education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT/ PROVINSIALE ASSESSERING

GRADE 12/ GRAAD 12

MATHEMATICS P1/WISKUNDE V1

JUNE/JUNIE 2026

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/PUNTE: 150

These marking guidelines consist of 12 pages./
Hierdie nasienriglyne bestaan uit 12 bladsye.

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NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed-out version.
- Consistent accuracy applies in ALL aspects of the marking guideline. Stop marking at the second calculation error.
- Assuming answers/values in order to solve a problem is NOT acceptable.

LET WEL:

- *As 'n kandidaat 'n vraag TWEE KEER beantwoord, merk slegs die EERSTE poging.*
- *As 'n kandidaat 'n antwoord van 'n vraag doodtrek en nie oordoen nie, merk die doodgetrekte poging.*
- *Volgehoue akkuraatheid word in ALLE aspekte van die nasienriglyne toegepas. Hou op nasien by die tweede berekeningsfout.*
- *Aanvaar van antwoorde/waardes om 'n probleem op te los, word NIE toegelaat nie.*

QUESTION/*VRAAG 1*			
1.1.1	$x^2 + x - 30 = 0$ $(x + 6)(x - 5) = 0$ $x = -6$ or/*of* $x = 5$	✓factors/*faktore* ✓$x = -6$ ✓$x = 5$	(3)
1.1.2	$2x^2 - 8 = 5x$ $2x^2 - 5x - 8 = 0$ $x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(-8)}}{2(2)}$ $= -1{,}11$ or/*of* $x = 3{,}61$	✓std form/*vorm* ✓subst ✓$x = -1{,}11$ ✓$x = 3{,}61$	(4)
1.1.3	$-7x^2 < -14x$ $-7x^2 + 14x < 0$ $x^2 - 2x > 0$ $x(x - 2) > 0$ $x < 0$ or/*of* $x > 2$ **OR/*OF*** $-7x^2 < -14x$ $-7x^2 + 14x < 0$ $-x^2 + 2x < 0$ $-x(x - 2) < 0$ $x < 0$ or/*of* $x > 2$	✓std form/*vorm* ✓factors/*faktore* ✓✓answer/*antwoord* **OR/*OF*** ✓std form/*vorm* ✓factors/*faktore* ✓✓answer/*antwoord*	(4)

1.1.4	$\sqrt{x+6}-x=4$ $\sqrt{x+6}=x+4$ $x+6=x^2+8x+16$ $x^2+7x+10=0$ $(x+5)(x+2)=0$ $x\neq -5$ or/*of* $x=-2$	✓isolate/*isoleer* $\sqrt{\ }$ ✓squaring both sides/ *kwadreer albei kante* ✓std form/*vorm* ✓factors/*faktore* ✓$x\neq -5$ or/*of* $x=-2$	(5)
1.1.5	$4^x-16=6\cdot 2^x$ $2^{2x}-6.2^x-16=0$ $(2^x-8)(2^x+2)=0$ $2^x=2^3$ or/of $2^x=-2$ $x=3$ no solution/geen oplossing	✓std form/*vorm* ✓factors/*faktore* ✓$x=3$ ✓no solution/*geen oploss*	(4)
1.2	$x+2y+5=0$ . . . . . ① $y^2+x^2+10x+5=0$ . . . . ② $x=-2y-5$ . . . . . ③ $\therefore y^2+(-2y-5)^2+10(-2y-5)+5=0$ $y^2+4y^2+20y+25-20y-50+5=0$ $5y^2-20=0$ $y^2-4=0$ $(y+2)(y-2)=0$ $y=-2$ or/*of* $y=2$ $x=-2(-2)-5$ or/*of* $x=-2(2)-5$ $=-1$ $=-9$	✓3rd equation/*vergelyking* ✓subst ✓std form/*vorm* ✓factors/*faktore* ✓*y*-values/*waardes* ✓*x*-values/*waardes*	(6)
1.3.1	$\frac{16}{\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}}=\frac{16\sqrt{2}}{2}=8\sqrt{2}$	✓rationlise/*rasionaliseer*	(1)
1.3.2	$(a+b)^2=2$ or $a+b=\pm\sqrt{2}$ But/*maar* $a+b>0$ $\therefore a+b=\sqrt{2}$ $8(a+b)=8\sqrt{2}$ $\therefore 8a+8b=8\sqrt{2}$ $\therefore 8a+8b=\frac{16}{\sqrt{2}}$	✓$\sqrt{\ }$ both sides/*albei kante* ✓ $a+b=\sqrt{2}$ ✓ $\times 8$	(3)
			[30]

QUESTION/*VRAAG* 2			
2.1	100; 207; 320; 439	✓100 ✓207 ✓439	(3)
2.2	$2a=6;\ a=3$ $3(3)+b=107;\ b=98$ $3+98+c=100;\ c=-1$ $T_n=3n^2+98n-1$	✓ $2a=6$; ✓$a=3$ ✓ $b=98$ ✓ $c=-1$	(4)
2.3	$T_n=6n+101$ $2021=6n+101$ $1920=6n$ $\therefore n=320$ ∴Between/*Tussen* T_{320} and/*en* T_{321}	✓$T_n=6n+101$ ✓subst $T_n=2021$ ✓320 ✓T_{320} and/*en* T_{321}	(4)
			[11]

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QUESTION/*VRAAG* 3			
3.1.1	$6 + 13 + 20 + 27 + \ldots$ $T_n = a + (n-1)d$ $= 6 + (n-1)7$ $= 7n - 1$ $T_{24} = 7(24) - 1$ $= 167$		✓$7n-1$ ✓subst ✓answer/*antwoord* (3)
3.1.2	$S_n = \frac{n}{2}[2a + (n-1)d]$ $S_{50} = \frac{50}{2}[2(6) + 49(7)]$ $= 8875$	$S_n = \frac{n}{2}[a + l]$ $S_{50} = \frac{50}{2}(6 + 349)$ $= 8875$	✓subst ✓answer/*antwoord* (2)
3.2	$\sum_{k=1}^{m} 12\left(\frac{1}{3}\right)^{k-1} = \frac{1456}{81}$ $\therefore 12 + 4 + \frac{4}{3} + \frac{4}{9} + \ldots$ $\frac{12\left[1 - \left(\frac{1}{3}\right)^m\right]}{1 - \frac{1}{3}} = \frac{1456}{81}$ $1 - \left(\frac{1}{3}\right)^m = \frac{728}{729}$ $\left(\frac{1}{3}\right)^m = \frac{1}{729}$ $\left(\frac{1}{3}\right)^m = \left(\frac{1}{3}\right)^6$ **OR/OF** $3^{-m} = 3^{-6}$ $\therefore m = 6$		✓1st three terms/*1e drie terme* ✓subst ✓$\frac{728}{729}$ ✓exp law/*eksp wet* ✓answer/*antwoord* (5)
3.3.1	$(x+2) + (x^2 - 2x - 8) + \ldots$ $r = \frac{x^2 - 2x - 8}{x+2} = \frac{(x+2)(x-4)}{x+2} = x - 4$ $\therefore -1 < x - 4 < 1$ $\therefore 3 < x < 5$		✓$r = x - 4$ ✓answer/*antwoord* (2)
3.3.2	$a = x + 2;\ r = x - 4;\ S_\infty = \frac{11}{3}$ $\frac{11}{3} = \frac{x+2}{1-(x-4)}$ $3(x+2) = 11(-x+5)$ $3x + 6 = -11x + 55$ $14x = 49$ $\therefore x = \frac{7}{2}$		✓subst/*vervang a* and/*en r* ✓subst $\frac{11}{3}$ ✓simplify/*vereenv* ✓answer/*antwoord* (4)
			[16]

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QUESTION/*VRAAG* 4

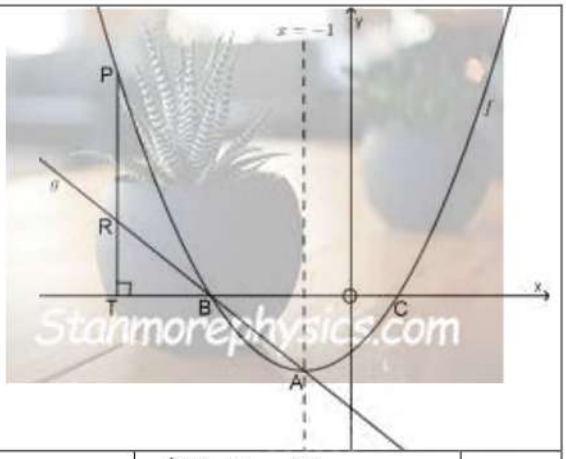
$S_n = p + \frac{p}{2} + \frac{p}{4} + \frac{p}{8} + \ldots + \frac{p}{2^n} \quad \ldots ①$		
$\frac{1}{2} \cdot S_n = \frac{p}{2} + \frac{p}{4} + \frac{p}{8} + \ldots + \frac{p}{2^n} + \frac{p}{2^{n+1}} \quad \ldots ②$	✓ $\times \frac{1}{2}$	
① − ②:		
$S_n - \frac{1}{2} \cdot S_n = p - \frac{p}{2^{n+1}}$	✓subtract eq/*minus vergl*	
$S_n\left(1 - \frac{1}{2}\right) = p\left(1 - \frac{1}{2^{n+1}}\right)$	✓factorise/*faktoriseer*	
$S_n = 2p\left(1 - \frac{1}{2^{n+1}}\right)$	✓ $\div \frac{1}{2}$ both sides/*albei kante*	
$= p\left(2 - \frac{2}{2^n.2}\right)$	✓ $2 - \frac{2}{2^n.2}$	
$= p\left(2 - \frac{1}{2^n}\right)$		

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[5]

QUESTION/*VRAAG* 5

$f(x) = ax^2 + bx + c$
$g(x) = -4x - 12$



5.1	$A(-1;\ -8)$ x −intercept/*afsnit*: $y = 0$ $\therefore 0 = -4x - 12$ $\therefore 4x = -12$ $\therefore x = -3$ $B(-3;0)$ $C(1;0)$	✓$A(-1;\ -8)$ ✓$y = 0$ ✓B ✓C	(4)
5.2	$y = a(x - x_1)(x - x_2)$ $-8 = a(-1 + 3)(-1 - 1)$ $-8 = -4a$ $\therefore a = 2$ $f(x) = 2(x + 3)(x - 1)$ $= 2x^2 + 4x - 6$	✓subst A, B & C ✓ $a = 2$ ✓subst $a = 2$	(3)

	OR/*OF* $y = a(x+p)^2 + q$ $0 = a(1+1)^2 - 8$ $4a = 8$ $a = 2$ $\therefore y = 2(x+1)^2 - 8$ $= 2(x^2 + 2x + 1) - 8$ $= 2x^2 + 4x - 6$	✓subst A & B or/*of* C ✓ $a = 2$ ✓subst $a = 2$	(3)
5.3	$\therefore (2; -10)$	✓$x = 2$ ✓$y = -10$	(2)
5.4	$k = -8$	✓$k = -8$	(1)
5.5	$(-\infty;\ 8]$ **OR/*OF*** $y \leq 8;\ y \in \mathbb{R}$	✓✓answer/*antwoord*	(2)
5.6	$f(x) = 16$ $2x^2 + 4x - 6 = 16$ $2x^2 + 4x - 22 = 0$ $x^2 + 2x - 11 = 0$ $x = \dfrac{-2 \pm \sqrt{4 - 4(1)(-11)}}{2(1)}$ $x = -4{,}46$ or/*of* $x = 2{,}46$ N/A $\therefore OT = 4{,}46$ units/*eenhede*	✓$f(x) = 16$ ✓std form/*vorm* ✓subst ✓x –values/*waardes* ✓selection of x ✓ $OT = 4{,}46$	(6)
			[18]

QUESTION/*VRAAG* 6

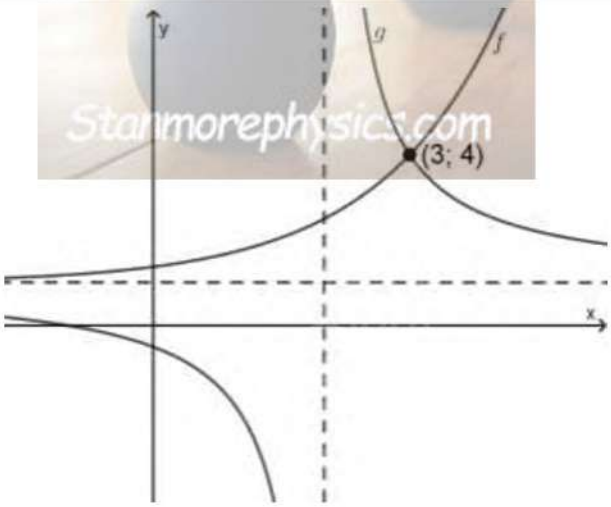
Given/*Gegee*:

$f(x) = 3.2^{x-p} + q$

$g(x) = \dfrac{a}{x+k} + c$

The asymptotes of g are $x = 2$ and $y = 1$
The asymptote of f is $y = 1$.

Die asimptote van g *is* $x = 2$ *en* $y = 1$
Die asimptote van f *is* $y = 1$.



6.1	$c = 1\ ;\ k = -2$ $g(x) = \dfrac{a}{x+k} + c$ $4 = \dfrac{a}{3-2} + 1$ $3 = a$ $\therefore g(x) = \dfrac{3}{x-2} + 1$	✓ $c = 1$ ✓ $k = -2$ ✓subst (3; 4) ✓answer/*antwoord*	(4)

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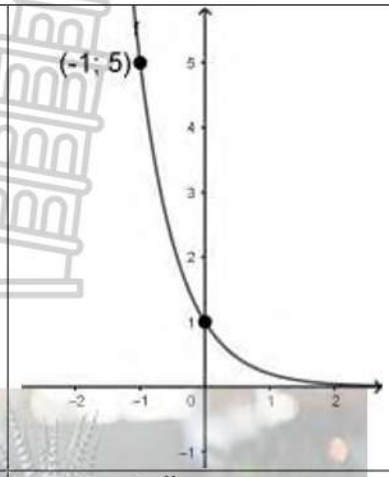
6.2	$q = 1$ and/*en* $(3; 4)$ $f(x) = 3.2^{x-p} + q$ $4 = 3.2^{3-p} + 1$ $3 = 3.2^{3-p}$ $1 = 2^{3-p}$ $2^0 = 2^{3-p}$ $\therefore p = 3$	✓$q = 1$ ✓subst (3; 4) ✓exp law/*eksp wet* ✓ $p = 3$	(4)
6.3	$(2; 3]$ **OR/*OF*** $2 < x \leq 3$	✓x-values/*waardes* ✓notation/*notasie*	(2)
6.4	$(2;\ 1) \rightarrow (2;\ 3)$ $\therefore y = -x + c$ $3 = -2 + c$ $5 = c$ $\therefore y = -x + 5$	✓$(2;\ 3)$ ✓subst ✓answer/*antwoord*	(3)
			[13]

QUESTION/*VRAAG* 7

$f(x) = \log_b x$

7.1	$f(x) = \log_b x$ $-3 = \log_b 125$ $\therefore b^{-3} = 5^3$ $b = (5^3)^{-\frac{1}{3}}$ $\therefore b = \frac{1}{5}$	✓subst (125; -3) ✓eksp form/*vorm* ✓$b = \frac{1}{5}$	(3)
7.2	$f(x) = \log_b x$ $0 = \log_{\frac{1}{5}} x$ $\therefore \left(\frac{1}{5}\right)^0 = x$ $\therefore x = 1$ $A(1; 0)$	✓1✓0	(2)
7.3	$x \in (0;\ 125]$ **OR/*OF*** $0 < x \leq 125$	✓critical values/*kritiese waardes* ✓notation/*notasie*	(2)
7.4	$x = \log_{\frac{1}{5}} y$ $y = \left(\frac{1}{5}\right)^x = 5^{-x}$	✓$x \leftrightarrow y$ ✓answer/*antwoord*	(2)

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7.5		✓shape/*vorm* ✓coordinate/*koördinaat* ✓*y*-intercept/*afsnit*	(3)
7.6	$y = -\left(\frac{1}{5}\right)^x = -5^{-x}$	✓answer/*antwoord*	(1)
			[13]

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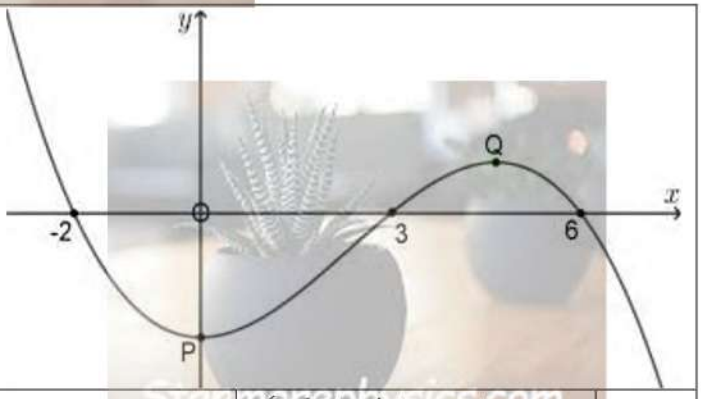
QUESTION/*VRAAG* 8

8.1	$f(x) = 3 - 2x^2$ $f(x+h) = 3 - 2(x+h)^2$ $= 3 - 2x^2 - 4xh - 2h^2$ $f'(x) = \lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h\to 0} \frac{3 - 2x^2 - 4xh - 2h^2 - 3 + 2x^2}{h}$ $= \lim_{h\to 0} \frac{h(-4x - 2h)}{h}$ $= \lim_{h\to 0} (-4x - 2h)$ $= -4x$	✓$f(x+h)$ value/*waarde* ✓subst ✓simplification/*vereenv* ✓factors/*faktore* ✓answer/*antwoord*	(5)
8.2.1	$f(x) = -x^5 + 3x^4$ $f'(x) = -5x^4 + 12x^3$	✓$-5x^4$ ✓$+12x^3$	(2)
8.2.2	$yx = 7x^3 - 5x^{\frac{2}{3}}$ $y = 7x^2 - 5x^{-\frac{1}{3}}$ $\therefore \frac{dy}{dx} = 14x + \frac{5}{3}x^{-\frac{4}{3}}$	✓$7x^2$ ✓$5x^{-\frac{1}{3}}$ ✓$14x$ ✓$+\frac{5}{3}x^{-\frac{4}{3}}$	(4)

8.3.1	$y = 5x - 8$ $y = 5(1) - 8$ $\therefore y = -3$	✓subst	(1)
8.3.2	$g(x) = 2x^3 + px^2 + qx - 7$ through/*deur* (1; -3) $-3 = 2(1)^3 + p(1)^2 + q(1) - 7$ $p + q = 2$ $q = 2 - p \ldots\ldots\ldots\ldots\ldots (1)$ $m = g'(1) = 5$ $6x^2 + 2px + q = 5$ $6(1)^2 + 2p(1) + q = 5$ $2p + q = -1$ $q = -1 - 2p \ldots\ldots\ldots\ldots (2)$ $\therefore 2 - p = -1 - 2p$ $p = -3$ $q = 2 - (-3)$ $= 5$	✓subst (1;–3) in g ✓eqation 1/*verg 1* ✓subst in g' ✓eqation 2/*verg 2* ✓$p = -3$ ✓$q = 5$	(6)
			[18]

QUESTION/*VRAAG* 9

$f(x) = -x^3 + ax^2 + bx + c$



9.1	$f(x) = -(x + 2)(x - 3)(x - 6)$ $y = -(x + 2)(x^2 - 9x + 18)$ $= -x^3 + 7x^2 - 36$ $\therefore a = 7;\ b = 0;\ c = -36$	✓subst x-intercepts ✓simplify/vereenv	(2)
9.2	$f(x) = -x^3 + 7x^2 - 36$ $f'(x) = -3x^2 + 14x = 0$ $3x^2 - 14x = 0$ $x(3x - 14) = 0$ $x = 0$ or/*of* $x = \frac{14}{3}$ $f(0) = -(0)^3 + 7(0)^2 - 36$ $= -36$ $f\left(\frac{14}{3}\right) = -\left(\frac{14}{3}\right)^3 + 7\left(\frac{14}{3}\right)^2 - 36$ $= \frac{400}{27} = 14{,}81$ $\therefore Q\left(\frac{14}{3}; \frac{400}{27}\right)$ and/*en* $P(0; -36)$	✓$f'(x) = 0$ ✓factors/*faktore* ✓x –values/*waardes* ✓ $Q\left(\frac{14}{3}; \frac{400}{27}\right)$ ✓ $P(0; -36)$	(5)

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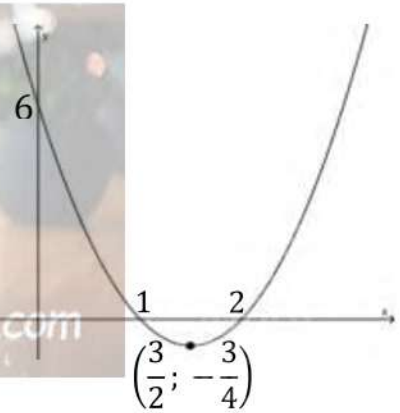
9.3	$f(x) = -x^3 + 7x^2 - 36$ $f'(x) = -3x^2 + 14x$ $f''(x) = 0$ $\therefore -6x + 14 = 0$ $-6x = -14$ $\therefore x = \frac{7}{3} = 2{,}33$ **OR/*OF*** $x = \frac{0 + \frac{14}{3}}{2} = \frac{7}{3} = 2{,}33$	✓$f''(x)$ ✓$= 0$ ✓$x = \frac{7}{3}$	(3)
9.4	$x.f'(x) > 0$ $x < \frac{14}{3};\ x \neq 0$	✓ $x < \frac{14}{3}$ ✓ $x \neq 0$	(2)
9.5	$-x^3 + 7x^2 - 36 - 4 = k$ $\therefore f(x) = k + 4$ $\therefore k < -40$ or/of $k > \frac{292}{27}$	✓notation/*notasie* ✓values/*waardes*	(2)
			[14]

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QUESTION/*VRAAG* 10

The graph of $f'(x)$ is drawn./*Die grafieke van* $f'(x)$ *is gegee.*

- 6 is the y-intercept of f'.
  6 is die y*-afsnit van* f'.
- 1 and 2 are the x-intercepts of f'
  1 en 2 is die x*-afsnitte van* f'
- $\left(\frac{3}{2}; -\frac{3}{4}\right)$ is the turning point of f'
  $\left(\frac{3}{2}; -\frac{3}{4}\right)$ *is die draaipunt van* f'



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10.1	$x = 2$	✓answer/*antwoord*	(1)
10.2	$1 < x < 2$	✓values/*waardes* ✓notation/*notasie*	(2)
10.3	$x = 0$ at/*by* y −intercept/*afsnit* $\therefore m = 6$	✓$m = 6$	(1)
10.4	$x = 3$ (use symmetry/*gebruik simmetrie*)	✓$x = 3$	(1)
10.5	Concave up/*Konkaaf na bo*	✓answer/*antwoord*	(1)
			[6]

QUESTION/*VRAAG* 11			
11.1	$S = 100(10)^2 - 200(10) + 300$ $= 8\,300\ m$	✓subst $t = 10$ ✓answer/*antwoord*	(2)
11.2	$200t - 200 = 600$ $200t = 800$ $t = 4\ s$	✓$S' = 600$ ✓$t = 4\ s$	(2)
11.3	$200t - 200 = 0$ $200t = 200$ $t = 1\ s$	✓$S' = 0$ ✓$t = 1\ s$	(2)
			[6]

TOTAL/*TOTAAL*: 150

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