Name and Surname : .....

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

MATHEMATICS
November Paper 2

ANSWER BOOK

100

7 November 2022

QUESTION 1

1.1.

Result %	Number of learners
50 – 60	23 (23)
60 – 70	40 (63)
70 – 80	55 (118)
80 – 90	34 (152)
90 – 100	19 (171)

1.1.1.	171 ✓	1
	✓ ✓ ✓	
1.1.2.	(a) $\bar{x} = \frac{55\times23+65\times40+75\times55+85\times34+95\times19}{171}$	
	$= 74,18\ \%$ ✓	4

(b) $T_1; \cdots; T_{171}$ $M = T_{\frac{1}{2}(1+171)} = T_{86}$

$T_1; \cdots; T_{85}$

$T_{87}; \cdots; T_{171}$ $Q_3 = T_{\frac{1}{2}(87+171)}$

$= T_{129}$ ✓

$80 - 90$

a.o. 1/2 $\therefore$ 85 % ✓ 2

(c) $T_1; \cdots; T_{171}$ $D_4 = T_{\frac{4}{10}(1+171)}$

$= T_{68,8}$ ✓

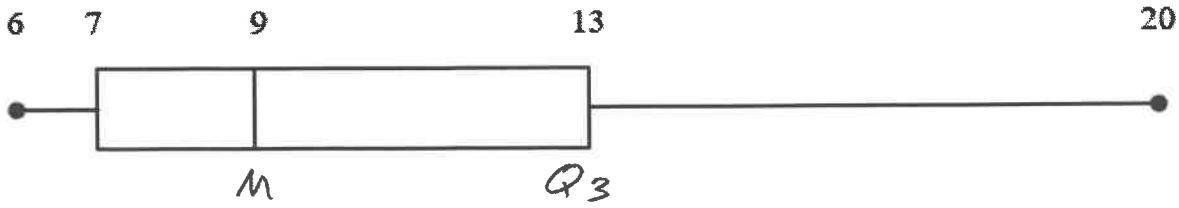
$= \frac{T_{68} + T_{69}}{2}$ ✓

$70 - 80$

$\therefore \frac{75 + 75}{2}$

a.o. 1/3 $= 75$ % ✓ 3

1.2.

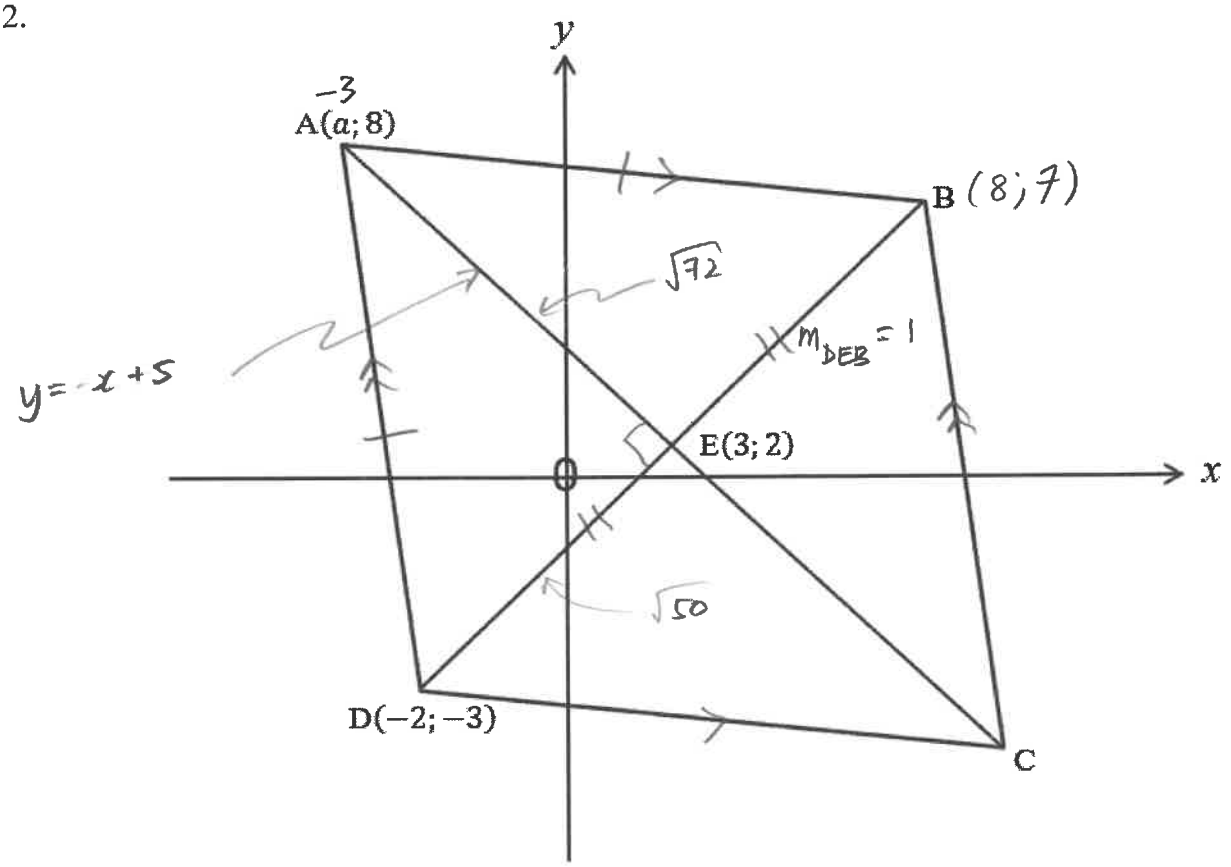


	$M - Q_3 \approx 25\%$	
	$\therefore \frac{25}{100} \times 32 = 8$ learners ✓ ✓	2

1.3.	$n_1 = 30 \quad \bar{x}_1 = 52\% \quad n_2 = 20 \quad \bar{x}_2 = 76$	
	Total number of marks	
	$= 30 \times 52 + 20 \times 76$	
	$= 3080$ ✓	
	Grade average $= \frac{3080}{50}$ ✓	
	$= 61,6\%$ ✓	3

QUESTION 2

2.



2.1.1.	$DE = EB$	✓ diags rhomb bisect	1
2.1.2.	$A\hat{E}D = 90°$	✓ diags rhomb ⊥	1
2.2.1.	$\frac{x_B + (-2)}{2} = 3$	$\frac{y_B + (-3)}{2} = 2$	
	$x_B = 8$	$y_B = 7$	
	✓	✓	
	$\therefore B(8; 7)$		2

2.2.2. $m_{DEB} = \frac{2-(-3)}{3-(-2)}$

$= 1$ ✓ 1

2.2.3. $m_{AEC} = -1$ ✓ $\perp$

$\therefore y = -x + c$

sub $E(3;2)$

$2 = -3 + c$ ✓ sub

$5 = c$

$\therefore y = -x + 5$ ✓ 3

2.2.4. $y = -x + 5$

sub $A(a;8)$

$8 = -a + 5$

$a = -3$ ✓ 1

2.2.5. $DE = \sqrt{(2-(-3))^2 + (3-(-2))^2}$ ✓

$= \sqrt{50}$ ✓ 2

2.2.6. $AE = \sqrt{(8-2)^2 + (-3-3)^2}$

$= \sqrt{72}$ ✓

$\therefore$ area $\Delta AED = \frac{1}{2}\sqrt{50}\sqrt{72}$ ✓

$= 30 \text{ u}^2$ ✓ 3

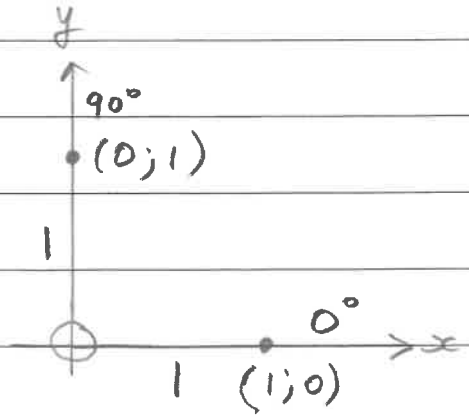
2.2.7. $\tan D\hat{A}E = \frac{\sqrt{50}}{\sqrt{72}}$ ✓ $\frac{o}{a}$

$D\hat{A}E = \tan^{-1}\left(\frac{5}{6}\right)$

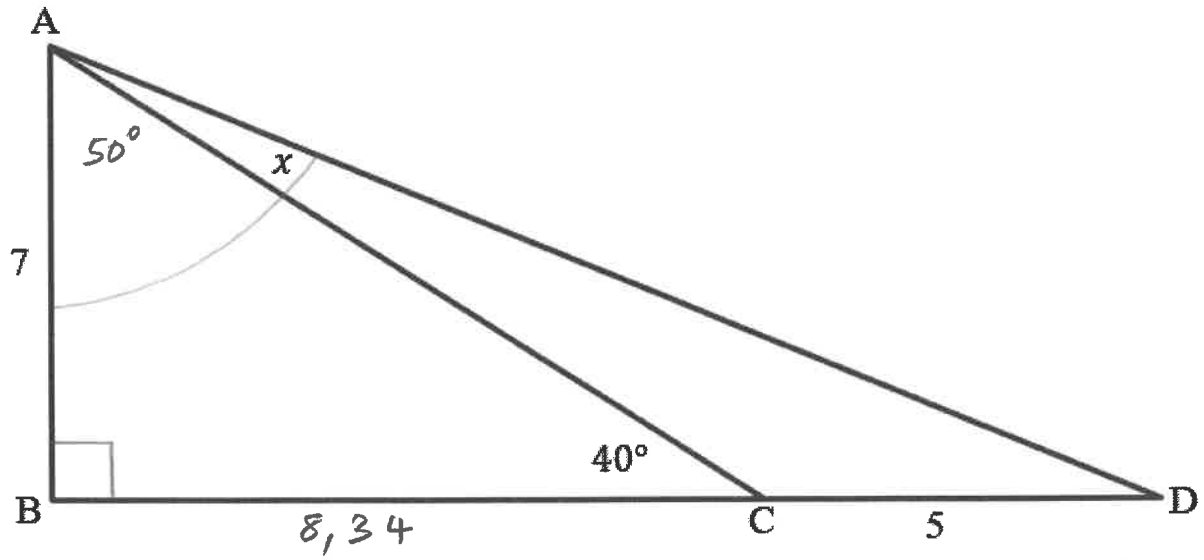
$= 39,81^\circ$ ✓ 2

QUESTION 3

3.1.1.	$-2\tan^2 40° = -2(\tan 40°)^2 = -1,41$ ✓	1
3.1.2.	$7 \sec 20° = 7 \times \frac{1}{\cos 20°} = 7,45$ ✓	1
3.2.1.	$5 \cos 3(x-10°) = 3$	
	$5 \cos A = 3$ $\quad A = 3(x-10°)$	
	$\cos A = \frac{3}{5}$ ✓ isolate	
	$A = \cos^{-1}(\frac{3}{5})$	
	$3(x-10°) = 53,13...°$ ✓	
	$x = 27,71°$ ✓	3
3.2.2.	$2 \operatorname{Cosec} x = 3$	
	$\operatorname{Cosec} x = \frac{3}{2}$	
	$\frac{1}{\sin x} = \frac{3}{2}$	
	$\sin x = \frac{2}{3}$ ✓	
	$x = \sin^{-1}(2/3)$	
	$= 41,81°$ ✓	2

3.3.1.	 ✓must be "usable"	1
3.3.2.	$\cot 90° = \frac{x}{y} = \frac{0}{1} = 0$ ✓	1

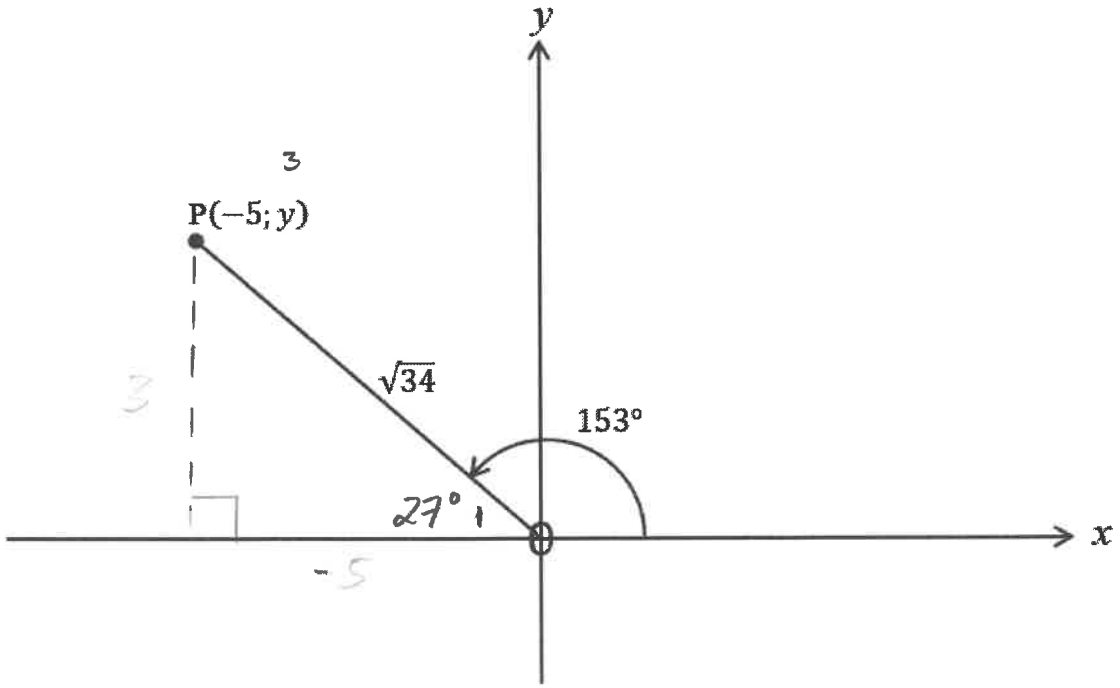
3.4.



3.4.1.	ΔABC : $\frac{7}{BC} = \tan 40°$ ✓	
	$7 = BC \tan 40°$	
	$\frac{7}{\tan 40°} = BC$	
	$8,34 = BC$ ✓	2
3,4 2.	$B\hat{A}C = 50°$ sum ^'s in $\Delta = 180°$	
	ΔBAD : $\tan B\hat{A}D = \frac{13,34}{7}$ ✓	
	$B\hat{A}D = \tan^{-1}(1,90\ldots)$	
	$x + 50° = 62,31\ldots°$ ✓	
	$x = 12,31°$ ✓	3

QUESTION 4

4.1.

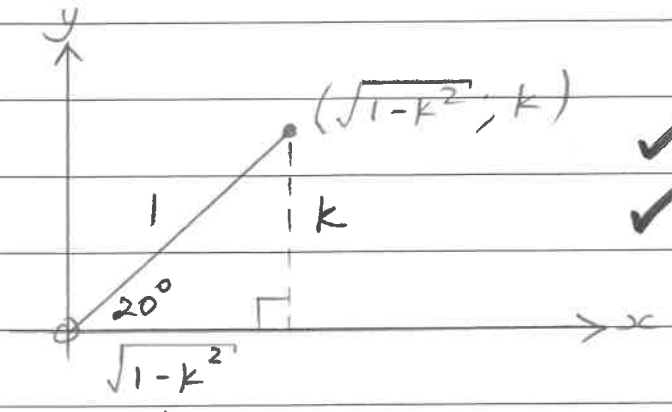


4.1.1.	$(-5)^2 + y^2 = (\sqrt{34})^2$ Pythag	
	$25 + y^2 = 34$	
	$y^2 = 9$	
	$y = \pm 3$ reject −	
	$\therefore y = 3$ ✓	1
4.1.2.	$\cos 153^\circ = \frac{-5}{\sqrt{34}}$ ✓ $\frac{x}{r}$	1
4.1.3.	$\hat{O}_1 = 27^\circ$ ∠'s on str line $= 180^\circ$	
	$\tan 27^\circ = \frac{3}{5}$ $\frac{o}{a}$ ✓✓ or 0	2

$\frac{3}{-5}$ 0/2

27° QI ∴ tan +

4.2. $\sin 20° = k = \frac{k}{1} \quad \frac{y}{r}$



✓ y
✓ x

Pythag

$\cos 20° = \frac{\sqrt{1-k^2}}{1} \quad \frac{x}{r}$

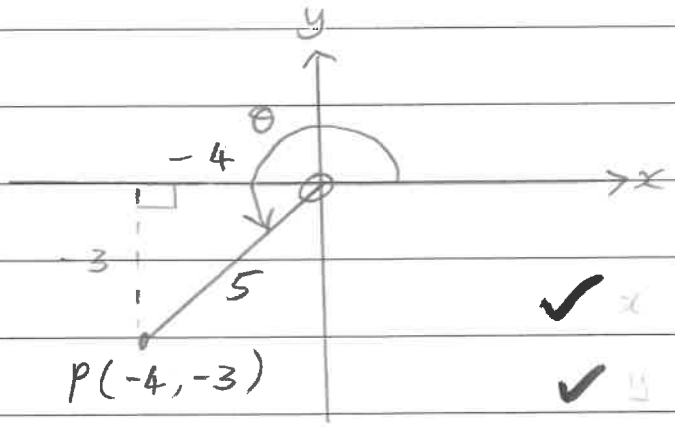
$= \sqrt{1-k^2}$ ✓ 3

4 3. $3\cot\theta = 4 \therefore \cot\theta = \frac{4}{3} \quad \frac{x}{y} \therefore \frac{-4}{-3}$

QIII

• $\cot\theta +$ ∴ I III

• $\theta \in (90°; 360°)$ ∴ II III IV



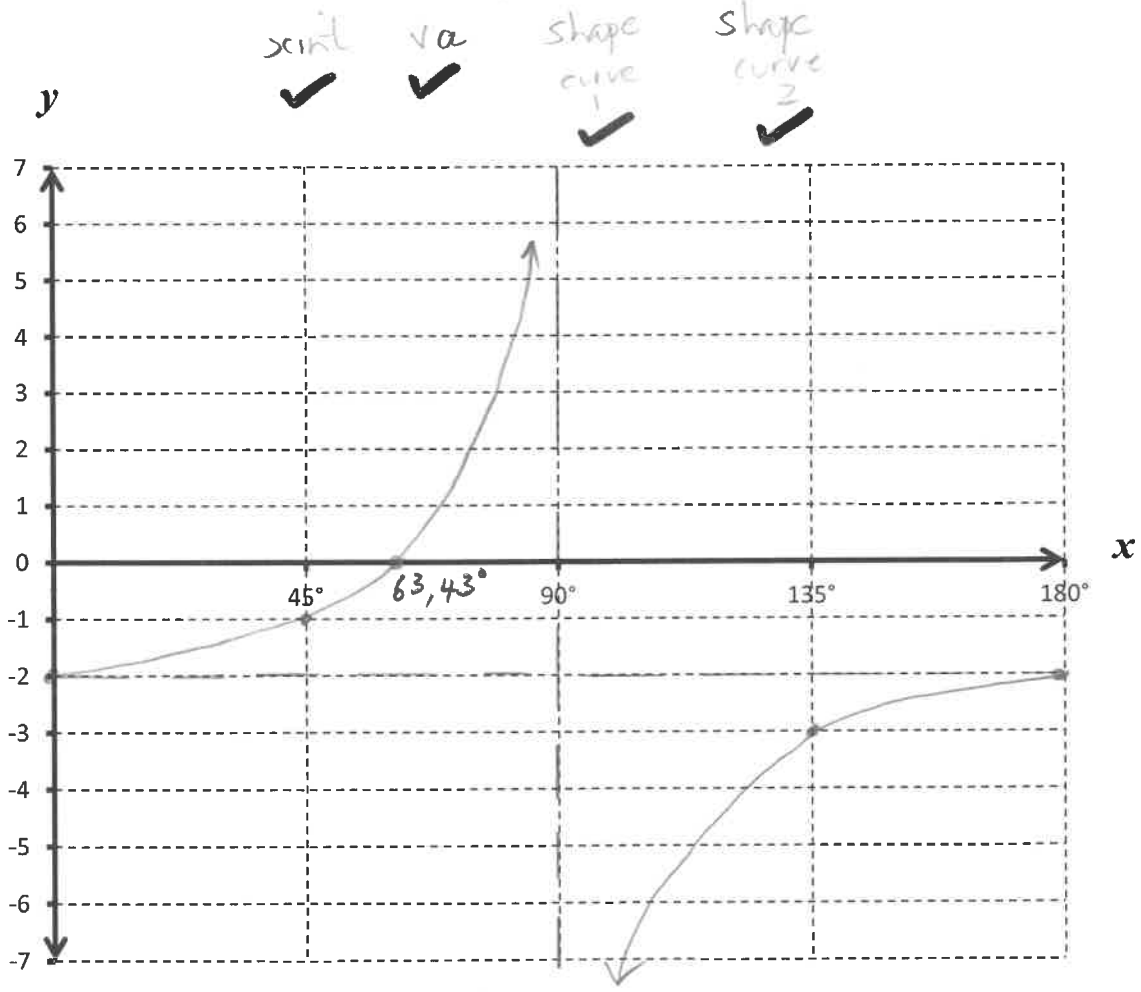
✓ x
✓ y
✓ r
✓ θ labelled

$r = 5$ Pythag ✓ 4

QUESTION 5

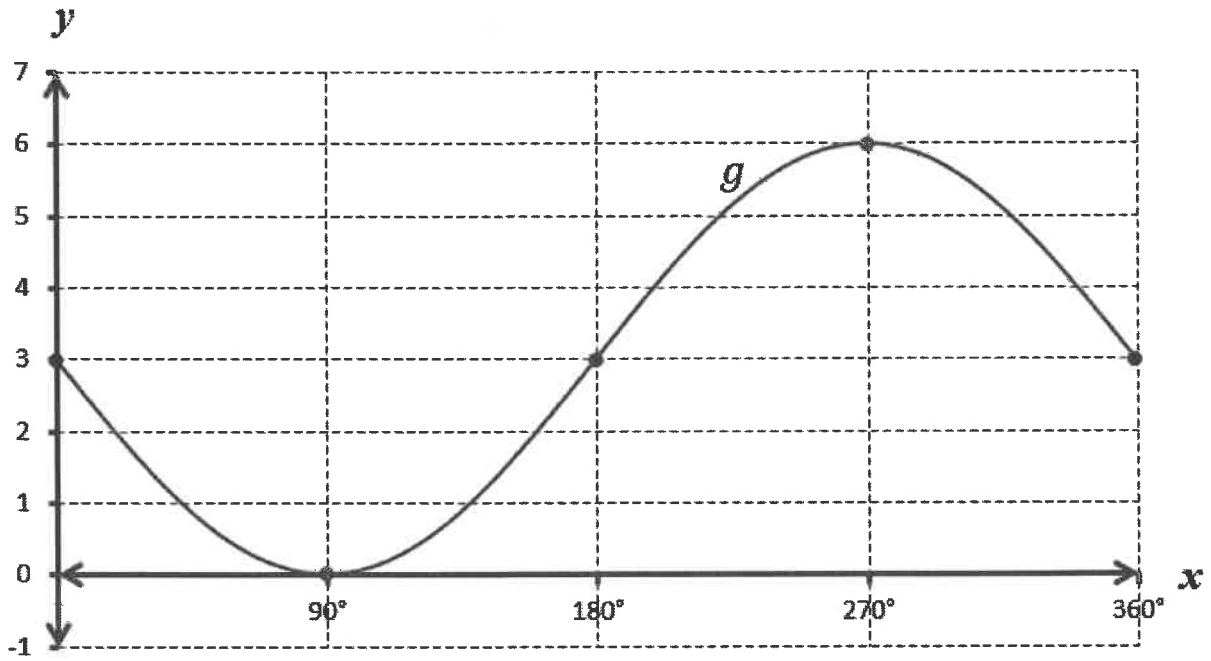
5.1.1.	$f(x) = \tan x - 2$	
	$0 = \tan x - 2$	
	$\therefore \tan x = 2$	
	$x = \tan^{-1}(2)$	
	$= 63,43^\circ$ ✓	1

5.1.2. $f(x) = \tan x - 2$



4

5.2. $g(x) = a\sin x + q$

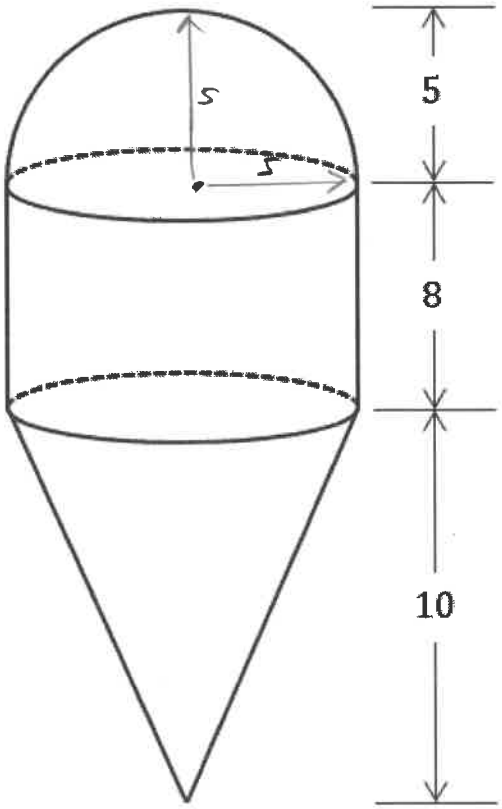


5.2.1	(a) $a = -3$ ✓	1
	(b) $q = 3$ ✓	1
5.2.2.	$y \in [0; 6]$ ✓	1
5.2.3.	$x \in (90°; 270°)$ ✓	1

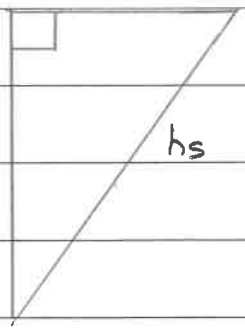
5 2.4.	g_{max} $g(x)_{max}$ $y_{max} = 6$ ✓ value	1
5 2.5.	$g(x) - 3 \geq 0$	
	$y_g - 3 \geq 0$	
	$y_g \geq 3$	
	$x = 0°$ ✓A or $x \in [180°; 360°]$ ✓A	2
5 2.6.	g: $y = a\sin x + q$	
	refl x $-y = a\sin x + q$	
	$y = -a\sin x - q$	
	refl y $y = -a\sin(-x) - q$ ✓T_1 ✓T_2	2
	OR	
	g: $y = -3\sin x + 3$	
	refl x $-y = -3\sin x + 3$	
	$y = 3\sin x - 3$	
	refl y $y = 3\sin(-x) - 3$ T_1 T_2	

QUESTION 6

6.1.



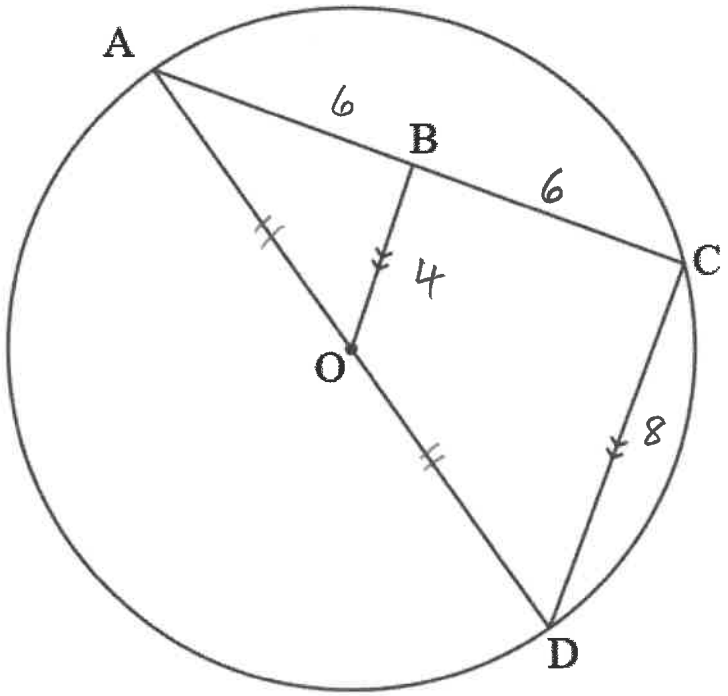
6.1.1.	$r = 5$ ✓	1
6.1.2.	$h_s^2 = 5^2 + 10^2$ Pythag	
	$h_s = \sqrt{125}$ ✓	



	$TSA = \frac{1}{2} \cdot 4\pi(5)^2 + 2\pi(5).8 + \pi(5)(\sqrt{125})$ ✓ ✓ ✓	
	$= 50\pi + 80\pi + 55,90\ldots\pi$	
	$= 185,90\ldots\pi$	
	$= 584,03\ u^2$ ✓ NB 2 dp	5
6.2.	$V = \frac{1}{3}\pi r^2 h = 50$	
	$V_n = \frac{1}{3}\pi r_n^2 h_n$	
	$= \frac{1}{3}\pi(\frac{1}{2}r)^2(3h)$ ✓	
	$= \frac{1}{3}\pi \cdot \frac{1}{4}r^2 \cdot 3h$	
	$= \frac{1}{4} \cdot 3 \cdot \frac{1}{3}\pi r^2 h$	
	$= ✓ \frac{3}{4} \cdot 50$	
	$= 37,5\ cm^3$ ✓	3

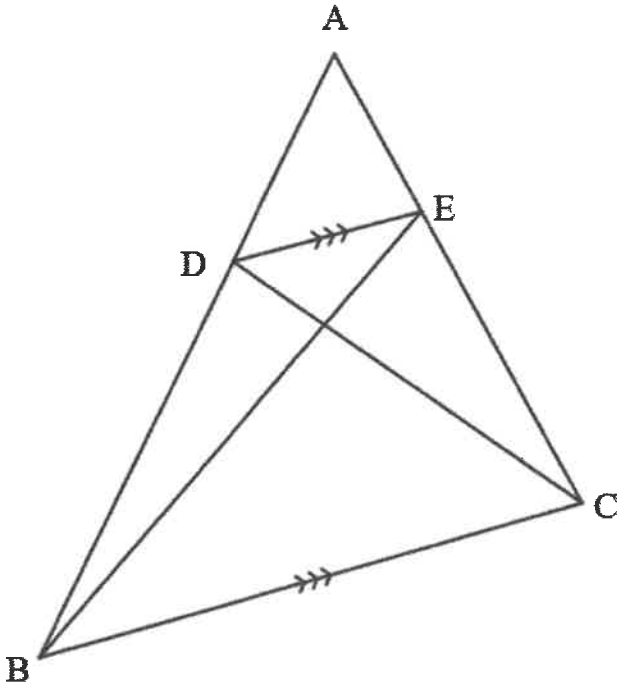
QUESTION 7

7.1.



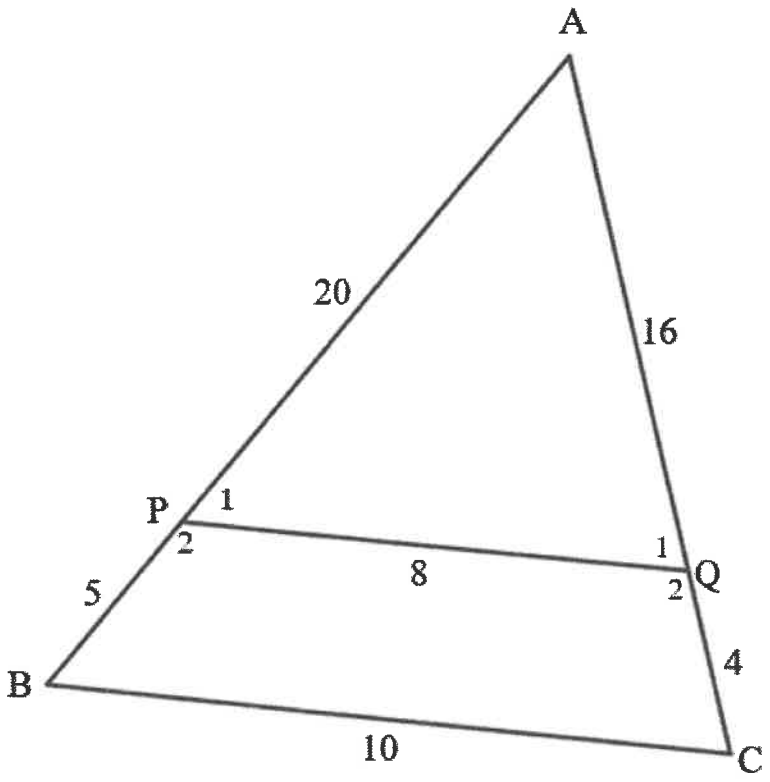
7.1.1.	$AO = OD$ radii	
	$\therefore AB = BC$ ✓R line through midpt // to	
	$\therefore AB = 6$ ✓S 2nd side	2
7.1.2.	$OB = 4$ ✓S ✓R midpt thm	2

7.2.



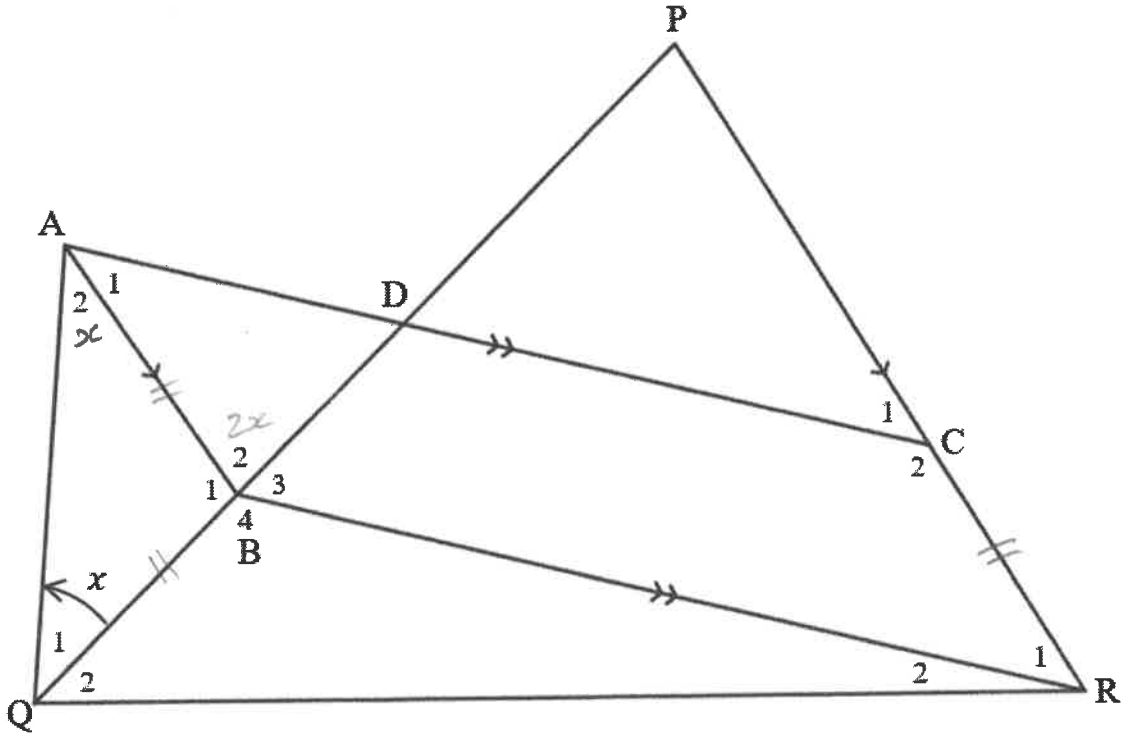
	area ΔDEC = area ΔEDB → same base (DE) ✓	R
	same height (DE ∥ BC) ✓	R
		2

7.3.



7.3.1.	In Δ's ABC, APQ	
	1. $\frac{AB}{AP} = \frac{25}{20} = \frac{5}{4}$ ✓	
	2. $\frac{BC}{PQ} = \frac{10}{8} = \frac{5}{4}$ ✓	
	3. $\frac{CA}{QA} = \frac{20}{16} = \frac{5}{4}$ ✓	
	$\therefore \frac{AB}{AP} = \frac{BC}{PQ} = \frac{CA}{QA}$ all $= \frac{5}{4}$	
	$\therefore \Delta ABC \,///\, \Delta APQ$ ✓R sides of Δ in prop^{n}	4
7.3.2.	$\hat{B} = \hat{P}_1$ ✓S $\Delta ABC \,///\, \Delta APQ$	
	$\therefore PQ \,//\, BC$ ✓R corr ^{n}s =	2

7.4.



7.4.1.	ACRB is ||gm ✓R both prs opp sides quad ||	1
7.4.2.	AB = CR ✓SR opp sides ||gm =	
	CR = BQ ✓S given	
	∴ AB = BQ both = CR	2
7.4.3.	$\hat{A}_2 = x$ ✓S ✓R ∠'s opp = sides	
	$\hat{B}_2 = 2x$ ✓S ✓R ext ∠ Δ	
	∴ $Q\hat{P}R = 2x$ ✓S ✓R alt ∠'s =, AB ∥ PR	6
