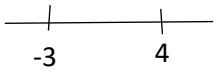
MEMO P1 GRADE 11 November 2020 .

QUESTION 1			
1.1.1	$2x^2-11x+15=0$ $(2x-5)(x-3)=0$ $\therefore x=\frac{5}{2}$ or 3	• Ans • ans	(2)
1.1.2	$3x^2-x-5=0$ $x=\frac{-(-1)\pm\sqrt{(-1)^2-4(3)(-5)}}{2(3)}$ $\therefore x=1,5$ or $x=-1,1$	• sub • ans • ans • decimal point	(4)
1.1.3	$\sqrt{5-x}=x+1$ $5-x=(x+1)^2$ $5-x=x^2+2x+1$ $x^2+3x-4=0$ $(x+4)(x-1)=0$ $\therefore x\neq -4$ or $x=1$	• square both sides • standard form • $x\neq -4$ • $x=1$	(4)
1.1.4	$x^2-x\leq 12$ $x^2-x-12\geq 0$ $(x-4)(x+3)\geq 0$ $x=4$ or -3  $x\in[-3\ ;\ 4]$ or $-3\leq x\leq 4\ ;\ x\in\mathrm{R}$	• Standard form • Critical points • values • brackets	(4)
1.2	$3y+x=2$ $\therefore x=-3y+2$ $y^2+(-3y+2)=(-3y+2)y+y$ $y^2-3y+2=-3y^2+2y+y$ $4y^2-6y+2=0$ $2y^2-3y+1=0$ $(2y-1)(y-1)=0$ $y=\frac{1}{2}$ or 1 $x=\frac{1}{2}$ or -1	• $x=-3y+2$ • Sub • Standard form • factors • Y-roots • X-roots	(6)

1.3 1.3.1	$A = 9x^2 + 6x$ $\frac{A}{9} = x^2 + \frac{2}{3}x$ $= x^2 + \frac{2}{3}x + (\frac{1}{3})^2 - (\frac{1}{3})^2$ $= (x^2 + \frac{1}{3})^2 - \frac{1}{9}$ $A = 9(x^2 + \frac{1}{3})^2 - 1$	• Division by 9 • Completing the square • ans can use $\frac{-b}{2a}$	(3)
1.3.2	-1	• ans	(1)
1.3.3	$\frac{-1}{3}$	• ans	(1)
1.4 1.4.1	$x = \sqrt{6 + \sqrt{6 + \sqrt{6 + \sqrt{6 + ...}}}}$ $x^2 = 6 + \sqrt{6 + \sqrt{6 + ...}}$ $= 6 + x$	• $x^2 = 6 + \sqrt{6 + \sqrt{6 + ...}}$ • $6 + x$	(2)
1.4.2	$x^2 - x - 6 = 0$ $(x - 3)(x + 2) = 0$ $x = 3$ or $x \neq -2$ $x = 3$	• Standard form • ans	(2)
			[29]

QUESTION 2			
2.1	$\frac{8^{1+2x}.16^{1-x}}{4^{x+1}}$ $\frac{2^{3(1+2x)}.2^{4(1-x)}}{2^{2(x+1)}}$ $2^{3+6x+4-4x-2x-2}$ $2^5 = 32$	• num prime factors • den prime factors • 3rd row • ans	(4)
2.2 2.2.1	$3x^{\frac{1}{2}} - 27 = 0$ $3x^{\frac{1}{2}} = 27$ $x^{\frac{1}{2}} = 9$ $x = 81$	• $x^{\frac{1}{2}} = 9$ • ans	(2)
2.2.2	$5^x + 2.5^{x+1} = 55$ $5^x(1 + 2.5) = 55$ $5^x = 5$ $x = 1$	• common factor • bracket • equating • ans	(4)
			[10]

QUESTION 3

3.1	$-3 \;;\; 3 \;;\; x \;;\; 27$ $6 \quad x-3 \quad 27-x$ $x-3-6 \quad 27-x-(x-3)$ $x-9=30-2x$ $3x=39$ $x=13$	• 1st diff • 2nd diff • equation	(3)
3.2	$-3 \;;\; 3 \;;\; 13 \;;\; 27$ $6 \quad 10 \quad 14$ $4 \quad 4$ $2a=4 \quad 3a+b=6 \quad a+b+c=-3$ $a=2 \quad b=0 \quad c=-5$ $T_n=2n^2-5$	• 1st and 2nd diff • a=2 • b=0 • c=-5 • $T_n=2n^2-5$	(5)
3.3	$2n^2-5=157$ $2n^2-162=0$ $n^2-81=0$ $(n-9)(n+9)=0$ $n=9$	• $2n^2-5=157$ • Standard form • ans	(3)
			[11]

QUESTION 4

4.1	R4500 +R5000 $T_0 \quad T_2 \quad T_4 \quad T_9$ $\frac{8\%}{2} \quad \frac{9\%}{12}$ $F_v=4500(1+\frac{8\%}{2})^8.(1+\frac{9\%}{12})^{60}+5000(1+\frac{8\%}{2})^4.(1+\frac{9\%}{12})^{60}$ $=R19547,77$	• timeline • i • $(1+\frac{8\%}{2})^8$ • $(1+\frac{9\%}{12})^{60}$ • $(1+\frac{8\%}{2})^4$ • ans	(6)

4.2	$1+i_{eff}=(1+\frac{i_{nom}}{n})^n$ $1+i_{eff}=(1+\frac{8}{200})^2$ $=(1+\frac{8}{200})^2-1$ $=0,0816$ $=8,16\%$	• sub • decimal • ans x 100	(3)
			[9]

QUESTION 5			
5.1	$-2x^2-4x+30=0$ $x^2+2x-15=0$ $(x+5)(x-3)=0$ $\therefore x=-5$ or 3 A(-5;0) B(3;0) C(0;30)	• factors • A • B • C	(4)
5.2	CD=20 units	• ans	(1)
5.3	$P(-1;y_p)$ $\therefore y=-2(-1)-4(-1)+30$ $=32$ $P(-1;32)$	• x=-1 • sub • co-ordinate	(3)
5.4	$m_{AE}=2$ $\therefore m_{h(x)}=-\frac{1}{2}$ $\therefore y=-\frac{1}{2}x$	• grad AE • grad h(x) • equation	(3)
5.5	$x\in(-5\ ;\ 3)$ or $-5<x<3\ ;\ x\in R$ don't have to have $x\in R$ to get full marks.	• values • brackets	(2)
5.6	$g(-1)=2(-1)+10$ $=8$ $\therefore PM=32-8$ $=24 units$	• $g(-1)=8$ • ans	(2)
5.7	$30<k<32$	• values • signs	(2)
			[17]

QUESTION 6

6.1	$x = 3$ $y = -1$	• x • y	(2)
6.2	$\frac{-6}{x-3} - 1 = 0$ $-6 - 1(x-3) = 0$ $-6 - x + 3 = 0$ $x = -3$	• =0 • ans	(2)
6.3	On Answer sheet		(4)
6.4	$x \in R; x \neq 3$ OR $x \in (-\infty; \infty); x \neq 3$	• $x \in R$ • restriction	(2)
6.5	$m(x) = \frac{-6}{x-3+3} - 1 - 4$ $m(x) = \frac{-6}{x} - 5$	• sub • ans	(2)
6.6	$y = x$ $y + 1 = x - 3$ $y = x - 4$	• sub • ans	(2)
			[14]

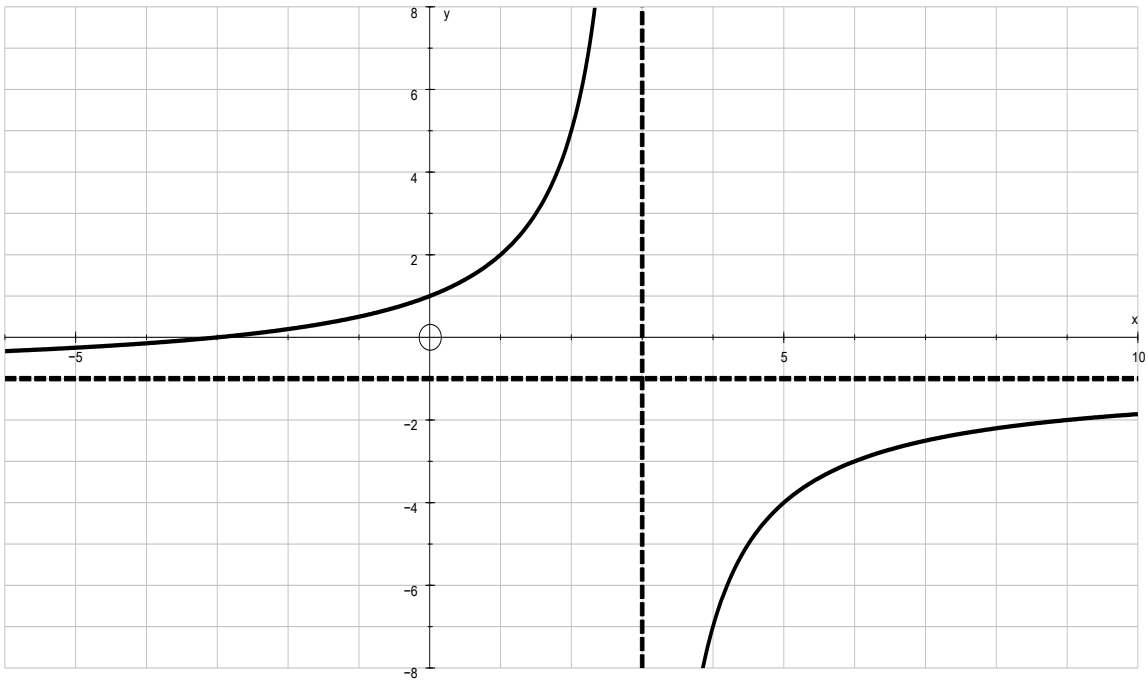
QUESTION 7

7.1	On answer sheet		(3)
7.2	$y \in (-1; -\infty)$	• values • brackets	(2)
7.3	$y = \frac{1}{2}^{x} - 1$ OR $y = 2^{-x} - 1$	• ans	(1)
			[6]

QUESTION 8

$TP\ x = 1$ (inspection) $y = -4$ $y = a(x-1)^2 - 4$ $0 = a(3-1)^2 - 4$ $a = 1$ $\therefore y = x^2 - 2x - 3$	• TP • Sub • A • equation	(4)
		[4]

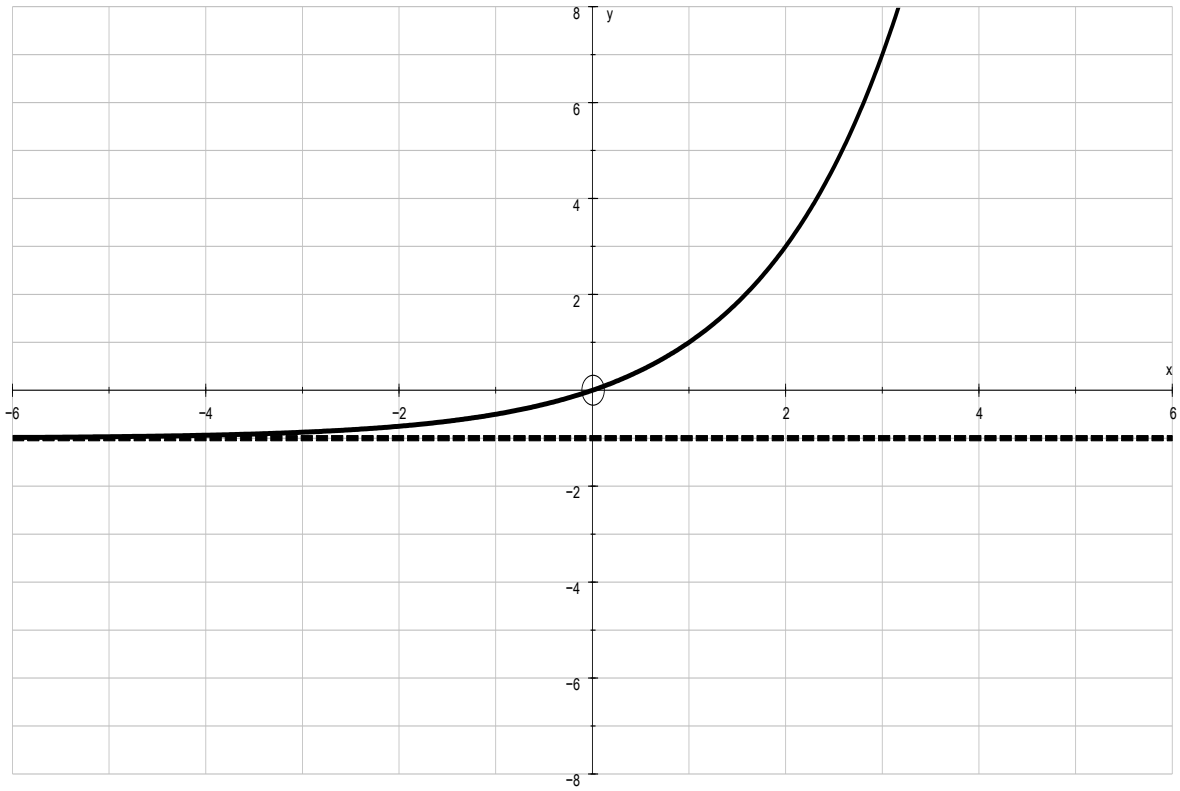
6.3



(4)

- asymptotes
- quads must be negative graph
- intercepts
- co-ordinates

7.1



(3)

- asymptote
- shape
- intercept and one other point