education

Department:
Education
PROVINCE OF KWAZULU-NATAL

MATHEMATICS

COMMON TEST

MARCH 2019

MARKING GUIDELINE

NATIONAL SENIOR CERTIFICATE

GRADE 10

MARKS: 75

These marking guideline consists of 10 pages.

GRADE 10 MEMORANDUM

QUESTION 1

1.1.1	$6x^2+7x-20$ $=(3x-4)(2x+5)$	✓ $(2x+5)$ ✓ $(3x-4)$ (2)
1.1.2	x^3+x^2-x-1 $=x^2(x+1)-1(x+1)$ $=(x^2-1)(x+1)$ $=(x-1)(x+1)(x+1)$	✓ common bracket ✓ factors ✓ diff. of two squares (3)
1.2.1	$(2x+3)(5-x)$ $=10x-2x^2+15-3x$ $=-2x^2+7x+15$	✓ $-2x^2$ ✓ $+7x$ ✓ $+15$ (3)
1.2.2	$(xy^3-3)(x^2y^6+3xy^3+9)$ $=(x^3y^9-27)$	✓ x^3y^9 ✓ -27 (2)
1.2.3	$\frac{3^{2x-1}.5^{x-3}}{45^{x-2}}$ $=\frac{3^{2x-1}.5^{x-3}}{(3^2.5)^{x-2}}$ $=\frac{3^{2x-1}.5^{x-3}}{3^{2x-4}.5^{x-2}}$ $=3^{2x-1-2x+4}.5^{x-3-x+2}$ $=3^3.5^{-1}$ $=\frac{27}{5}$	✓ base as prime factors $(3^2.5)$ ✓ simplification ✓ adding and subtracting indices ✓ $3^3.5^{-1}$ or $5\frac{2}{5}$ (4)
		[14]

QUESTION 2

2.1	$(x-3)(x+2)=0$ $\therefore x=3$ or $x=-2$	✓✓ answers (2)
2.2	$11\times 3^{2x+1}=297$ $3^{2x+1}=27$ $3^{2x+1}=3^3$ $\therefore 2x+1=3$ $2x=2$ $x=1$	✓ dividing through by 11 ✓ 3^3 ✓answer (3)
2.3	$\frac{4x^2-3x-1}{4x+1}+\frac{x^3+1}{x^2-x+1}=2$ $\frac{\cancel{(4x+1)}(x-1)}{\cancel{4x+1}}+\frac{(x+1)\cancel{(x^2-x+1)}}{\cancel{x^2-x+1}}=2$ $x-1+x+1=2$ $2x=2$ $x=1$	✓✓factors $(x+1)(x^2-x+1)$ ✓factors $(4x+1)(x-1)$ ✓ simplification ✓ answer (5)
2.4	$\pi x^2h=V$ $x^2=\frac{V}{\pi h}$ $x=\sqrt{\frac{V}{\pi h}}$	✓ dividing by πh ✓ answer (2)
		[12]

QUESTION 3

3.1	$\frac{9}{20}$	✓ answer (1)
3.2.1	$1-3x=0$ $x=\frac{1}{3}$	✓ denominator = 0 ✓ answer (2)
3.2.2	$P=\sqrt{\frac{-20(7)}{1-3(7)}}=\sqrt{7}$ $\sqrt{9}<\sqrt{7}<\sqrt{4}$ $3<\sqrt{7}<2$	✓ $\sqrt{7}$ ✓ answer (2)
3.3	$x+2$	✓ answer (1)
		[6]

QUESTION 4

4.1	$4x=10-3y$ $.....(Eq1)$ $y+2x=6$ $.....(Eq2)$ $(Eq2)\times 2 \rightarrow 2y+4x=12$ $.....(Eq3)$ $(Eq1) \rightarrow 3y+4x=10$ $.....(Eq4)$ $(Eq3)-(Eq4)\rightarrow -y=2$ $y=-2$ Substitute $y=-2$ into $(Eq\ 2) \rightarrow -2+2x=6$ $2x=8$ $x=4$ **OR/OF** $4x=10-3y$ $.....(Eq1)$ $y+2x=6$ $.....(Eq2)$ $(Eq2)\times 3 \rightarrow 3y+6x=18$ $.....(Eq3)$ $(Eq1) \rightarrow 3y+4x=10$ $.....(Eq4)$ $(Eq3)-(Eq4)\rightarrow 2x=8$ $x=4$ Substitute $x=4$ into $(Eq\ 2) \rightarrow y+2(4)=6$ $y=-2$	✓multiply (Eq 2) by 2 ✓subtracting ($Eq3$) and ($Eq4$) ✓ y-value ✓ substitution of y back into Eq ✓ x-value **OR/OF** ✓multiply (Eq 2) by 3 ✓subtracting ($Eq3$) and ($Eq4$) ✓ x-value ✓ substitution of x back into Eq ✓ y-value

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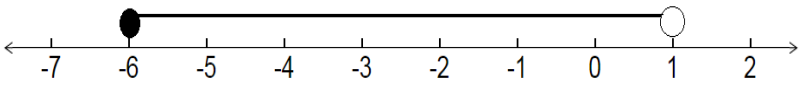
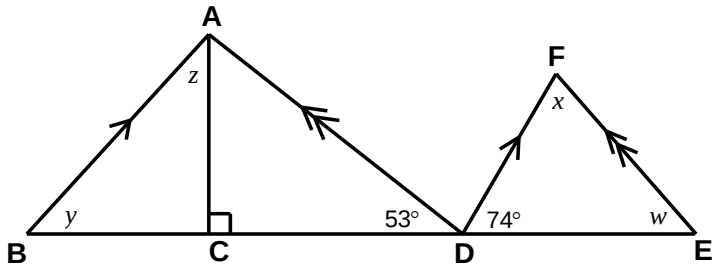
	OR/OF $4x = 10 - 3y$ .....$(Eq1)$ $y + 2x = 6$ .....$(Eq2)$ $(Eq2) \rightarrow y = 6 - 2x$ .....$(Eq3)$ Substitute $(Eq3)$ into $(Eq1) \rightarrow 4x = 10 - 3(6 - 2x)$ $4x = 10 - 18 + 6x$ $-2x = -8$ $x = 4$ Substitute $x = 4$ into $(Eq\ 3) \rightarrow y = 6 - 2(4)$ $y = -2$	**OR/OF** ✓ $(Eq\ 3)$ ✓Substitution of $(Eq\ 3)$ into $(Eq\ 1)$ ✓ x-value ✓ substitution of x back into Eq ✓ y-value (5)
4.2.1	$-9 \le 2x + 3 < 5$ $-12 \le 2x < 2$ $-6 \le x < 1$	✓ $2x$ ✓ -6 ✓1 (3)
4.2.2		✓ answer (1)
4.2.3	$x \in [-6;1)$	✓ answer (1)
4.3	Let the first number $= x$ $\therefore$ second number $= 2x - 4$ and third number $= 4x + 2$ $\therefore \frac{x + (2x - 4) + (4x + 2)}{3} = 25$ $x + 2x - 4 + 4x + 2 = 75$ $7x - 2 = 75$ $7x = 77$ $x = 7$ The smallest number is therefore 7.	✓ $2x - 4$ ✓ $4x + 2$ ✓ equation for mean ✓ answer (4)
		[14]

QUESTION 5

		
5.	$w = 53^o$ (corresponding $\angle$s; AD// FE $x = 53^o$ (angle sum Δ $y = 74^o$ (corresponding $\angle$s; AB // FD $z = 16^o$ (angle sum Δ)	✓ S/R ✓ S/R ✓ S/R ✓ S/R **[4]**

QUESTION 6

6.1.1	Kite	✓ answer (1)
6.1.2	Parallelogram **OR** Rectangle **OR** Square	✓ answer (any one) (1)
6.2	Rhombus **OR** Square	✓ answer (any one) (1)
6.3	Rectangle	✓ answer (1)
		[4]

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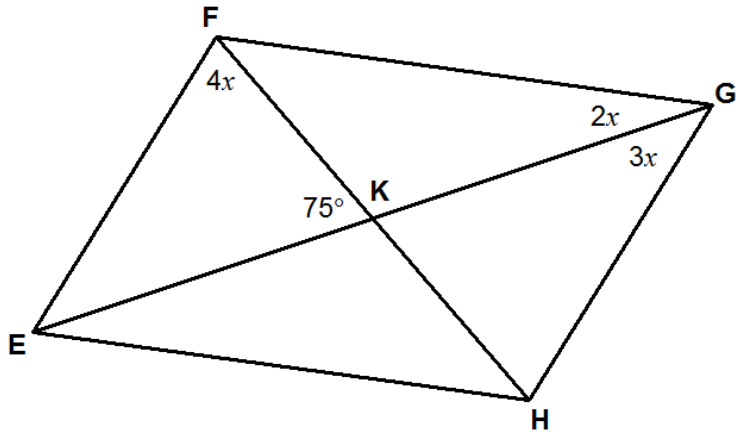
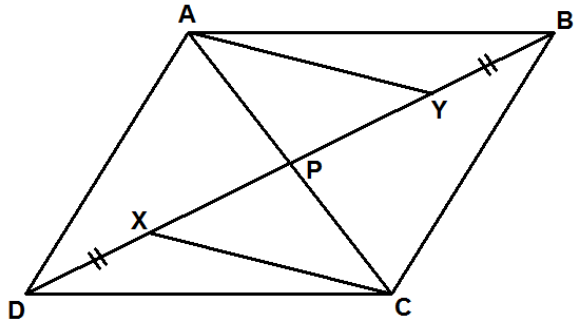
QUESTION 7

7.1		
7.1.1	$F\hat{E}G = 3x$ (alternate $\angle s$; $FE \parallel GH$) $In\,\Delta FEK$: $4x+3x+75^o = 180^o$ (angle sum Δ) $7x = 105^o$ $x = 15^o$	✓ S/R ✓ S/R ✓ answer (3)
7.1.2	$F\hat{G}H = 5x$ $F\hat{G}H = 5(15^o) = 75^o$ $\therefore G\hat{H}E = 105^o$ (co – intererior $\angle s$; $FE \parallel GH$)	✓ $F\hat{G}H = 75°$ ✓ answer (2)
7.2		
	$BP = DP$ (diagonals of parm) But $BY = DX$ (given) $\therefore XP = YP$ $AP = CP$ (diagonals of parm) $\therefore AYCX$ is a parm (diagonals of parm bisect each other)	✓ S/R ✓ S/R ✓ S/R (3)
		[8]

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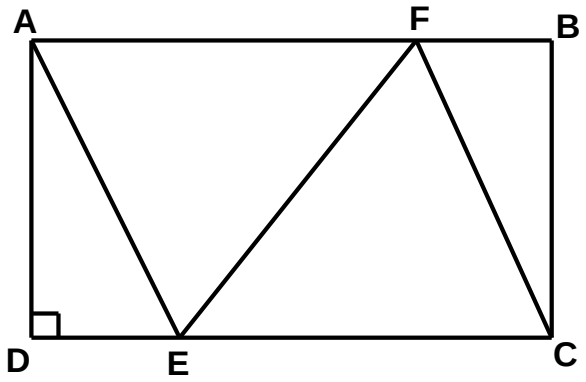
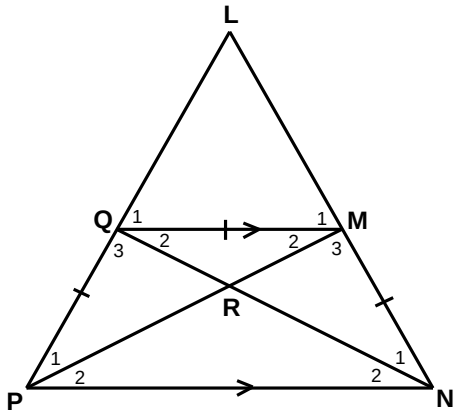
QUESTION 8

8.1		
	Let $BF = x$ $AF = AB - BF$ $\therefore AF = 16 - x$ $\therefore CF = 16 - x$ (adjacent sides of fhombus) In ΔBCF: $CF^2 = BC^2 + BF^2$ (Pythag) $(16-x)^2 = 12^2 + x^2$ $256 - 32x + x^2 = 144 + x^2$ $-32x = -112$ $x = \frac{7}{2}$ $\therefore CF = 16 - \frac{7}{2}$ $CF = 12,5\,cm$	✓ S ✓ S ✓ S/R ✓ S/R ✓ $256 - 32x + x^2 = 144 + x^2$ ✓ $x = \frac{7}{2}$ ✓ answer (7)
8.2		
8.2.1	$Let\ \hat{P}_1 = x$ $\therefore \hat{M}_2 = x$ (angles opposite= sides) $\therefore \hat{P}_2 = x$ (alternate∠s; QM // PN) $\therefore \hat{M}_2 = \hat{P}_2$ $\therefore MP$ bisects $\hat{P}$	✓ S/R ✓ S/R ✓ S (3)

8.2.2	*In* ΔPRN *and* ΔQRM $\hat{P} = \hat{M}_2$ (*alternate* $\angle s$; QM // PN) $\hat{N}_2 = \hat{Q}_2$ (*alternate* $\angle s$; QM // PN $P\hat{R}N = M\hat{R}Q$ (*vertically opposite* $\angle s$) $\therefore \Delta PRN$ /// ΔQRM ($\angle\angle\angle$)	✓ S/R ✓ S/R ✓ S/R (3)
		[13]
		TOTAL: 75

GEOMETRY • *MEETKUNDE*	
S	**A mark for a correct statement** **(A statement mark is independent of a reason)**
	'n Punt vir 'n korrekte bewering ***('n Punt vir 'n bewering is onafhanklik van die rede)***
R	**A mark for the correct reason** **(A reason mark may only be awarded if the statement is correct)**
	'n Punt vir 'n korrekte rede ***('n Punt word slegs vir die rede toegeken as die bewering korrek is)***
S/R	**Award a mark if statement AND reason are both correct**
	Ken 'n punt toe as die bewering EN rede beide korrek is