



Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

**MATHEMATICS
COMMON TEST
SEPTEMBER 2018
MEMORANDUM**

MARKS: 75

TIME: 1.5 hours

This memorandum consists of 6 pages.

QUESTION 1

1.1	$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(-1 - 5)^2 + (5 - 1)^2}$ $= \sqrt{80}$	$\checkmark^a$ correct sub into dist. formula $\checkmark^{ca}$ answer (2)
1.2	$m = \frac{y_2 - y_1}{x_2 - x_1}$ $m_{AC} = \frac{5 + 7}{-3 - 9}$ $= -1$	$\checkmark^a$ correct sub into grad. formula $\checkmark^{ca}$ answer (2)
1.3	$y - y_1 = m(x - x_1)$ $y + 7 = -1(x - 9)$ $y = -x + 2$	$y - y_1 = m(x - x_1)$ or $y = mx + c$ $\checkmark^a$ $\checkmark^{ca}$ correct sub into equation formula $\checkmark^{ca}$ answer (3)
1.4	$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ $M_{BD}\left(\frac{-3 + 9}{2}, \frac{5 - 7}{2}\right)$ $M_{BD}(3; -1)$	$\checkmark^a$ midpoint formula $\checkmark^a$ correct sub into midpoint formula $\checkmark^{ca}$ answer (3)
1.5	$m = \frac{y_2 - y_1}{x_2 - x_1}$ $m_{AM} = \frac{1 + 1}{5 - 3}$ $= 1$ $m_{AM} \cdot m_{BM} = (-1)(1)$ $= -1$ $\therefore AM \perp BD$ $\hat{AMB} = 90^\circ$	$\checkmark^{ca}$ gradient $\checkmark m_{AM} \cdot m_{BM} = -1$ $\checkmark$ conclusion (3)
1.6	$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ $M_{BC}\left(\frac{-3 - 1}{2}, \frac{5 - 5}{2}\right)$ $M_{BC}(-2; 0)$ $M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ $M_{AE}\left(\frac{x + 5}{2}, \frac{5 - 7}{2}\right)$ $\frac{x + 5}{2} = -2 \quad \frac{y + 1}{2} = 0$ $x = -9 \quad y = -1$ $E(-9; -1)$	$\checkmark^a$ midpoint of BC $\checkmark^{ca}$ equating x-co-ordinates and y-co-ordinates $\checkmark^{ca} \checkmark^{ca}$ answers (4) [17]

QUESTION 2

2.1	$\frac{80}{100} \times 70000 = R56000$ $A = P(1 + in)$ $= 56000(1 + \frac{22}{100} \times 5)$ $= R117600$ $\text{Monthly instalments} = \frac{117600}{60} + 120$ $= R2080,00$	R56000 ✓^a loan amount R117600 ✓^{ca} final amount 60 ✓^a no. of payments R2080,00 ✓^{ca} answer (4)
2.2	Let $P = x$ $\therefore A = 3x$ $A = P(1 + in)$ $3x = x(1 + \frac{7,5}{100}n)$ $3 = 1 + \frac{7,5}{100}n$ $2 = \frac{7,5}{100}n$ $= 26.27 \text{ years}$ $= 27 \text{ years}$	✓^a $A = 3P$ ✓^a correct sub. into simple interest formula ✓^{ca} simplification 27 years ✓^{ca} answer (4)
2.3	$A = P(1 + i)^n$ $10,98 = 7,25(1 + i)^8$ $i = \sqrt[8]{\frac{10,98}{7,25}} - 1$ $= 0,0533$ $r = 5,33\%$	✓^a correct sub. into compound interest formula ✓^{ca} simplification $r = 5,33\%$ ✓^{ca} answer (3)
2.4.1	$\$152 \times R9,10 = R1383,20$	$R1383,20$ ✓ ^a (1)
2.4.2	$\frac{R3500}{R11,25}$ $= \text{£}311,11$	$\text{£}311,11$ ✓ ^a answer (1)
2.4.3	$\frac{250 \times 11,25}{9,10} = R309,07$	$\frac{250 \times 11,25}{9,10}$ ✓ ^a $R309,07$ ✓ ^{ca} answer (2)

[15]

QUESTION 3

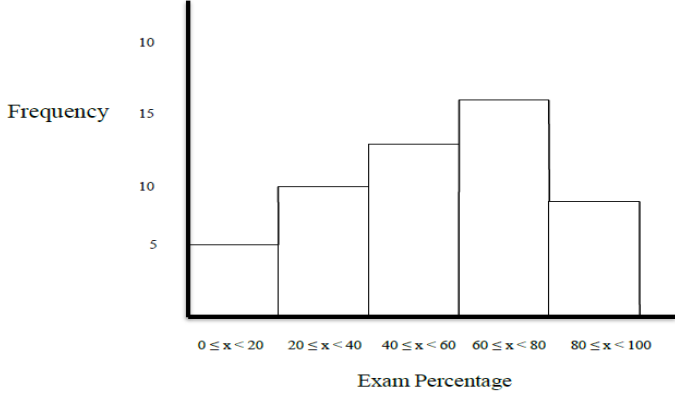
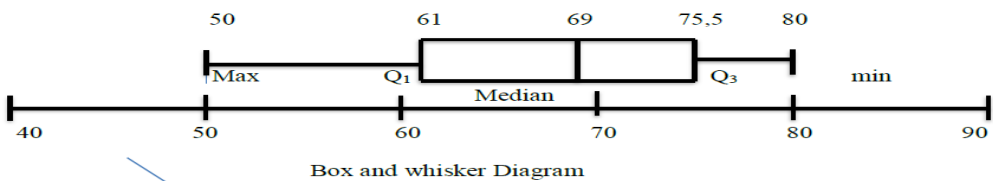
3.1	In $\triangle ABD$ $AS = DS$ (given) $AP = BP$ (given) $\therefore PS \parallel BD$ (midpt th) In $\triangle BCD$ $CR = DR$ (given) $CQ = BQ$ (given) $\therefore QR \parallel BD$ (midpt th) $\therefore PS \parallel QR$	$\checkmark^a$ both statements $\checkmark^a$ S & R $\checkmark^a$ both statements $\checkmark^a$ S & R (4)
3.2.1	$\hat{E}_1 = x$ $\hat{E}_2 = 180^\circ - x$ (<i>adj. angles str. line</i>) $F_2 = 180^\circ - x$ (<i>alt. angles $DE \parallel BF$</i>) $F_1 = x$ (<i>adj. angles str. line</i>) $\therefore \hat{E}_1 = \hat{F}_1$	$\checkmark^a$ S & R $\checkmark^a$ S & R $\checkmark^a$ S & R (3)
3.2.2	In $\triangle AED$ and $\triangle CFB$ $\hat{A}_1 = \hat{C}_1$ (<i>alt angles $AD \parallel BC$</i>) $\hat{E}_1 = \hat{F}_1$ (<i>proven</i>) $AD = BC$ (<i>opp. sides parm</i>) $\therefore \triangle AED \cong \triangle CFB (A, A, S)$	$\checkmark^a$ S & R $\checkmark^a$ S & R $\checkmark^a$ S & R $\checkmark^a$ S & R (4)
3.2.3	$DE \parallel BF$ (given) $DE = BF$ (corres. sides $\equiv \Delta s$) $\therefore DEBF$ is a parm (one pair opp sides both = & $\parallel$)	$\checkmark^a$ statement $\checkmark^a$ S & R $\checkmark^a$ reason (3)

[14]

QUESTION 4

Surface area of hemisphere = $\frac{4\pi r^2}{2}$ $= \frac{4\pi(12)^2}{2}$ $= 904,78 \text{ cm}$ Slant height (s) of Cone = $\sqrt{(24)^2 + (12)^2}$ $= 26,83 \text{ cm}$ Surface Area of Cone = πrs $= \pi \times 12 \times 26,83$ $= 1011,47$ Total Surface Area = $904,78 + 1011,47$ $= 1916,25 \text{ cm}$	$\frac{4\pi(12)^2}{2} \checkmark^a$ sub. into correct formula $904,78 \text{ cm} \checkmark^{ca}$ answer $24 \checkmark^a$ pythagorus $\pi \times 12 \times 26,83 \checkmark^{ca}$ sub. into correct formula $1011,47 \checkmark^{ca}$ answer $1916,25 \text{ cm} \checkmark^{ca}$ answer [6]
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QUESTION 5

5.1.1	$60 \leq x < 80$	✓ ^a answer (1)
5.1.2	$50 \leq x < 60$	✓ ^a answer (1)
5.1.3		x-axis ✓ y-axis ✓ shape ✓ (3)
5.2.1	Range = 80-50 = 30	30 ✓ ^{ca} answer (1)
5.2.2.1	Median = $\frac{66+72}{2}$ = 69	69 ✓ ^{ca} answer (1)
5.2.2.2	$Q_1 = \frac{59+63}{2}$ = 61 $Q_3 = \frac{73+78}{2}$ = 75,5	61 ✓ ^{ca} answer 75,5 ✓ ^{ca} answer (2)
5.1.3	Min.Value: 50 Q ₁ : 61 Median: 69 Q ₃ : 75.5 Max.Value: 80	80 max ✓ ^{ca} 50 min ✓ ^{ca} (2)
5.1.4		✓ ^{ca} box ✓ ^{ca} whisker (2)
5.1.5	$\frac{9}{12} \times 100$ = 75 75 th percentile	$\frac{9}{12}$ ✓ ^{ca} 75 ✓ ^{ca} answer (2) [15]

QUESTION 6

6.1	$\tan(12^\circ) = \frac{139,2}{dist}$ $dist = \frac{139,2}{\tan(12^\circ)}$ $= 654.88 \text{ m}$	139.2 ✓ ^a using tan ✓ ^a $\tan(12^\circ) = \frac{139,2}{dist}$ ✓ ^{ca} substitution 654.88 m ✓ ^{ca} answer (4)
6.2	$\tan \theta = \frac{139,2}{679,88}$ $= 11,58^\circ$	679.88 ✓ ^{ca} using tan ✓ ^a $\tan \theta = \frac{139,2}{679,88}$ ✓ ^{ca} substitution 11,58° ✓ ^{ca} answer (4) [8]