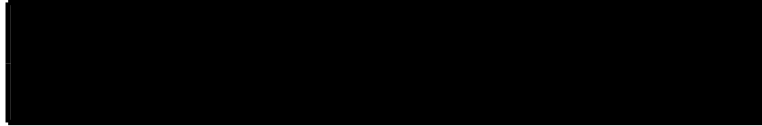




Province of the
EASTERN CAPE
EDUCATION



GRAAD 11

NOVEMBER 2010

**WISKUNDE V1
MEMORANDUM**

PUNTE: 150

TYD: 3 uur

Hierdie memorandum bestaan uit 11 bladsye.

VRAAG 1

1. 1.1.1 $x^2 + 3x - 2 = 0$
1

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-3 \pm \sqrt{9 - 4(1)(-2)}}{2}$$

$$x = \frac{-3 \pm \sqrt{17}}{2}$$

$$x = 0,56 \text{ of } x = -3,56$$

✓ instelling

✓✓ antwoorde
(-1 vir verkeerde afronding) (3)

1.1.2

$$\frac{1}{2x} + \frac{x}{x+1} = \frac{5x+1}{4(x+1)}$$

$$2(x+1) + 4x^2 = x(5x+1)$$

$$2x + 2 + 4x^2 = 5x^2 + x$$

$$x^2 - x - 2 = 0$$

$$(x-2)(x+1) = 0$$

$$x = 2 \text{ maar } x \neq -1$$

✓ maal met deler

✓ std vorm

✓ faktore

✓ antwoord (4)

1.1.3

$$3^x - 3^{x-1} = \frac{2}{27}$$

$$3^x(1 - 3^{-1}) = \frac{2}{27}$$

$$3^x\left(\frac{2}{3}\right) = \frac{2}{27}$$

$$3^x = \frac{1}{9}$$

$$3^x = 3^{-2}$$

$$x = -2$$

✓ gemene faktor

✓ vereenvoudiging

✓ vereenvoudiging

✓ antwoord (4)

1.1.4

$$6 - x^2 + x \leq 0$$

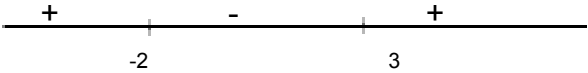
$$x^2 - x - 6 \geq 0$$

$$(x-3)(x+2) \geq 0$$

✓ std vorm

✓ faktore





$x \leq -2$ of $x \geq 3$

✓✓ antwoorde

(4)

1. **OPSIE 1:**

2

$$x = 2y - 3 \dots\dots\dots(1)$$

✓ maak x die onderwerp

$$\text{Stel } (1) \text{ in } x^2 - 2xy + 4y^2 = 7$$

$$(2y - 3)^2 - 2y(2y - 3) + 4y^2 = 7$$

✓ instelling

$$4y^2 - 12y + 9 - 4y^2 + 6y + 4y^2 = 7$$

$$4y^2 - 6y + 2 = 0$$

$$2y^2 - 3y + 1 = 0$$

✓ std vorm

$$(2y - 1)(y - 1) = 0$$

✓ faktore

$$y = \frac{1}{2} \text{ of } y = 1$$

✓ antwoorde

$$\text{Stel } y = \frac{1}{2} \text{ in } (1):$$

$$x = 2(\frac{1}{2}) - 3$$

$$x = -2$$

✓ x- waarde

$$\text{Stel } y = 1 \text{ in } (1):$$

$$x = 2(1) - 3$$

$$x = -1$$

✓ x- waarde

(7)

OPSIE 2:

$$y = \frac{x+3}{2} \dots\dots\dots (1)$$

✓ maak y die onderwerp

$$\text{Stel } (1) \text{ in } x^2 - 2xy + 4y^2 = 7$$

$$x^2 - 2x(\frac{x+3}{2}) + 4(\frac{x+3}{2})^2 = 7$$

✓ instelling

$$x^2 - x^2 - 3x + x^2 + 6x + 9 = 7$$

$$x^2 + 3x + 2 = 0$$

✓ std vorm

$$(x + 1)(x + 2) = 0$$

✓ faktore

$$x = -1 \text{ of } x = -2$$

✓ antwoorde

$$\text{Stel } x = -1 \text{ in } (1):$$

$$y = \frac{-1+3}{2}$$

$$y = 1$$

✓ y-waarde

$$\text{Stel } x = -2 \text{ in } (1):$$

$$y = \frac{-2+3}{2}$$

$$y = \frac{1}{2}$$

✓ y-waarde

(7)

[22]

VRAAG 2

$$\frac{2.}{1} = \frac{(\sqrt{3} + 2)^2 + 2}{\sqrt{3}}$$

$$= \frac{3 + 4\sqrt{3} + 4 + 2}{\sqrt{3}}$$

$$= \frac{9 + 4\sqrt{3}}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$$

$$= \frac{9\sqrt{3} + 12}{3}$$

$$= 3\sqrt{3} + 4$$

✓ vereenvoudiging

✓ rasionalisasie

✓ antwoord (3)

$$\frac{2.}{2} \quad x + 4 > 0$$

$$x > -4$$

✓ metode

✓ antwoord (2)

$$\frac{2.}{3} \quad 280 = 2x + 2y$$

$$140 = x + y$$

$$y = 140 - x$$

✓ y as onderwerp

$$x \times y = \text{Area}$$

$$x(140 - x) = 4800$$

$$140x - x^2 = 4800$$

$$x^2 - 140x + 4800 = 0$$

$$(x - 80)(x - 60) = 0$$

$$x = 80 \text{ of } x = 60$$

✓ oppervlakte

✓ std vorm

✓ faktore

$$\text{Langste sy} \quad \therefore x = 80 \text{ mm}$$

✓ antwoord (5)

[10]**VRAAG 3**

$$\frac{3.}{1} \quad 3.1.1 \quad 0$$

$$\therefore -8 ; -4 ; 0 ; \dots$$

$$\text{gemene verskil} = 4$$

$$T_n = 4n - 12$$

✓ antwoord

✓ gemene verskil = 4

✓ antwoord (3)

$$3.1.2 \quad 328 = 4n - 12$$

$$340 = 4n$$

$$85 = n$$

$$\therefore \text{die } 85^{\text{de}} \text{ term}$$

✓ instelling

✓ vereenvoudiging

✓ antwoord (3)

3.1.3

 $-\frac{4}{8}$ gemene verhouding = $-\frac{4}{8}$ $= \frac{1}{2}$

volgende term = -2

✓ waarde van verhouding

✓ antwoord

(2)

3.1.4 $\therefore -8 ; -4 ; -2 ; -1 ; \dots$

$$T_n = -8 \cdot \left(\frac{1}{2}\right)^{n-1}$$

of $T_n = -2^3 \cdot 2^{1-n}$

of $T_n = -2^{4-n}$

✓✓ antwoord

(
2
)

3.1.5 $T_{11} = -2^{4-11}$

$$T_{11} = -2^{-7}$$

$$T_{11} = -\frac{1}{128}$$

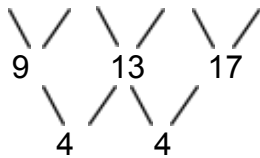
✓ instelling

✓ vereenvoudiging

✓ antwoord

(
3
)

3. $3 ; 12 ; 25 ; 42$
2



1^{ste} verskil

2^{de} verskil

3.2.1 $25 ; 42$

✓✓ antwoorde

(
2
)

3.2.2 **OPSIE 1:**

$$2a = 4 \quad \therefore a = 2$$

✓ waarde van a

$$3a + b = 9$$

✓ metode

$$3(2) + b = 9$$

$$b = 3$$

✓ waarde van b

$$a + b + c = 3$$

✓ antwoord

$$2 + 3 + c = 3$$

$$c = -2$$

✓ waarde van c

$$\therefore T_n = 2n^2 + 3n - 2$$

✓ antwoord

(
6
)

OPSIE 2:

$$T_n = an^2 + bn + c$$

Stel $n = 1 ; n = 2 ; n = 3$

$$T_1 = a + b + c = 3 \dots\dots(1)$$

$$T_2 = 4a + 2b + c = 12 \dots\dots(2)$$

$$T_3 = 9a + 3b + c = 25 \dots\dots(3)$$

$$T_2 - T_1 = 3a + b = 9$$

$$T_3 - T_2 = 5a + b = 13$$

$$3a + b = 9 \quad \dots\dots(4)$$

✓ methode

$$5a + b = 13 \quad \dots\dots(5)$$

✓ methode

$$(5) - (4): 2a = 4$$

$$a = 2$$

✓ waarde van a

$$\text{Stel in (4): } 10 + b = 13$$

$$b = 3$$

✓ waarde van b

$$\text{Stel in (1): } 2 + 3 + c = 3$$

$$c = -2$$

✓ waarde van c

$$\therefore T_n = 2n^2 + 3n - 2$$

✓ antwoord

(6)

OPSIE 3:

$$2a = 4 \quad \therefore a = 2$$

✓ waarde van a

$$2 + b + c = 3$$

$$\therefore b + c = 1$$

✓ metode

$$8 + 2b + c = 12$$

$$\therefore 2b + c = 4$$

✓ metode

$$b = 3$$

✓ waarde van b

$$c = -2$$

✓ waarde van c

$$\therefore T_n = 2n^2 + 3n - 2$$

✓ antwoord

(6)

3.2.3

$$T_n = 2n^2 + 3n - 2$$

$$T_n = 2(50)^2 + 3(50) - 2$$

$$T_n = 5\,148$$

✓ instelling

✓ antwoord

(2)

3.2.4

$$2n^2 + 3n - 2 < 228$$

$$2n^2 + 3n - 230 < 0$$

$$(2n + 23)(n - 10) < 0$$

$$-11,5 < n < 10$$

so 9 terme

✓ ongelykheid

✓ std vorm

✓ faktore

✓ moontlike antwoorde

✓ antwoord

(5)

[aanvaar "toets" metode as 9^{de} en 10^{de} term bereken word]

[28]

VRAAG 44. 4.1.1 R120 000
1

✓ antwoord

(1)

4.1.2 R102 000

✓ antwoord

(1)

4.1.3 Verminderende saldo-depresiasie

✓ antwoord

(1)

4.1.4 $A = P(1 - i)^n$

✓ formule

$$102\,000 = 120\,000(1 - i)^2$$

✓ instelling

$$0,85 = (1 - i)^2$$

$$\sqrt{0,85} = 1 - i$$

✓ vereenvoudiging

$$i = 1 - \sqrt{0,85}$$

$$i = 0,0780455\dots$$

$$\therefore r = 7,80\%$$

✓ antwoord

(4)

4.1.5 $A = 120\,000(1 - 0,078\dots)^{10}$

✓ instelling

$$A = R53\,244,64$$

✓ antwoord

(Aanvaar R53 270,95)

(2)

4. 2	4.2.1	$1 + i_{\text{eff}} = \left(1 + \frac{0,08}{12}\right)^{12}$	✓ instelling	
		$i_{\text{eff}} = (1,006)^{12} - 1$	✓ vereenvoudiging	
		$i_{\text{eff}} = 0,08299\dots$		
		$\therefore \text{effektiewe koers} = 8,3\%$	✓ antwoord	(3)
	4.2.2	$A_2 = 4\,200 \left(1 + \frac{0,08}{12}\right)^{24}$	✓ i en n waardes	
		$= R4\,926,13$	✓ waarde van A_2	
		$A_3 = 4\,926,13 \left(1 + \frac{0,1}{2}\right)^2 + 3\,000$	✓ i en n waardes	
		$= 5\,431,06 + 3\,000$	✓ + 3 000	
		$= R8\,431,06$	✓ waarde van A_3	
		$A_7 = 8\,431,06 \left(1 + \frac{0,1}{2}\right)^8$	✓✓ nuwe p en n waardes	
		$= R12\,456,51$	✓ antwoord	
		$(\text{Aanvaar } R12\,456,52)$		(8)
				[20]

VRAAG 5

5. 1	$-x^2 - 2x + 3 = 0$	✓ = 0	
	$x^2 + 2x - 3 = 0$		
	$(x + 3)(x - 1) = 0$	✓ faktore	
	$x = -3 \text{ of } x = 1$	✓ x waardes	
	$\therefore A(-3 ; 0) \text{ en } B(1 ; 0)$	✓ koördinate	(4)
5. 2	$y = -x^2 - 2x + 3$		
	$= -[x^2 + 2x - 3]$	✓ gemene faktor	
	$= -[x^2 + 2x + 1 - 1 - 3]$	✓ plus / min 1	
	$= -[(x + 1)^2 - 4]$	✓ faktoreer	
	$= -(x + 1)^2 + 4$	✓ vereenvoudiging	
	TP (-1 ; 4)	✓ Draaipunt	(5)
5. 3	(-3 ; 4)	✓✓ x-koördinaat & y-koördinaat	
	transleer 2 eenhede na links	✓ antwoord	(3)
5. 4	$p = 1$	✓ antwoord	

$q = 1$

✓ antwoord

(2)

$$\begin{aligned}
 5. \quad & y\text{-afsnit: } y = \frac{-2}{(0)+1} + 1 \\
 & y = -2 + 1 \\
 & y = -1
 \end{aligned}$$

✓ stel $x = 0$

✓ antwoord

$$\therefore E(0; -1)$$

(2)

$$5. \quad A(-3; 0) \quad C(0; 3)$$

6

✓ koördinate van C

$$\begin{aligned}
 M_{AC} &= \frac{3-0}{0+3} \\
 &= 1
 \end{aligned}$$

✓ instelling

✓ gradiënt

$$y = x + 3$$

✓ antwoord

(4)

$$\begin{aligned}
 5. \quad MN &= (-x^2 - 2x + 3) - (x + 3) \\
 7 \quad &= -x^2 - 3x
 \end{aligned}$$

✓ parabool – reguitlyn

✓ vergelyking

OPSIE 1:

$$\begin{aligned}
 \text{Maks } MN &= \frac{4ac - b^2}{4a} \\
 &= \frac{4(-1)(0) - (-3)^2}{4(-1)} \\
 &= \frac{9}{4}
 \end{aligned}$$

✓ formule

✓ instelling

✓ antwoord

(5)

OPSIE 2:

$$\text{Maks wanneer } x = \frac{-b}{2a} = \frac{-(-3)}{2(-1)} = -\frac{3}{2}$$

✓ x – waarde

$$\therefore \text{Maks } MN = -\left(-\frac{3}{2}\right)^2 - 3\left(-\frac{3}{2}\right) = \frac{9}{4}$$

✓ instelling

✓ antwoord

(5)

OPSIE 3:

$$MN = -\left[x^2 + 3x + \left(\frac{3}{2}\right)^2 - \frac{9}{4}\right]$$

✓ plus & min $\frac{9}{4}$

$$= -\left[\left(x + \frac{3}{2}\right)^2 - \frac{9}{4}\right]$$

$$= -\left(x + \frac{3}{2}\right)^2 + \frac{9}{4}$$

✓ $y = a(x - p)^2 + q$

$$\therefore \text{Maks } MN = \frac{9}{4}$$

✓ antwoord

(5)

[25]

VRAAG 6

6. $h(x) = 2^x - 2$

1

✓ antwoord (1)

6. y-int: $(0; -1)$

2

✓ antwoord (1)

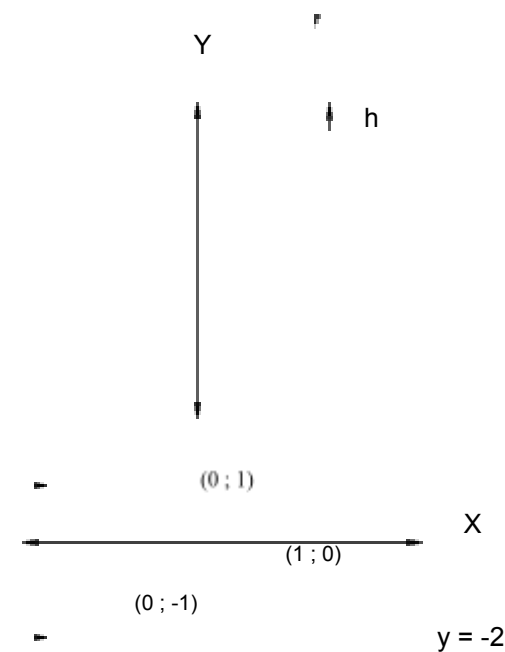
6. $y = -2$

3

✓ antwoord (1)

6.

4



f: ✓ y-afsnit

h: ✓ vorm
 ✓ x-afsnit
 ✓ y-afsnit
 ✓ asymptoot
 ✓ vorm

(6)

6. $x > 1$

5

✓ antwoord (1)

6. $k(x) = 2^{-x} - 2$

6

✓ antwoord (1)

6. $y = 2^x$ $(-6; b)$

7

$$b = 2^{-6}$$

$$= 0,016$$

✓ instelling
 ✓ antwoord (2)

[13]**VRAAG 7**

7. $x^2 = 2x$

1

✓ opstel van vergelyking

$$x^2 - 2x = 0$$

$$x(x - 2) = 0$$

at P $x = 2$

$$y = 4$$

✓ faktore
 ✓ x-koördinaat
 ✓ y-koördinaat (4)

7. 7.2.1 $y \geq 1$

2

✓✓ antwoord (2)

7.2.2 $x < 0$ of $x > 2$ ✓ $x < 0$ ✓ of ✓ $x > 2$ (3)7.2.3 $x < 0$

✓ antwoord (1)

7. $h(x) = 2(x + 4)$

3

 $h(x) = 2x + 8$

✓ instelling

✓ antwoord (2)

[12]

VRAAG 8

8. 8.1.1 $x \leq 60$

✓ beperking

1

$y \leq 100$

✓ beperking

(2)

8.1.2 $x + y \geq 80$

✓ beperking

(1)

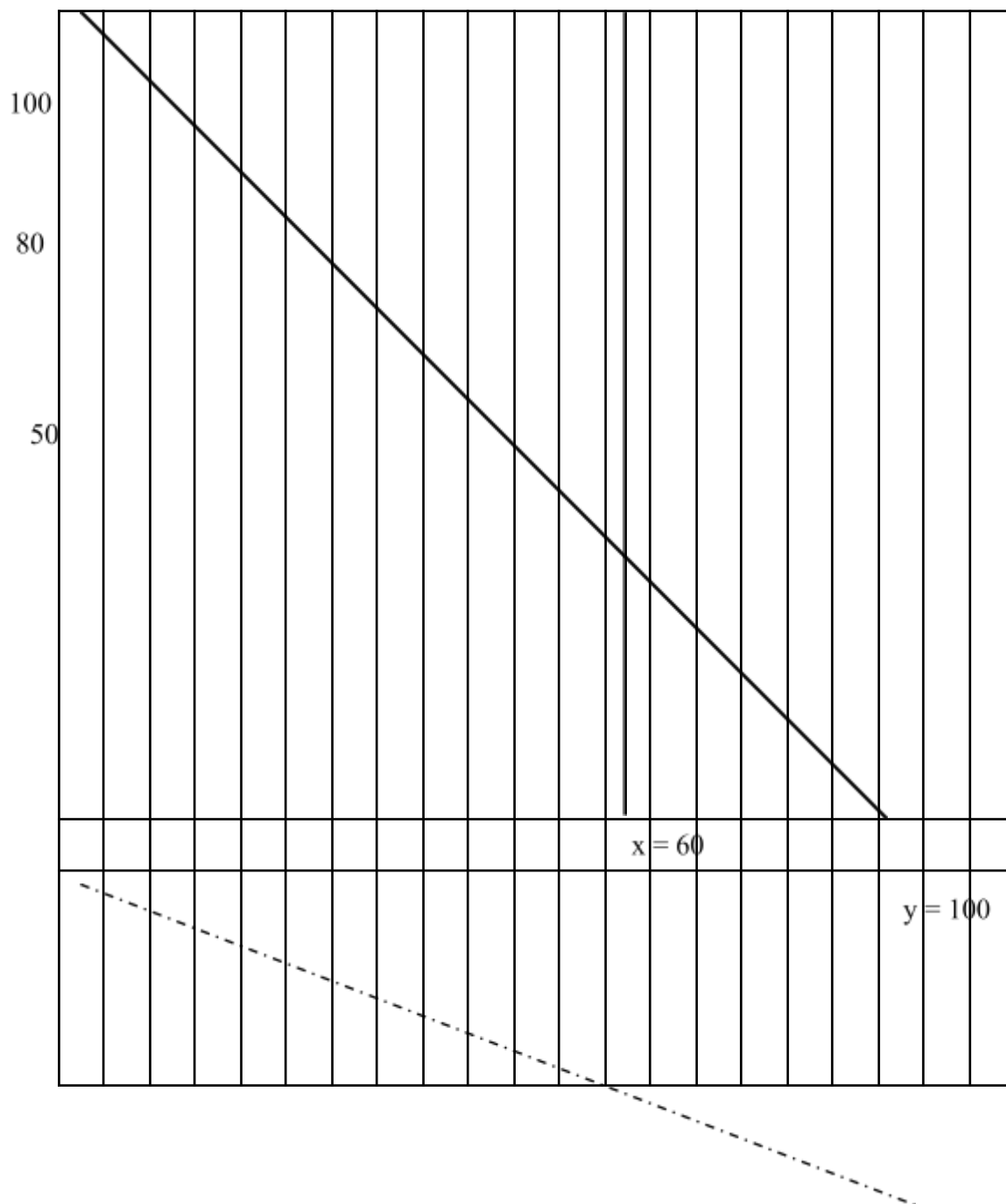
8.1.3 $\frac{40}{60}x + \frac{30}{60}y \leq 60$

✓ beperking

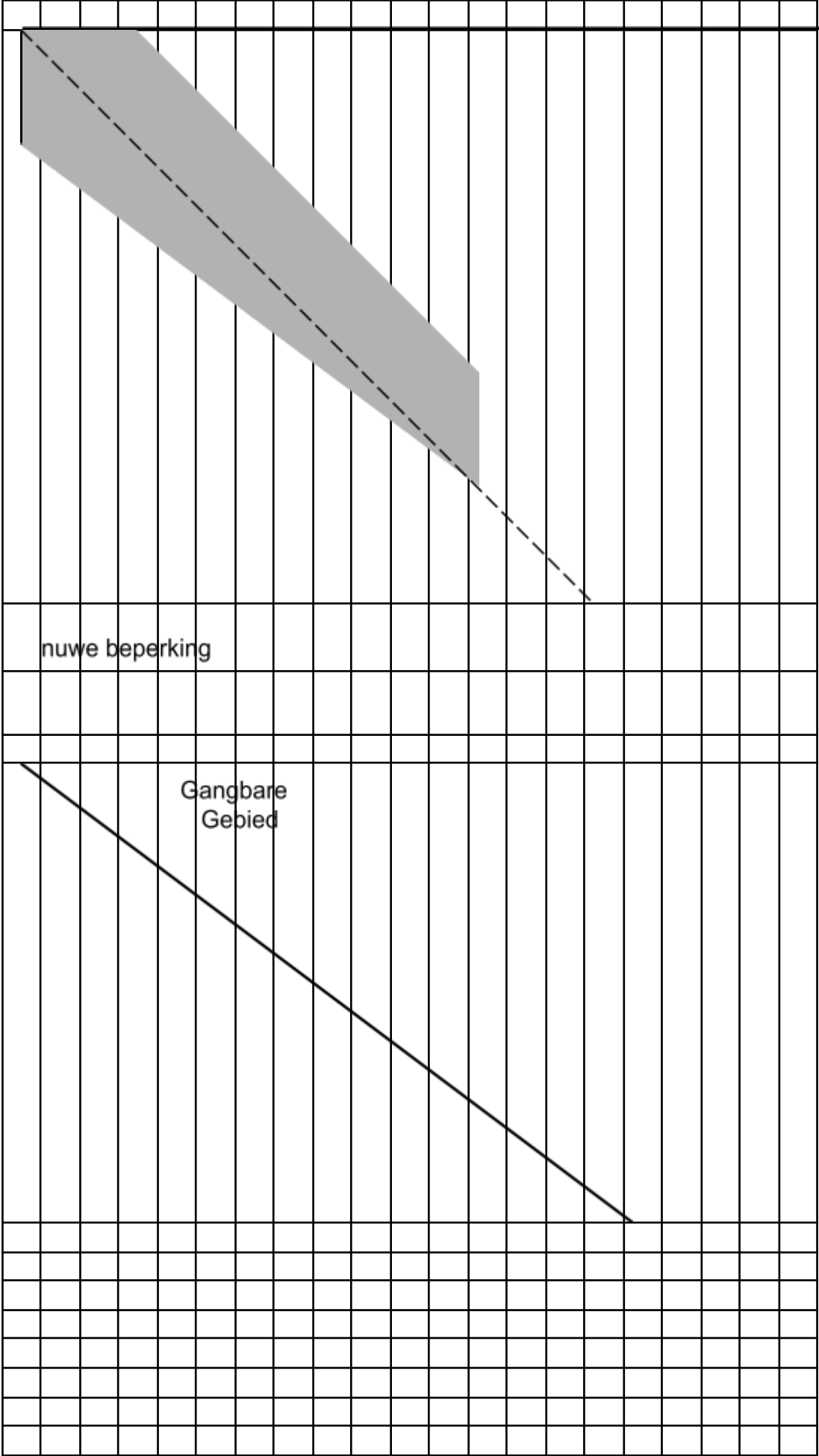
(1)

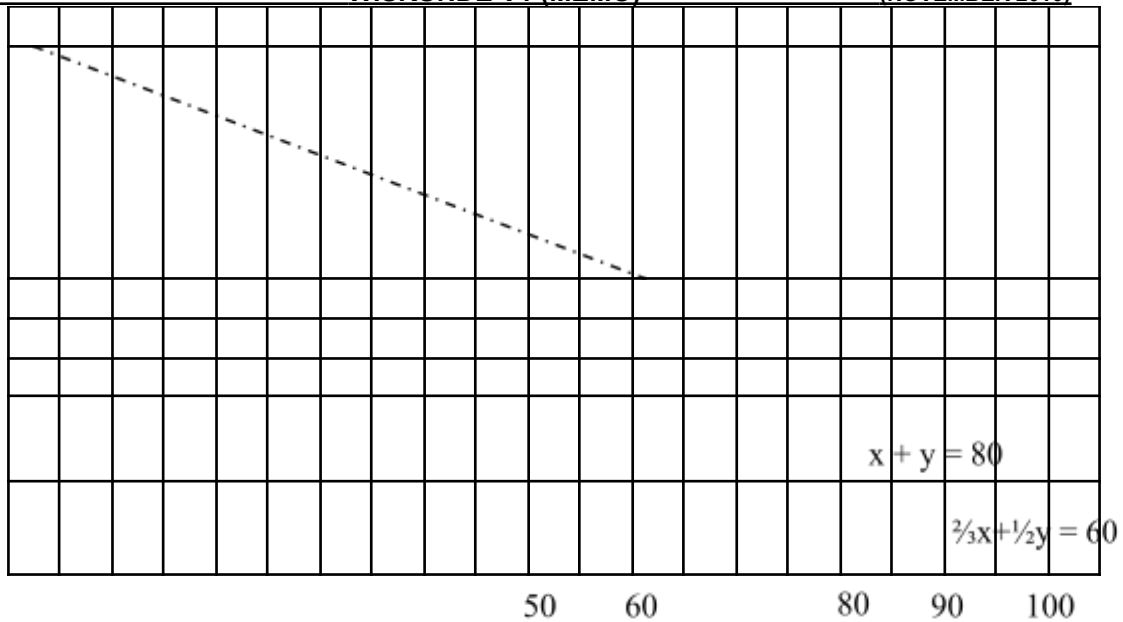
of $\frac{2}{3}x + \frac{1}{2}y \leq 60$

8.1.20



(7)





8. $P = 40x + 80y$

3

✓ antwoord

(1)

8. **OPSIE 1:**

4

(0 ; 100) $P = 40(0) + 80(100) = 8\,000$

✓ instelling

(15 ; 100) $P = 40(15) + 80(100) = 8\,600$

✓ instelling

(60 ; 40) $P = 40(60) + 80(40) = 5\,600$

✓ instelling

∴ Maks wins by (15 ; 100)

✓ antwoord

(4)

OPSIE 2:

$$80y = -40x + P$$

$$y = -\frac{1}{2}x + \frac{P}{80}$$

$$\text{soeklyn: } M = -\frac{1}{2}$$

- ✓ y-vorm
- ✓ gradiënt
- ✓ soeklyn

∴ Maks wins by (15 ; 100)

✓ antwoord (4)

$$8. \quad \frac{2}{3}x + \frac{1}{2}y \leq 50$$

✓ nuwe beperking

0 stoele

✓ antwoord

100 tafels

✓ antwoord

Wins = R8 000

✓ antwoord (4)

[20]

TOTAAL: 150