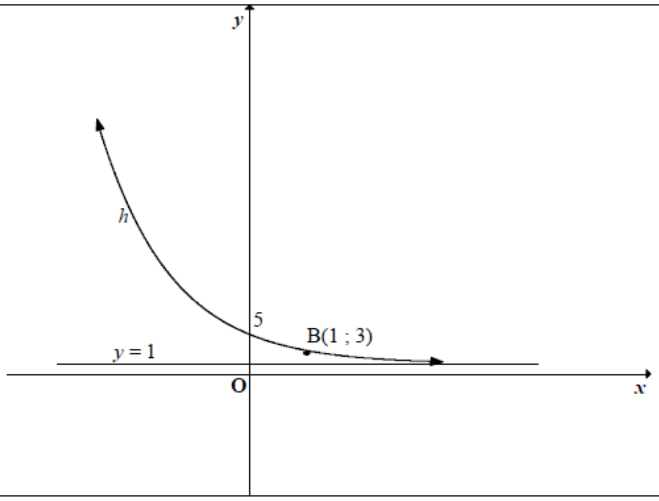
QUESTION/*VRAAG* 5

5.1.1	$(1\,;-2)$	✓ for/*vir* 1 ✓ for/*vir* -2 (2)
5.1.2	For x-intercept/*Vir* x-*afsnit*: $0=\frac{-9}{x-1}-2$ $2=\frac{-9}{x-1}$ $2(x-1)=-9$ $2x=-7$ $x=-\frac{7}{2}$ $\left(-\frac{7}{2}\,;\,0\right)$ For y-intercept/*Vir* y-*afsnit*: $y=\frac{-9}{0-1}-2$ $=9-2$ $=7$ $(0;7)$	✓ $y=0$ ✓ simplification/*vereenv* ✓ answer/*antwoord* ✓ $x=0$ ✓ answer/*antwoord* (5)
5.1.3	$y=-x-1$	✓ $-x$ ✓ -1 (2)

5.1.4	Closest point is a point of intersection between the axis of symmetry and the hyperbola/*Naaste punt is 'n snypunt tussen die simmetrie-as en die hiperbool*: $-x-1=\frac{-9}{x-1}-2$ $-x+1=\frac{-9}{x-1}$ $x-1=\frac{9}{x-1}$ $(x-1)^2=9$ $x-1=3 \quad \text{or} \quad x-1=-3$ $x=4 \qquad x=-2$ in the fourth quadrant, $x>0$, hence $x=4$ *only* $y=-4-1$ $y=-5$ Point/*Punt* is $(4;-5)$ **OR/*OF*** Closest point is a point of intersection between the axis of symmetry and the hyperbola/*Naaste punt is 'n snypunt tussen die simmetrie-as en die hiperbool*: $-x-1=\frac{-9}{x-1}-2$ $(-x-1)(x-1)=-9-2(x-1)$ $-x^2+1=-9-2x+2$ $0=x^2-2x-8$ $0=(x-4)(x+2)$ $x=4 \qquad x=-2$ in the fourth quadrant, $x>0$, hence $x=4$ *only* $y=-4-1$ $y=-5 \qquad$ Point is $(4;-5)$ **OR/*OF*** $y=\frac{-9}{x} \xrightarrow{\text{translate 1 right and 2 down}} f(x)=\frac{-9}{x-1}-2$ Under translation 1 right and 2 down, points in the fourth quadrant will stay in the fourth quadrant. Since the origin becomes A under the translation 1 right and 2 down and the point in the fourth quadrant which is the closest point on $y=\frac{-9}{x}$ to the origin is $(3;-3)$, The closest point on f to A is $(3+1;-3-2)$ i.e. $(4;-5)$	✓ equating/*vgl* ✓ $(x-1)^2=9$ ✓ answers for/*antwoord vir x* ✓ selects $x=4$ only/ *kies slegs x = 4* ✓ answer for/*antwoord vir y* (5) ✓ equating/*vgl* ✓ $0=x^2-2x-8$ ✓ answers for/*antwoord vir x* ✓ selects $x=4$ only/ *kies slegs x = 4* ✓ answer for/*antwoord vir y* (5) ✓points in 4th quad stay in 4th quad ✓ origin becomes A ✓closest point to origin on parent function is $(3;-3)$ ✓✓answer/*antwoord* (5)

	Onder die translasie 1 regs en 2 na onder, sal punte in die vierde kwadrant steeds in die vierde kwadrant wees. *Die oorsprong word A onder die translasie 1 regs en 2 na onder, en die punt in die vierde kwadrant wat die naaste punt aan* $y=\frac{-9}{x}$ *tot die oorsprong is, is* $(3;-3)$. *Die naaste punt op f aan A is* $(3+1;-3-2)$ *d.i.* $(4;-5)$	✓*punte in* 4^{de} *kwad bly in* 4^{de} *kwad* ✓*oorsprong word A* ✓*naaste punt aan oorsprong op moederfunksie is* $(3;-3)$ ✓✓answer/*antwoord* (5)
5.1.5	$y=\frac{9}{x-1}+2$	✓ $\frac{9}{x-1}$ ✓ +2 (2)
5.2.1	For *y*-intercept/*Vir y-afsnit* substitution $x = 0$: $y = 4.2^0 + 1$ $= 5$ H(0 ; 5)	✓$x = 0$ substitution into the equation/*in die vgl* ✓$y = 5$ (2)
5.2.2	For *x*-intercept/*Vir y-afsnit* $y = 0$ i.e./*d.i.* $4.2^{-x}+1=0$ $4.2^{-x}=-1$ $2^{-x}=-\frac{1}{4}$, which is impossible, since $2^{-x}>0$ for $x\in R$, *wat onmoontlik is omdat* $2^{-x}>0$ *vir* $x\in R$ Therefore/*Dus*: no solution/*geen oplossing*, which means there will be no *x*-intercept/*wat beteken daar sal geen x-afsnit wees nie*. **OR/*OF*** The graph lies above its asymptote $y = 1$ because the coefficient of 2^{-x} is 4/*Die grafiek lê bokant sy asimptoot* $y = 1$ *want die koëffisiënt van* 2^{-x} *is* 4. **OR/*OF*** The range is $(1;\infty)$ or $y > 1$ *Die waardeversameling is* $(1;\infty)$ of $y > 1$	✓ $4.2^{-x}+1=0$ ✓ $2^{-x}=-\frac{1}{4}$ and explanation/*en verduideliking* (2) ✓above/*bokant* ✓ $y = 1$ (2) ✓✓correct range/*korrekte waardeversameling* (2)
5.2.3		✓ shape/*vorm* ✓*y*-intercept and other point/*y-afsnit en ander punt* ✓ asymptote/*asimptoot* (3)

5.2.4	$g(x) = 4\left(2^{-x} + 2\right)$ $= 4.2^{-x} + 8$ The graph of h is translated 7 units upwards to form g/ *Die grafiek van h word 7 eenhede na bo getransleer om g te vorm.*	✓ 7 units/*eenhede* ✓ upwards/*opwaarts* (2) **[25]**