of \angle of ΔMNP]	✓S (1)
		[5]

QUESTION 5



<p>5.1</p>	<p>In ΔADC</p> $\frac{FC}{DF} = \frac{CE}{EA} \text{ [prop theorem, } EF \parallel AD\text{]}$ $\frac{FC}{20} = \frac{4}{5}$ <p>$FC = 16 \text{ cm}$</p>	<p>✓S ✓R</p> <p>✓ $FC = 16 \text{ cm}$</p> <p>(3)</p>
<p>5.2</p>	<p>In ΔABC</p> $\frac{CD}{DB} = \frac{CE}{EA} \text{ [prop theorem; } DE \parallel AB\text{]}$ <p>$CD = 20 + 16 = 36$</p> $\frac{36}{BD} = \frac{4}{5}$ <p>$BD = 45 \text{ cm}$</p>	<p>✓ S/R</p> <p>✓ $CD = 36$</p> <p>✓ $BD = 45$</p> <p>(3)</p>
<p>5.3</p>	$\frac{\text{Area } \Delta ECF}{\text{Area } \Delta ABC} = \frac{\frac{1}{2} EC \cdot FC \sin C}{\frac{1}{2} AC \cdot BC \sin C}$ $= \frac{\frac{1}{2} (4)(16) \sin C}{\frac{1}{2} (9)(81) \sin C}$ $= \frac{64}{729}$	<p>✓ area rule</p> <p>✓ substitution area ΔECF</p> <p>✓ area ΔABC</p> <p>✓ ratio</p> <p>(4)</p> <p>[10]</p>

QUESTION 6



6.1.	Alt \triangle [DG \parallel AC]	\checkmark R	(1)
6.2.1.	$\frac{BE}{BP} = \frac{BF}{BS} \text{ (Prop theorem EF } \parallel \text{ PS)}$ $\therefore BE = \frac{BP \times BF}{BS}$	\checkmark S \checkmark R	(2)
6.2.2	<p>In $\triangle BGP$ and $\triangle BEG$</p> <p>$\widehat{P}_1 = x$ [tan-chord theorem] $= \widehat{G}_1$ from 6.1</p> <p>$\widehat{PBG} = \widehat{EBG}$ [common]</p> <p>$\widehat{BGP} = \widehat{BEG}$ [sum \triangle of \triangle]</p> <p>$\therefore \triangle BGP \parallel \triangle BEG$ [\angle, \angle, \angle]</p>	\checkmark S \checkmark R \checkmark S \checkmark R	(4)
6.2.3.	$\frac{BG}{BE} = \frac{BP}{BG} \text{ [}\triangle BGP \parallel \triangle BEG\text{]}$ $\therefore BG^2 = BP \times BE$ $= BP \times \left(\frac{BP \times BF}{BS} \right)$ $= \frac{BP^2 \times BF}{BS}$ $\therefore \frac{BG^2}{BP^2} = \frac{BF}{BS}$	\checkmark ratio \checkmark substitution of BE $\checkmark \frac{BP^2 \times BF}{BS}$	(3)
			[10]

TOTAL: 50