Name and Surname : Solns

Grade/Class : 10/……… **Mathematics Teacher** : ………

100

ANSWER BOOKLET

Grade 10

November Paper 2

November 2020

QUESTION 1

1.

Test result %	No of learners	
$40 < x \le 50$	12	12
$50 < x \le 60$	23	35
$60 < x \le 70$	48	83
$70 < x \le 80$	31	114
$80 < x \le 90$	16	130
$90 < x \le 100$	9	129

1.1.	$n = \underline{139}$ ✓	1
1.2.	$\bar{x} = \dfrac{45 \times 12 + 55 \times 23 + 65 \times 48 + 75 \times 31 + 85 \times 16 + 95 \times 9}{139}$	
	$= \dfrac{9465}{139}$ ✓ x f ✓ midpt interval	
	$= \underline{68,09}$ ✓	3
1.3.1.	$P_{65} = T_{\frac{65}{100}(1+139)}$	
	$= T_{91}$	
	∴ position $\underline{91}$ ✓	1

1.3.2.	$70 < x \leq 80$ ✓	1

QUESTION 2

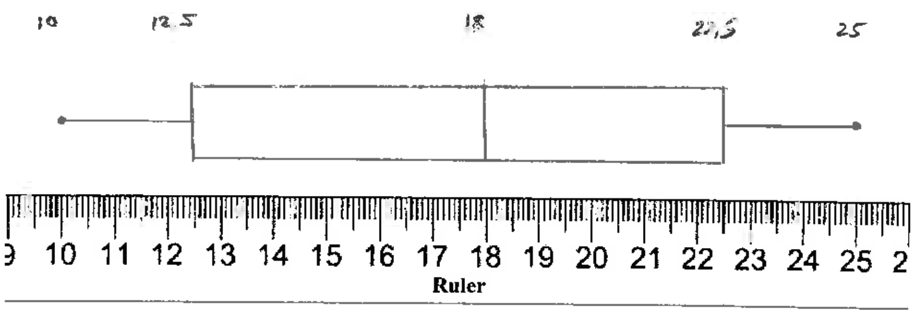
2.

10	11	12	13	16	17	18	20	20	22	23	24	25

2.1.1.	$R = 25 - 10$	
	$= 15$ ✓	1
2.1.2.	Mode $= 20$ ✓	1
2.2.1.	I min $= 10$	
	II $Q_1 = \frac{12+13}{2} = 12,5$	
	III $M = 18$	
	IV $Q_3 = \frac{22+23}{2} = 22,5$	
	V max $= 25$	
	✓ all	1

2.2.2. Box-and-whisker diagram :

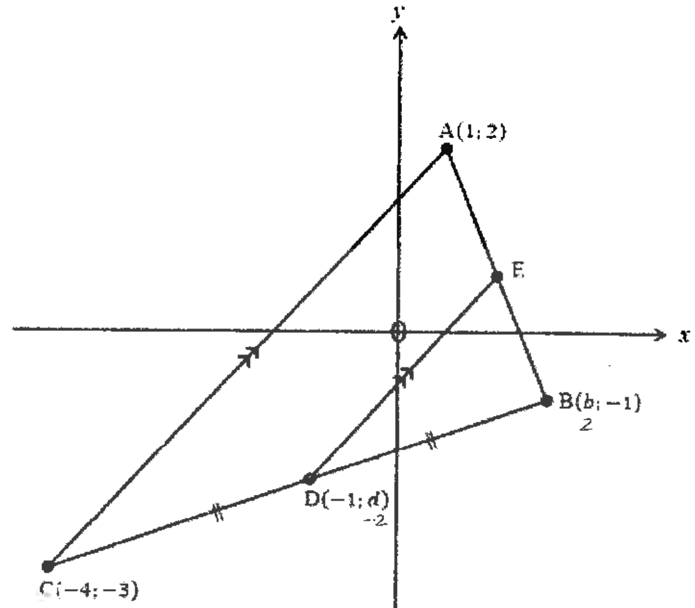
✓ shape
✓ Scale



2.3.	Semi IQR $= \frac{22,5 - 12,5}{2}$ ✓num	
	$= 5$ ✓	2

QUESTION 3

3.



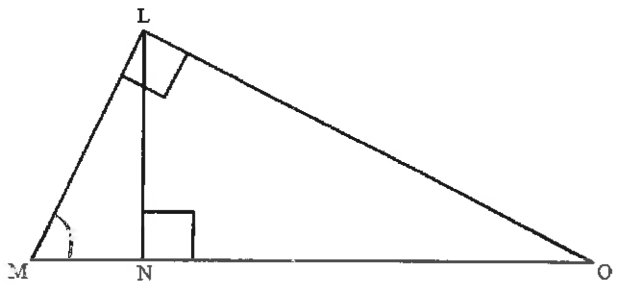
3.1.	AC A(1;2) C(-4;-3)	
	$= \sqrt{(-3-2)^2 + (-4-1)^2}$ ✓	
	$= \sqrt{50}$	
	$= 7{,}07$ ✓ NB 2 d.p.	2
3.2.1.	line through midpt ∥ to 2nd side ✓	1

3.2.2.	$DE = \frac{1}{2}(7{,}07)$	
	$= 3{,}54$	1
3.3.1.	$\frac{-3+(-1)}{2} = d$	
	$-2 = d$	1
3.3.2.	$\frac{-4+b}{2} = -1$	1
	$\times 2: \quad -4+b = -2$	
	$b = 2$	
3.4.1.	(a) m_{BC} $B(2;-1)$ $C(-4;-3)$	
	$= \frac{-3-(-1)}{-4-2}$	
	$= \frac{1}{3}$	1
3.4.1.	(b) m_{AB} $A(1;2)$ $B(2;-1)$	
	$= \frac{-1-2}{2-1}$	
	$= -3$	1

3.4.2.	$m_{BC} \times m_{AB} = \left(\frac{1}{3}\right) \times (-3)$	
	$= -1$	
	$\therefore BC \perp AB$	2
3.5.	$m_{AC} = \frac{-3-2}{-4-1}$ $A(1;2)$ $C(-4;-3)$ $F(f;-10)$	
	$= 1$	
	$m_{CF} = \frac{-10-(-3)}{f-(-4)}$	
	$= \frac{-7}{f+4}$	
	Collinear: $1 = \frac{-7}{f+4}$	
	$f+4 = -7$	
	$f = -11$	4

QUESTION 4

4.1.



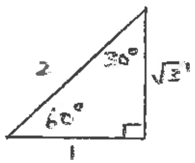
	$\tan M = \frac{LN}{MN}$ or $\frac{OL}{LM}$ $\quad \frac{o}{a}$	2

4.2.1.	$1 - \sin^2 3x$	
	$= 1 - (\sin(3 \cdot 17°))^2$	
	$= 0,40$	1
4.2.2.	$5 \sec x + 3$	
	$= 5 \cdot \frac{1}{\cos 17°} + 3$	
	$= 8,23$	1

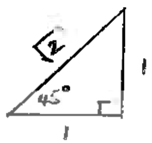
4.3.1.	$12^2 = 10^2 + 11^2 - 2.10.11.\cos x$	
	$-77 = -220 \cos x$	
	$\therefore \cos x = \frac{7}{20}$	
	$x = \cos^{-1}\left(\frac{7}{20}\right)$	
	$= 69,51°$	3
4.3.2.	$\frac{\sin 5x}{8} = \frac{\sin 120°}{11}$	
	$\frac{\sin A}{8} = \frac{\sin 120°}{11}$ $\quad A = 5x$	
	$\sin A = 0,62...$	
	$A = \sin^{-1}(0,62...)$	
	$5x = 39,03...°$	
	$x = 7,81°$	3
4.3.3.	$5 - 2\cot x = 1$	
	$\cot x = 2$	
	$\therefore \frac{1}{\tan x} = 2$ $\quad 2 = \frac{2}{1}$	
	$\tan x = \frac{1}{2}$	
	$x = \tan^{-1}(\frac{1}{2})$	
	$= 26,57°$	3

QUESTION 5

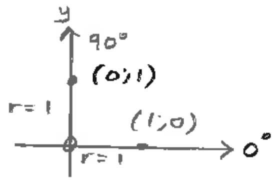
5.1.1. (a)



5.1.1. (b)

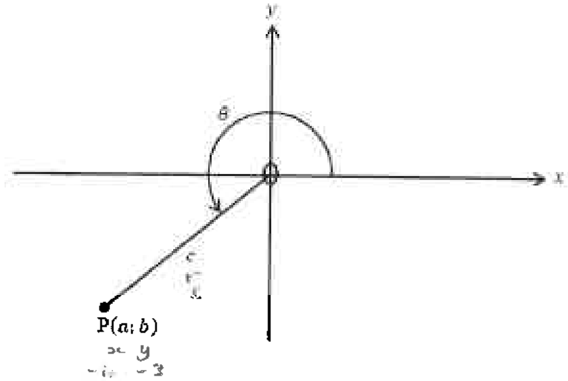


5.1.1. (c)



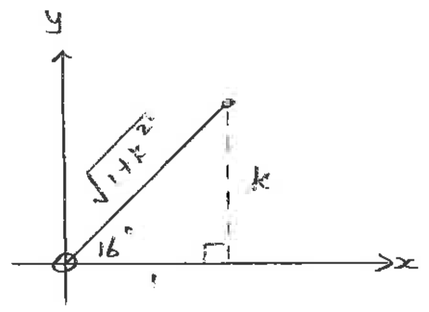
5.1.2. (a)	$\tan 30° = \frac{1}{\sqrt{3}}$ $\frac{o}{a}$	1
5.1.2. (b)	$\cos 45° = \frac{1}{\sqrt{2}}$ $\frac{a}{h}$	1
5.1.2.(c)	$\cot 90° = \frac{0}{1}$ $\frac{x}{y}$	
	$= 0$	1

5.2.



5.2.1.	cosec < 0 ie – in Q III IV	
	$\theta \in (90°; 270°)$ in Q II III	
	Quad 3 satisfies BOTH conditions	2
5.2.2.	$\operatorname{cosec} \theta = -\frac{5}{3}$ $\frac{r}{y} = \frac{5}{-3}$	
	$\therefore r = 5$ $y = -3$	
	$x^2 + (-3)^2 = (5)^2$ Pythag	
	$x^2 = 16$	
	$x = \pm\sqrt{16}$	
	$x = -4$ reject +	
	$\therefore a = -4$ $b = -3$ $c = 5$	3
5.2.3.	$\cos \theta = \frac{-4}{5}$ $\frac{x}{r}$	1

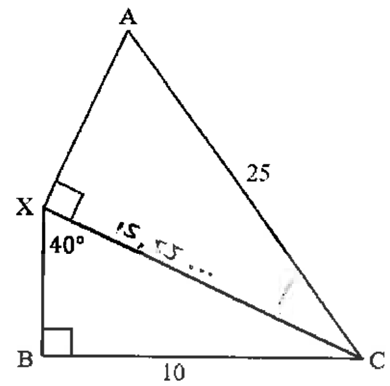
5.3.



	$\tan 16° = k$	
	$= \frac{k}{1}$ $\quad \frac{y}{x}$	
	$\therefore x = 1 \quad y = k$	
	$(1)^2 + (k)^2 = r^2$ Pythag	
	$1 + k^2 = r^2$	
	$\pm\sqrt{1+k^2} = r$	
	$-\sqrt{1+k^2} = r$ reject	
	$\therefore \sin 16° = \frac{k}{\sqrt{1+k^2}}$ ✓ $\frac{y}{r}$	3

QUESTION 6

6.

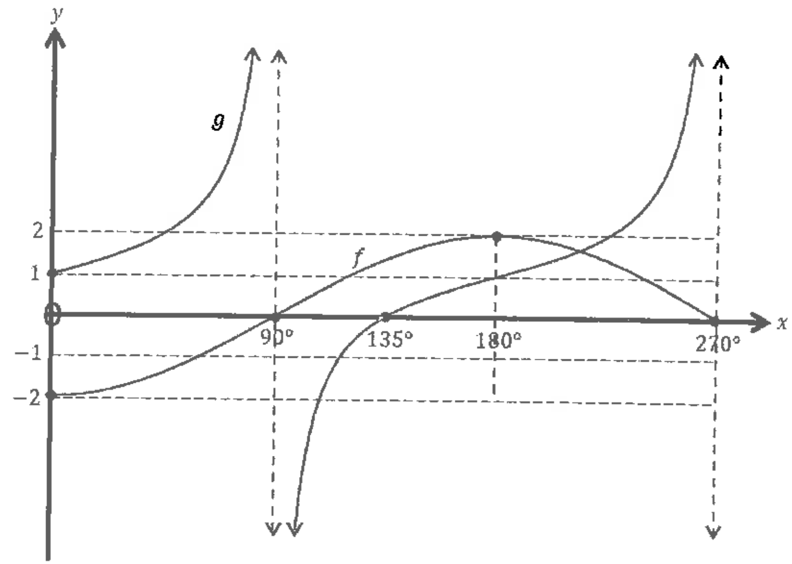


	$\sin 40° = \frac{10}{XC}$ $\quad \frac{o}{h}$ ✓	
	$XC \cdot \sin 40° = 10$	
	$XC = \frac{10}{\sin 40°}$ ✓	
	$= 15,55\ldots$ ✓	
	$\cos X\hat{C}A = \frac{15,55\ldots}{25}$ $\quad \frac{a}{h}$ ✓	
	$= 0,62\ldots$	
	$X\hat{C}A = \cos^{-1}(0,62\ldots)$	
	$= 51,52°$ ✓	5

QUESTION 7

$g: y = \tan x - b$
$f: y = a\cos x$

7.

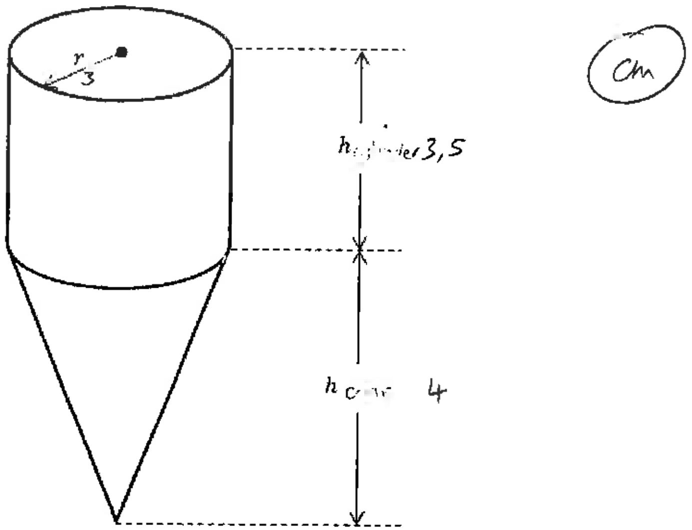


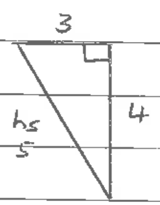
7.1.1.	Period of $g = 180°$	1
7.1.2.	Amplitude of $f = 2$	1
7.2.1.	$\tan x - b > 0$	
	$g(x) > 0$	
	PTO	

	y_g +	
	$\therefore x \in [0°; 90°)$ or $(135°; 270°)$	2
	• and : −1	
7.2.2.	$f(x) \times g(x) \leq 0$	
	$y_f \times y_g$ 0 −	
	$\therefore x \in [0°; 90°)$ or $(90°; 135°]$	2
7.3.1.	(a) $a = -2$ $y = -2\cos x$	1
	$y = a\cos x$	
	(b) $b = -1$ $y = \tan x + 1$	1
	$= \tan x - b$	

QUESTION 8

8.

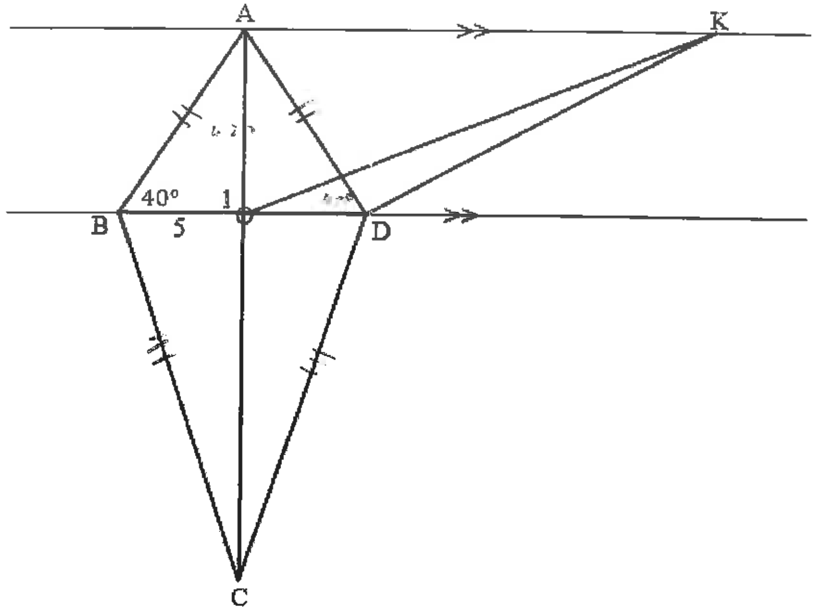


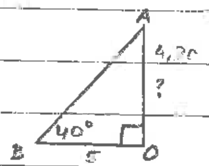
8.1.	$h_s = 5$ cm Pythag	1
		
8.2.	V = cylinder + cone	
	$= \pi(3)^2(3,5) + \frac{1}{3}\pi(3)^2(4)$	
	$= 136,66$ cm^3 A	3

8.3.	TSA = circle + rectangle + cone	
	$= \pi(3)^2 + 2\pi(3)(3,5) + \pi(3)(5)$	
	$= 141,37$ cm^2 A	4
	• (8.1) (8.2) (8.3) do NOT penalise if no units are stated.	

QUESTION 9

9.

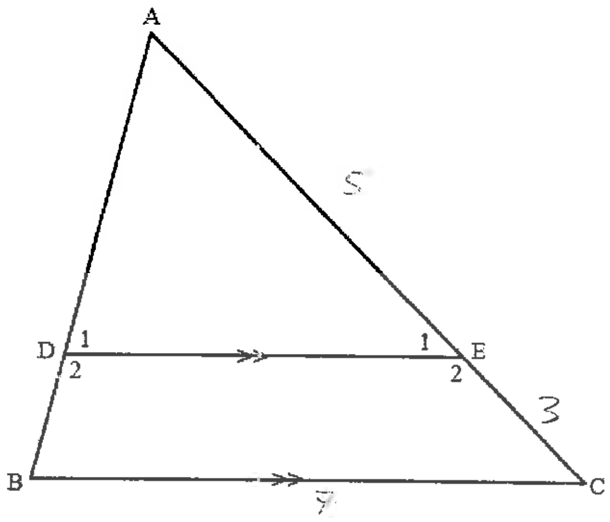


9.1.	$A\hat{D}B = 40°$ ✓S ✓R ∠'s opp = sides	2
9.2.	$\hat{O}_1 = 90°$ ✓S diags kite ⊥	1
9.3.	$\tan 40° = \frac{AO}{5}$ ✓ $\frac{o}{a}$ 	
	$5 . \tan 40° = AO$	
	$4,20 = AO$ ✓	2

9.4.	area $\triangle AOB = \frac{1}{2}(5)(4,20)$	
	$= 10,5 \ u^2$ ✓	1
9.5.	$BO = OD = 5$ ✓SR diag kite bisected	
	$h_{\triangle KDO} = 4,20$ ✓ AK ∥ BD	
	∴ area $\triangle KDO$	
	$= \frac{1}{2}(5)(4,20)$ ✓	
	$= 10,5 \ u^2$ ✓	
	(OR)	
	$BO = OD = 5$ ✓SR diag kite bisected	
	area $\triangle KDO$	
	= area $\triangle AOB$ ✓ same base (BO = OD)	
	✓R same height (AK ∥ BD)	
	$= 10,5 \ u^2$ ✓	4

QUESTION 10

10.

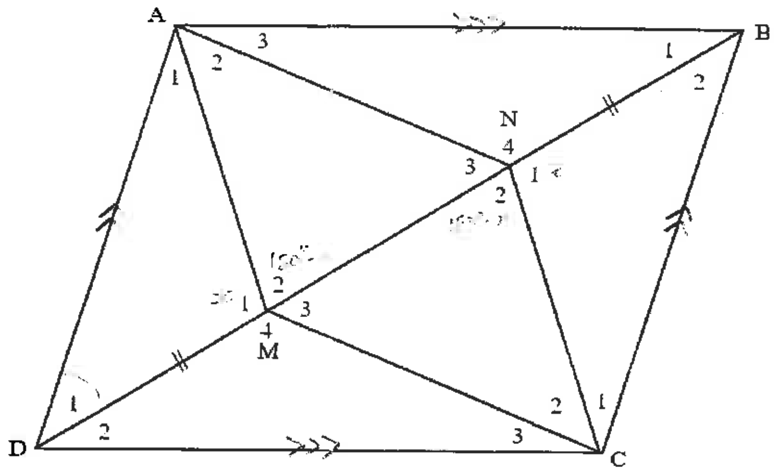


10.1.	$\triangle ABC \parallel\!\!\mid \triangle ADE$	1
10.2.	In $\triangle$'s ABC, AD_1E_1	
	1. $\hat{A} = \hat{A}$ common	
	2. $\hat{B} = \hat{D}_1$ corr $\angle$'s $=$, $DE \parallel BC$	
	3. $\hat{C} = \hat{E}_1$ corr $\angle$'s $=$, $DE \parallel BC$	
	$\therefore \triangle ABC \parallel\!\!\mid \triangle ADE$ AAA	3

10.3.	$\frac{DE}{BC} = \frac{AE}{AC}$ $\triangle ABC \parallel\!\!\mid \triangle ADE$	
	$\frac{DE}{7} = \frac{5}{8}$	
	$DE = \frac{35}{8}$	2

QUESTION 11

11.



11.1.1.	In Δ's DMA, BNC	
	1. $\hat{D}_1 = \hat{B}_2$ ✓S/R alt $\angle$'s =, AD ∥ BC	
	2. DM = BN ✓S/R given	
	3. AD = BC ✓S/R opp sides ∥gm =	
	∴ $\Delta DMA \equiv \Delta BNC$ SAS ✓R	4
11.1.2.	Let $\hat{M}_1 = x$	
	∴ $\hat{N}_1 = x$ ✓S $\Delta DM_1A \equiv \Delta B_2N_1C$	
	∴ $\hat{M}_2 = 180° - x$ $\angle$'s on str line = 180°	
	Similarly, $\hat{N}_2 = 180° - x$	

	∴ $\hat{M}_2 = \hat{N}_2$ ✓S both = $180° - x$	
	∴ AM ∥ CN ✓R alt $\angle$'s =	
11.2.	AM ∥ CN (11.1.2)	
	AM = CN ✓S/R $\Delta DMA \equiv \Delta BNC$	
	∴ AMCN is a ✓R ∥gm opp sides = & ∥	
	parallelogram	