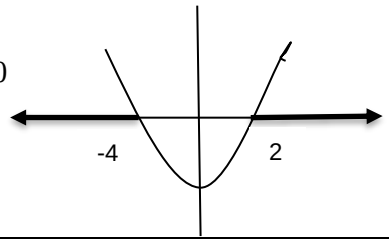
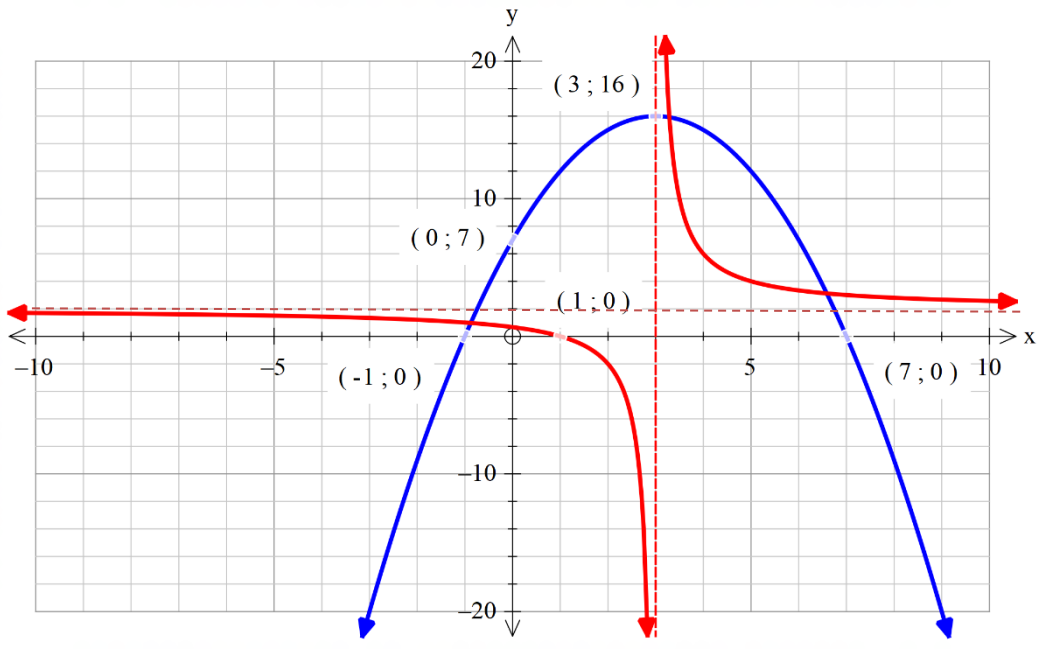
QUESTION 1				
1.1	Solve for x:			
	1.1.1	$(3x-2)(2x-3)=0$ $3x-2=0$ $x=\frac{2}{3}$ $2x-3=0$ $x=\frac{3}{2}$	• answers	(2)
	1.1.2	$7x^2+3x-2=0$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $x=\frac{-(3)\pm\sqrt{(3)^2-4(7)(2)}}{2(7)}$ $x=-0,79$ $x=0,36$	• Sub • answer 1 • answer 2	(3)
	1.1.3	$x^2+2x-8\geq 0$ $(x+4)(x-2)\geq 0$ $\therefore x\leq 4$ *or* $x\geq 2$ 	• Roots • Method • Answer	(3)
	1.1.4	$\sqrt{2x+1}=x-1$ $(\sqrt{2x+1})^2=(x-1)^2$ $2x+1=x^2-2x+1$ $0=x^2-4x$ $0=x(x-4)$ $x=0$ *NA* $\therefore x=4$	• sq both sides • standard form • factors • answers • 4	(5)
	1.1.5	10^{x+3} $10^x.10^3$ $\frac{1}{2}.1000$ $=500$	• split • answer	(2)

	1.1.6	$2^x - 16.2^{-x} = 6$ $2^x - \frac{16}{2^x} = 6$ $(2^x)^2 - 16 = 6.2^x$ $(2^x)^2 - 6.2^x - 16 = 0$ $(2^x - 8)(2^x + 2) = 0$ $2^x = 8$ $x = 3$ $2^x \neq -2$ *NA*	• Negative exponent into fraction • Multiplied by LCD • Factors • 3	(4)
1.2	Solve for x and y simultaneously			
	$x - 2y = -3$ $xy = 20$ $\therefore x = 2y - 3$ $(2y - 3)y = 20$ $2y^2 - 3y - 20 = 0$ $(2y + 5)(y - 4) = 0$ $y = -\frac{5}{2}$ $y = 4$ $\therefore x = -8$ $x = 5$		• x subject of form • sub • standard form • factors • x values • y values	(6)
				[26]
QUESTION 2				
	2.1.1	$\frac{2^{x+2}.4^{x+1}}{8^{x-1}}$ $\frac{2^{x+2}.2^{2x+2}}{2^{3x-3}}$ $2^{x+2+2x+2-3x+3}$ 2^7 128	• Prime bases • Applying exp laws • answer	(3)

	2.1.2	$\left(\frac{125x^7}{x}\right)^{\frac{2}{3}}$ $\left(\sqrt[3]{\frac{125x^7}{x}}\right)^2$ $\left(\frac{5x^{\frac{7}{3}}}{x^{\frac{1}{3}}}\right)^2$ $\frac{25x^{\frac{14}{3}}}{x^{\frac{2}{3}}}$ $25x^4$ OR $(5^3x^6)^{\frac{2}{3}}$ 5^2x^4 $25x^4$	• root • minus exp • answer • simplify • powers • answer	(3)
	2.1.3	$\frac{\sqrt{27x^6}-\sqrt{48x^6}}{\sqrt{12x^6}}$ $\frac{3x^3\sqrt{3}-4x^3\sqrt{3}}{2x^2\sqrt{3}}$ $\frac{-x^2\sqrt{3}}{2x^2\sqrt{3}}$ $-\frac{1}{2}$	• simplification of surds • numerator • answer	(3)
	2.1.4	$\sqrt{1+\frac{1}{2}}\sqrt{1+\frac{1}{3}}\sqrt{1+\frac{1}{4}}\sqrt{1+\frac{1}{5}}\sqrt{1+\frac{1}{6}}\sqrt{1+\frac{1}{7}}$ $\sqrt{\frac{3}{2}.\frac{4}{3}.\frac{5}{4}.\frac{6}{5}.\frac{7}{6}.\frac{8}{7}}$ $=2$	• common fraction • one root • answer	(3)
2.2	2.2.1	Unequal and one positive/one negative (one each)	• unequal • one each	(2)
	2.2.2	The graph needs to be shifted at least 6 units down	• 6 • down	(2)
2.3	$x=\frac{-5\pm\sqrt{3-12k}}{4}$ $\triangle=0$ $3-12k=0$ $12k=3$ $k=\frac{1}{4}$		• =0 • answer	(2)

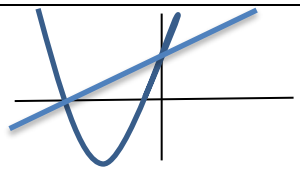
				[18]
QUESTION 3				
	3.1.1	$x = 9$		(1)
	3.1.2	$Tn = an^2 + bn + c$ $2a = 2$ $a = 1$ $3a + b = 7$ $3(1) + b = 7$ $b = 4$ $a + b + c = -7$ $(1) + (4) + c = -7$ $c = -12$ $\therefore Tn = n^2 + 4n - 12$	• a value • b value • c value • answer	(4)
	3.1.3	$Tn = n^2 + 4n - 9$		(1)
	3.1.4	$428 = n^2 + 4n - 9$ $n^2 + 4n - 437 = 0$ $(n + 23)(n - 19) = 0$ $n = 19$ $n \neq -23$	• equal to 428 • =0 • factorise • n=19	(4)
3.2				
	3.2.1	$T_{22} = 64 + 2 + 2 = 70$		(1)
	3.2.2	$T_{20} = 3n + b$ $64 = 3(20) + b$ $b = 4$ $T_n = 3n + 4$ $3T_5 - 2 = 3[3(5) + 4] - 2$ $= 55$ $3n + 4 = 55$ $3n = 51$ $n = 17$	• Sub of 64 and 20 • Sub into 3t5 • 55 • 17	(4)
				[15]

QUESTION 4

	4.1	$x = \frac{-b}{2a}$ $x = -\frac{6}{2(-1)}$ $x = 3$ $\therefore y = 16$ *OR* $f(x) = -x^2 + 6x + 7$ $= -(x^2 - 6x - 7)$ $= -[(x^2 - 6x + 9) - 9 - 7]$ $= [(x-3)^2 - 16]$ $= -(x-3)^2 + 16$ $\therefore (3;16)$	• Method • X • Y OR • Completing the square • X • y	(3)
	4.2	$-x^2 + 6x + 7 = 0$ $x^2 - 6x - 7 = 0$ $(x-7)(x+1) = 0$ $x = 7$ *OR* $x = -1$	• =0 • answers	(2)
	4.3	$x = 3$ $y = 2$	• X • y	(2)
	4.4	$h(x) = -\left[\frac{4}{x-3} + 2\right]$ $h(x) = -\frac{4}{x-3} - 2$	• whole negative • -2	(2)
	4.5		• shape • asymptotes • shape • Plotting	(4)

	4.6	$y = -x + c$ $(3) = -(2) + c$ $5 = c$ $\therefore y = -x + 5$ *or* $y - 2 = -(x - 3)$ $y = -x + 3 + 2$ $y = -x + 5$	• Sub into neg equation • answer	(2)
	4.7	$y = x - 1$ $\therefore x = y + 1$ $y = \frac{4}{(y+1)-3} + 2$ $y^2 - 2y = 4 + 2y - 4$ $y^2 - 4y = 0$ $y(y-4) = 0$ $y = 0$ $y = 4$ $\therefore x = 5$ $Q(5;4)$ *or* $x - 1 = \frac{4}{x-3} + 2$ $x - 3 = \frac{4}{x-3}$ $(x-3)^2 = 4$ $x - 3 = \pm 2$ $x = 5$ *or* $x = 1$ $Q(5;4)$	• sub • =0 • Point • x= • = • $(x-3)^2$ • X=5 • Point	(4)
				[16]
QUESTION 5				
	5.1	$q = -6$		(1)
	5.2	$-5\frac{1}{4} = a.2^{-1-1} - 6$ $\frac{3}{4} = \frac{1}{4}a$ $a = 3$	• sub • simplify • show	(3)

	5.3	$x-\text{int}: 2^{x-1}=2$ $\therefore x=2$ $(2;0)$ $y-\text{int}: y=3.2^{-1}-6$ $y=-4\frac{1}{2}$ $\left(0;\frac{-9}{2}\right)$ Average Gradient $\frac{0+\frac{9}{2}}{2-0}$ $=\frac{9}{4}$	• $2^{x-1}=2$ • X=2 • Y=-9/2 • Sub into formula • answer	(5)
	5.4	$p(x)=3.2^{x+2}-7$	• x shift • Y shift	(2)
				[12]
QUESTION 6				
	6.1	$y=a(x+5)(x+1)$ $C(-5;0):10=a(0+5)(0+1)$ $10=5a$ $a=2$ $\therefore y=2x^2+12x+10$ $\therefore a=2$ $b=12$ $c=10$	• X-ints • (x;y) sub • Answer for a • equation	(4)
	6.2	$x=\frac{-b}{2a}=\frac{-12}{2(2)}=-3$ $f(-3)=2(-3)^2+12(-3)+10$ $=-8$ $[-8;\infty)$	• -3 • -8 • $[-8;\infty)$	(3)
	6.3	$6=2x+10$ $-4=2x$ $x=-2$ $\therefore y=2(-2)^2+12(-2)+10$ $y=-6$ $Dis\tan ce=12units$	• sub 3 • sub • distance	(3)

	6.4	 f(x) + - + g(x) - + + f(x).g(x) - - + $x < -1$	• values • brackets/ inequalities	(2)
				[11]
		TOTAL		**[100]**