LIMPOPO

PROVINCIAL GOVERNMENT

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF

EDUCATION

NATIONAL SENIOR CERTIFICATE /
NASIONALE SENIOR SERTIFIKAAT

GRADE/*GRADE* 12

MATHEMATICS P1/*WISKUNDE V1*

MARKING GUIDELINES/*NASIENRIGLYNE*

SEPTEMBER 2026

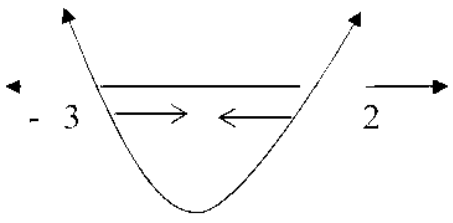
MARKS/*PUNTE*: **150**

This marking guidelines consists of 18 pages/ ***Hierdie nasienriglyne bestaan uit 18 bladsye***

NOTE/*NOTA*:

- If a candidate answers a question TWICE, only mark the FIRST attempt/ *As 'n kandidaat 'n vraag TWEE keer beantwoord, merk slegs die EERSTE poging*
- Consistent accuracy applies in ALL aspects of the marking guidelines/ *Konsekwente akkuraatheid is van toepassing in ALLE aspekte van die nasienriglyne*

QUESTION 1/*VRAAG 1*

1.1	1.1.1	$y+\frac{1}{y}=2$ $y^2-2y+1=0$ $(y-1)(y-1)=0$ $y=1$	✓standard form/*standaardvorm* ✓answer/*antwoord*	(2)
	1.1.2	$(2x^2+3x)+\frac{1}{(2x^2+3x)}=2$ $2x^2+3x=1$ $2x^2+3x-1=0$ $x=\frac{-3\pm\sqrt{(3)^2-4(2)(-1)}}{2(2)}$ $x=-1,78$ or / *of* $x=0,28$	✓standard form/*standaardvorm* ✓substitution/*vervanging* ✓ answer/*antwoord* ✓ answer/*antwoord*	(4)
1.2	1.2.1	$x^2+x-6<0$ $(x+3)(x-2)<0$ CV $x=-3$ or / *of* $x=2$  $-3<x<2$	✓critical values/*kritieke waardes* ✓✓answer/*antwoord*	(3)

Copyright reserved/ *Kopiereg voorbehou*

	1.2.2	$5+\sqrt{x+5}=\frac{14}{\sqrt{x+5}}$ $5\sqrt{x+5}+x+5=14$ $5\sqrt{x+5}=9-x$ $25(x+5)=81-18x+x^2$ $x^2-43x-44=0$ $(x-44)(x+1)=0$ $x\neq 44$ or / *of* $x=-1$	✓cross multiply/*maal KGV* ✓isolating surds/*isoleer wortel* ✓squaring/*vierkant* ✓standard form/*standaardvorm* ✓answer with selection/ *antwoord met seleksie*	(5)
	1.2.3	$9^{x+1}-10.3^x+1=0$ $3^{2x}.9-10.3^x+1=0$ $(9.3^x-1)(3^x-1)=0$ $3^x=\frac{1}{9}$ or / *of* $3^x=1$ $3^x=3^{-2}$ or / *of* $3^x=3^0$ $x=-2$ or / *of* $x=0$	✓factorisation/*faktorisering* ✓both equations/*beide vgl* ✓ answer/*antwoord* ✓ answer/*Antwoord*	(4)
1.3	1.3.1	Surface Area / *Buite oppervlakte* $=2lb+2lh+2bh$ $2x^2+2xy+2xy=288$ $2x^2+4xy=288$ $x^2+2xy-144=0$	✓ $2x^2+2xy+2xy=288$ ✓ $2x^2+4xy=288$	(2)
	1.3.2	$x^2+2xy-144=0$ $y=21-2x$ $x^2+2x(21-2x)-144=0$ $x^2+42x-4x^2-144=0$ $-3x^2+42x-144=0$ $x^2-14x+48=0$ $(x-6)(x-8)=0$ $x=6$ or / *of* $x=8$ $y=9$ or / *of* $y=5$ **OR/*OF***	✓substitution/*vervanging* ✓standard form/*standaardvorm* ✓x – values/*waardes* ✓y - values/*waardes* **OR/*OF***	(4)

Copyright reserved/ *Kopiereg voorbehou*

		$x^2 + 2xy - 144 = 0$ $\frac{21-y}{2} = x$ $\left(\frac{21-y}{2}\right)^2 + 2y\left(\frac{21-y}{2}\right) - 144 = 0$ $\frac{441-42y+y^2}{4} + \frac{42y-2y^2}{2} - 144 = 0$ $441 - 42y + y^2 + 84y - 4y^2 - 576 = 0$ $-3y^2 + 42y - 135 = 0$ $y^2 - 14y + 45 = 0$ $(y-5)(y-9) = 0$ $y = 5$ or / *of* $y = 9$ $x = 8$ or / *of* $x = 6$	✓substitution/*vervanging* ✓ standard form/*standaardvorm* ✓y - values/*waardes* ✓x - values /*waardes*	(4)
				[24]

QUESTION 2/*VRAAG 2*

2.1	2.1.1	$r = \frac{T_2}{T_1} = \frac{(x-3)^2}{(x-3)}$ $r = (x-3)$ $-1 < (x-3) < 1$ $2 < x < 4$	✓value of *r/waarde van r* ✓condition/*voorwaarde* ✓answer/*Antwoord*	(3)
	2.1.2	$S_\infty = \frac{x-3}{1-(x-3)}$ $= \frac{x-3}{4-x}$	✓substitution/*vervanging* ✓answer/*Antwoord*	(2)
	2.1.3	$S_\infty = \frac{2.5-3}{1-(2.5-3)}$ $= \frac{2.5-3}{4-2.5}$ $= -0.33$	✓substitution/*vervanging* ✓answer/*Antwoord*	(2)
2.2	2.2.1	$4 + 6 + 8 + \ldots\ldots\ldots\ldots$ $a = 4$ $d = 2$ $\frac{n}{2}[8 + (n-1)2] = 990$ $\frac{n}{2}[2n + 6] = 990$ $n^2 + 3n - 990 = 0$ $(n-30)(n+33) = 0$ $n = 30$ or / *of* $n \neq -33$	✓expansion/*uitbrei* ✓ substitution/*vervanging* ✓standard form/*standaardvorm* ✓answer with selection/*antwoord met seleksie*	(4)

Copyright reserved/ *Kopiereg voorbehou*

	2.2.2	$T_n = a + (n-1)d$ $T_{30} = 4 + 29(2)$ $= 62$ $S_n - S_{n-1} = S_{30} - S_{29}$ $= 990 - \left[\frac{29}{2}[8 + 28(2)]\right]$ $= 990 - 928$ $= 62$ $\therefore T_{30} = S_{30} - S_{29}$	✓substitution/*vervanging* ✓answer/*antwoord* ✓substitution/*vervanging* ✓answer/*antwoord*	(4)
				[15]

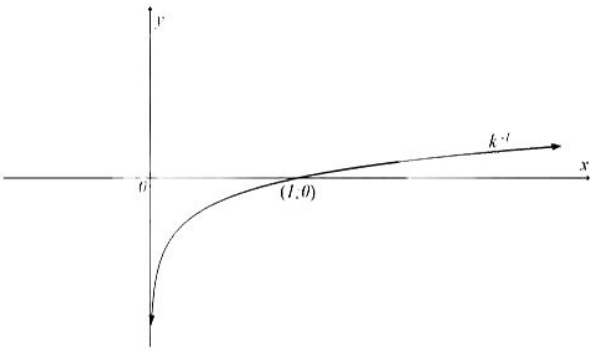
Copyright reserved/ *Kopiereg voorbehou*

QUESTION 3/*VRAAG 3*

3.1	$-1\ ;\ 1\ ;\ 3\ ;\ 5\ ;\ \ldots\ldots\ldots\ldots$ $a=-1$ $d=2$ $T_{10}=-1+9(2)$ $=17$	✓first difference/*eerste verskil* ✓substitution/*vervanging* ✓answer/*antwoord*	(3)
3.2	$T_{30}=-1+29(2)$ $=57$	✓substitution/*vervanging* ✓answer/*antwoord*	(2)
3.3	$2a=2$ $a=1$ $3a+b=-1$ $3(1)+b=-1$ $b=-4$ $a+b+c=3$ $1-4+c=3$ $c=6$	✓$2a=2$ ✓$3(1)+b=-1$ ✓$1-4+c=3$	(3)
3.4	The minimum value in the sequence is 2/ *Die minimum waarde in die reeks is 2*	✓answer/*antwoord*	(1)
			[9]

Copyright reserved/ *Kopiereg voorbehou*

QUESTION 4/*VRAAG 4*

4.1	$B(0\ ;-8)$ $3^x-9=0$ $3^x=9$ $3^x=3^2$ $x=2$ A(2 ; 0)	✓ $B(0\ ;-8)$ ✓equate to zero/*stel gelyk 0* ✓x – value/*waarde*	(3)
4.2	$g(x)=3^x-9$ $k(x)=g(x)+9$ $k(x)=3^{2x}-9+9$ $k(x)=9^x$	✓substitution/*vervanging* ✓answer/*antwoord*	(2)
4.3	$y=9^x$ $x=9^y$ $y=\log_9 x$	✓interchange x and y/*ruil x en y* ✓answer/*antwoord*	(2)
4.4		✓shape/*vorm* ✓(1 ; 0)	(2)
4.5	$x>0$	✓domain/*definisieversameling*	(1)
4.6	$h(x)=-k^{-1}(x)$ $=-\log_9(x)$	✓ $h(x)=-k^{-1}(x)$ ✓answer/*antwoord*	(2)
4.7	$\sum_{x=0}^{2}9^x-\sum_{x=3}^{4}g(x)$ $=[1+9+81]-[3^3-9+3^4-9]$ $=91-90$ $=1$	✓$[1+9+81]$ ✓$[108-18]$ ✓answer/*antwoord*	(3)
			[15]

Copyright reserved/ *Kopiereg voorbehou*

QUESTION 5/*VRAAG 5*

5.1	$y=\frac{a}{x-1}+2$ through / *deur* (0 ; 0) $0=\frac{a}{-1}+2$ $0=-a+2$ $a=2$ $f(x)=\frac{2}{x-1}+2$	✓subst *p* and *q*/*verv p en q* ✓subst (0 ; 0)/*vervang* (0 ; 0) ✓value of *a*/*waarde van a*	(3)
5.2	$y=mx+c$ $y=mx+0$ through / *deur* D(1 ; 2) $2=m(1)+0$ $m=2$ $y=2x$	✓substitute *c*/*vervang c* ✓gradient/*gradiënt* ✓answer/*antwoord*	(3)
5.3	$\frac{2}{x-1}+2=2x$ $\frac{2}{x-1}=2x-2$ $2=(2x-2)(x-1)$ $2x^2-4x=0$ $2x(x-2)=0$ $x\neq 0$ or / *of* $x=2$ $y=4$ C(2 ; 4)	✓equating/*gelykstel* ✓simplification/*vereenvoudiging* ✓standard form/*standaardvorm* ✓both values of *x* and *y*/ *beide waardes van x en y*	(4)
5.4	$x<0$ or / *of* $1<x<2$	✓ $x<0$ ✓ $1<x<2$ **OR/*OF*** (1 ; 2)	(2)
5.5	$-\infty<x<1$; $x\neq 0$	✓ $-\infty<x<1$ ✓ $x\neq 0$	(2)
			[14]

Copyright reserved/ *Kopiereg voorbehou*

QUESTION 6/*VRAAG 6*

6.1	$y = a(x+p)^2 + q$ $y = a(x-1)^2 - 3$ subst / *verv* $(0\ ;-1)$ $-1 = a(0-1)^2 - 3$ $a = 2$ $y = 2(x-1)^2 - 3$ $= 2(x^2 - 2x + 1) - 3$ $= 2x^2 - 4x - 1$ $b = -4$	✓substitution/*vervanging* ✓subst $(0\ ;-1)$ /*verv* (0 ; -1) ✓value of *a*/*waarde van a* ✓ value of *b*/*waarde van b*	(4)
6.2	$-(1+k) < 0$ $-1-k < 0$ $-k < 1$ $k > -1$	✓substitution/*vervanging* ✓solution/*oplossing*	(2)
			[6]

Copyright reserved/ *Kopiereg voorbehou*

QUESTION 7/*VRAAG 7*

7.1		$A = P(1+i)^n$ $A = 62\,000(1+0,05)^{20}$ $A = R164\ 504,46$	✓i ✓substitution/*vervanging* ✓answer/*antwoord*	(3)
7.2	7.2.1	$P_v = \frac{x[1-(1+i)^{-n}]}{i}$ $x = \frac{800000 \times \frac{0,11}{12}}{\left[1-\left(1+\frac{0,11}{12}\right)^{-240}\right]}$ $x = R8257,51$	✓i ✓n ✓substitution//*vervanging*	(3)
	7.2.2	Balance / *Balans* $= \frac{8257,51\left[1-\left(1+\frac{0,11}{12}\right)^{-60}\right]}{\frac{0,11}{12}}$ $= R379\,787,94$ **OR/*OF*** Balance / *Balans* $= A - F_v$ Balance / *Balans* $= P(1+i)^n - \frac{x[(1+i)^n-1]}{i}$ $= 800000\left(1+\frac{0,11}{12}\right)^{180} - \frac{8257,51\left[\left(1+\frac{0,11}{12}\right)^{180}\right.}{\frac{0,11}{12}}$ Balance / *Balans* = R379 786,50	✓$n = -60$ ✓i ✓substitution/*vervanging* ✓answer/*antwoord* **OR/*OF*** ✓$n = 180$ ✓substitution A/*verv A* ✓substitution F_v/*verv* F_v ✓answer/*antwoord*	(4) (4)

Copyright reserved/ *Kopiereg voorbehou*

	7.2.3	$P_v = \frac{x[1-(1+i)^{-n}]}{i}$ $800\,000 = \frac{12\,000\left[1-\left(1+\frac{0,11}{12}\right)^{-n}\right]}{\frac{0,11}{12}}$ $n = \frac{\log\left(1-\frac{800\,000\times\frac{0,11}{12}}{12\,000}\right)}{-\log\left(1+\frac{0,11}{12}\right)}$ $n = 103,5$ Period / *Periode* = 104 months / *maande* In years / *In jare* $= \frac{104}{12} \approx 9$ years / *jare*	✓ substitution P_v/*verv* P_v ✓substitution/*vervanging* ✓correct use of logs/ *korrekte gebruik van logs* ✓value of *n*/*waarde van n* ✓answer/*antwoord*	(5)
				[15]

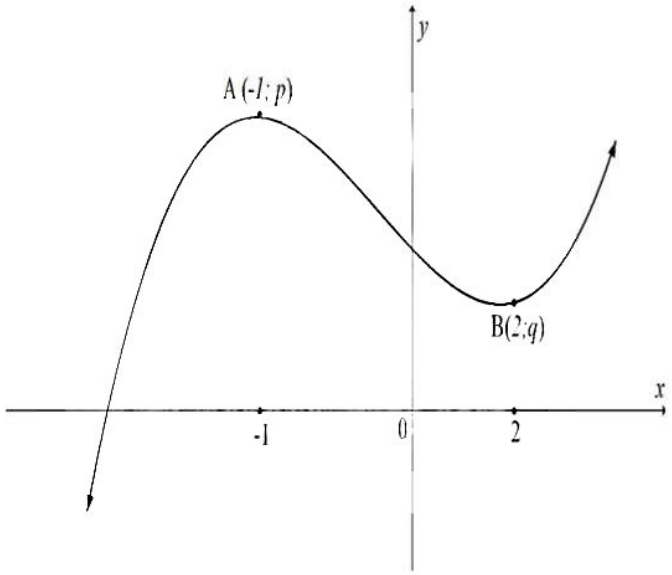
QUESTION 8/*VRAAG 8*

8.1	$f(x)=-x^2+3x$ $f'(x)=\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ $f'(x)=\lim_{h\to 0}\frac{-(x+h)^2+3(x+h)-(-x^2+3x)}{h}$ $f'(x)=\lim_{h\to 0}\frac{-x^2-2xh-h^2+3x+3h+x^2-3x}{h}$ $f'(x)=\lim_{h\to 0}\frac{h(-2x-h+3)}{h}$ $f'(x)=\lim_{h\to 0}(-2x-h+3)$ $f'(x)=-2x+3$ **OR** $f(x)=-x^2+3x$ $f(x+h)=-(x+h)^2+3(x+h)$ $=-x^2-2xh-h^2+3x+3h$ $f(x+h)-f(x)=-x^2-2xh-h^2+3x+3h+x^2-3x$ $=-2xh-h^2+3h)$ $f'(x)=\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ $f'(x)=\lim_{h\to 0}\frac{h(-2x-h+3)}{h}$ $f'(x)=\lim_{h\to 0}(-2x-h+3)$ $f'(x)=-2x+3$	✓ $f(x+h)$ ✓ substitution/*vervanging* ✓simplification/*vereenvoudiging* ✓common factor/*gemeensk factor* ✓answer/*antwoord* ✓ $f(x+h)$ ✓ substitution/*vervanging* ✓simplification/*vereenvoudiging* ✓common factor/*gemeensk faktor* ✓answer/*antwoord*	(5)
8.2	8.2.1 $g(x)=x^2-2\sqrt{x}$ $g(x)=x^2-2x^{\frac{1}{2}}$ $g'(x)=2x-x^{-\frac{1}{2}}$	✓ $2x^{\frac{1}{2}}$ ✓ $2x$ ✓ $x^{-\frac{1}{2}}$	(3)

Copyright reserved/ *Kopiereg voorbehou*

	8.2.2	$y=\left[\frac{x^3-2x^2-x+2}{x-1}\right]$ $y=\left[\frac{(x-1)(x^2-x-2)}{x-1}\right]$ $y=x^2-x-2$ $\frac{dy}{dx}=2x-1$	✓factors/*faktore* ✓ $2x$ ✓ -1	(3)
				[11]

QUESTION 9/*VRAAG 9*

9.1		✓shape/*vorm* ✓ $A(-1\ ;\ p)$ ✓ $B\ (2\ ;\ q)$	(3)
9.2	One root/*Een wortel*	✓answer/*antwoord*	(1)

9.3	$f'(x) = 3x^2 + 2xb + c$ $f'(x) = 0$ $3(-1)^2 + 2b(-1) + c = 0$ $3 - 2b + c = 0$ $c = 2b - 3$ .....(1) $f'(2) = 0$ $3(2)^2 + 2b(2) + c = 0$ $12 + 4b + c = 0$ $c = -4b - 12$.....(2) $2b - 3 = -4b - 12$ $6b = -9$ $b = -\frac{3}{2}$ $c = -4\left(-\frac{3}{2}\right) - 12$ $\therefore c = -6$	✓ $3x^2 + 2xb + c$ ✓ $c = 2b - 3$ ✓ $c = -4b - 12$ ✓ $2b - 3 = -4b - 12$ ✓ $b = -\frac{3}{2}$ ✓ $c = -6$	(6)
			[10]

Copyright reserved/ *Kopiereg voorbehou*

QUESTION 10/*VRAAG 10*

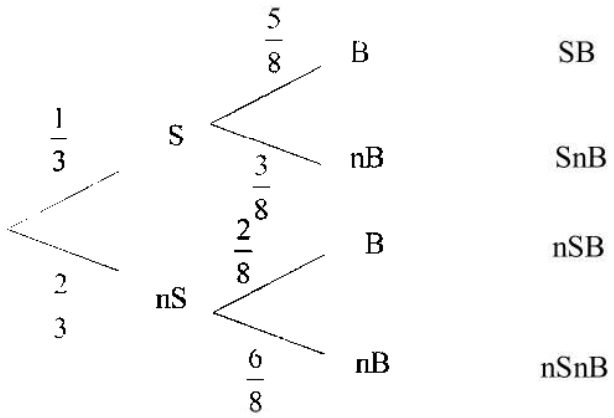
10.1	10.1.1	$p\left(x\ ;\ \sqrt{-x^3+8}\right)$ $OP^2=(x_2-x_1)^2+(y_2-y_1)^2$ $=(x)^2+\left(\sqrt{-x^3+8}\right)^2$ $=-x^3+x^2+8$ $OP=\sqrt{-x^3+x^2+8}$	✓substitution/*vervanging* ✓answer/*antwoord*	(2)
	10.1.2	For max / min values $f'(x)=0$ *Vir min / maks waardes* $f'(x)=0$ $-3x^2+2x=0$ $x(-3x+2)=0$ $x=0$ or / *of* $x=\frac{2}{3}$ subst / *verv* $x=0$ $y=8$ subst / *verv* $x=\frac{2}{3}$ $y=-\left(\frac{2}{3}\right)^3+\left(\frac{2}{3}\right)$ $=8{,}15$ The maximum of OP^2 is 8,15 / *Die maksimum van* OP^2 *is 8,15*	✓ $f'(x)=0$ ✓both values of *x/beide waardes van x* ✓value of *y* when $x=0$ / *waarde van y as* $x=0$ ✓value of *y* when $x=\frac{2}{3}$ /*waarde van x as* $x=\frac{2}{3}$ ✓ max value/*maks waarde*	(5)
	10.1.3	The y – intercept of the graph is $2\sqrt{2}$ and the *x* – intercept is 2. The minimum value is $(2\ ;\ 0)$ /*Die y – afsnit van die grafiek is* $2\sqrt{2}$ *en die x – afsnit is 2. Die minimum waarde is* $(2\ ;\ 0)$. $OP^2=-x^3+x^2+8$ $=-(2)^3+(2)^2+8$ $=4$ $OP=\sqrt{4}=2$	✓substitution/*vervanging* ✓answer/*antwoord*	(2)

Copyright reserved/ *Kopiereg voorbehou*

10.2	10.2.1	$A=\frac{1}{2}(PQ+RS)(QR)$ $A(x)=\frac{1}{2}(2x-3+4x+3)(5-x)$ $=\frac{1}{2}(6x)(5-x)$ $=15x-3x^2$	✓substitution/*vervanging* ✓simplification/*vereenvoudig*	(2)
	10.2.2	$A'(x)=0$ $15-6x=0$ $6x=15$ $x=2.5\ m$	✓derivative = 0/*afgeleide = 0* ✓answer/*antwoord*	(2)
	10.2.3	Maximum Area / *Maksimum Opv* $=15(2.5)-3(2.5)^2$ $=18.75\ m^2$	✓substitution/*vervanging* ✓answer/*antwoord*	(2)
				[15]

Copyright reserved/ *Kopiereg voorbehou*

QUESTION 11/*VRAAG 11*

11.1	11.1.1	$a = 720$ $b = 120$ $c = 180$ $d = 540$ $e = 180$ $f = 240$	✓any two/*enige twee* ✓ any two/*enige twee* ✓ any two/*enige twee*	(3)
	11.1.2	P(Good Eng) × P(Good Maths) $= \frac{480}{720} \times \frac{540}{720}$ $= 0,5$ P(Good English and Good Maths) $= \frac{360}{720}$ $= 0,5$ So it seems that the good English is independent of maths ability / *Dit lyk dat goeie Engels onafhanklik is van wiskundige vaardigheid*	✓$\frac{480}{720} \times \frac{540}{720}$ ✓answer/*antwoord* ✓answer/*antwoord* ✓ reasoning	(4)
11.2	B → Beach/*strand* S → Sunny/*sonnig*  		

Copyright reserved/ *Kopiereg voorbehou*

	$P(SB)+P(nSB)$ $=\left(\frac{1}{3}\times\frac{5}{8}\right)+\left(\frac{2}{3}\times\frac{2}{8}\right)$ $=\frac{5}{24}+\frac{4}{24}$ $=\frac{9}{24}$		✓$\left(\frac{1}{3}\times\frac{5}{8}\right)$ ✓$\left(\frac{2}{3}\times\frac{2}{8}\right)$ ✓answer/*antwoord*	(3)
11.3	11.3.1	$P=\frac{4\times3\times2\times24}{5040}$ $=\frac{576}{5040}=\frac{4}{35}$	✓$7!=5040$ ✓ $4\times3\times2\times24=576$ ✓ answer/*antwoord*	(3)
	11.3.2	$P=\frac{6\times4\times24}{5040}$ $=\frac{576}{5040}=\frac{4}{35}$ Both events have the **same probability**/*Beide gebeurtenisse het* ***dieselfde waarskynlikheid***	✓ $6\times4\times24=576$ ✓ answer/*antwoord* ✓conclusion/*gevolgtrekking*	(3)
				[16]

TOTAL/ *TOTAAL*: 150

Copyright reserved/ *Kopiereg voorbehou*