



Province of the
EASTERN CAPE
EDUCATION

**NASIONALE
SENIOR SERTIFIKAAT**

GRAAD 12

SEPTEMBER 2011

**WISKUNDE V2
MEMORANDUM**

PUNTE: 150

Die memorandum bestaan uit 11 bladsye.

VRAAG 1

1.1 *Gemiddelde*

$$= \frac{40 + 35 + 60 + 58 + 59 + 37 + 52 + 60 + 33 + 40}{10}$$

$$\text{Gemiddelde} = \frac{474}{10}$$

$$\text{Gemiddelde} = 47,4$$

✓ $\frac{474}{10}$
 ✓ antwoord
 slegs antwoord:
 2/2

(2)

1.2

x	$x - \bar{x}$	$(x - \bar{x})^2$
40	- 7,4	54,76
35	- 12,4	153,76
60	12,6	158,76
58	10,6	112,36
59	11,6	134,56
37	- 10,4	108,16
52	4,6	21,16
60	12,6	158,76
33	- 14,4	207,36
40	- 7,4	54,76
Som		1164,4

✓ tabel
 ✓ som
 ✓ antwoord

$$\text{Standaardafwyking} = \sqrt{\frac{1164,4}{10}}$$

$$= 10,79$$

OF

$$\text{Standaardafwyking} = 10,79$$

net antwoord:
 3/3

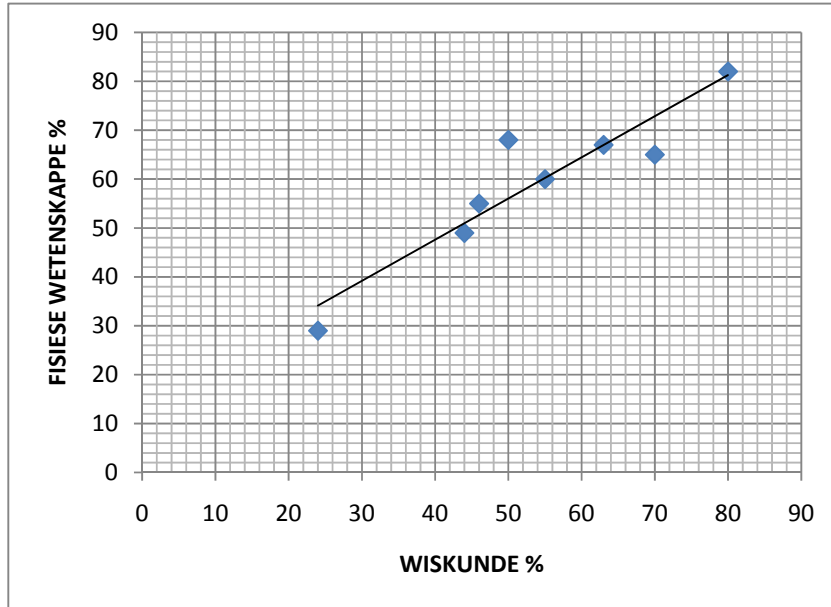
(3)

1.3 Vanaf 47,4 – 10,79 tot 47,4 + 10,79
 Vanaf 36,61 tot 58,19

$$\frac{5}{10} \times 100\% = 50\%$$

✓ 36,61 tot
 58,19
 ✓ 5
 ✓ antwoord

(3)
[8]

VRAAG 2**2.1 WISKUNDE EN FISIESE WETENSAPPE PERSENTASIES VAN LEERDERS**

- ✓ 4 punte korrek
- ✓ verdere 4 punte korrek

(2)

2.2 Ja. 'n Positiewe korrelasie word aangetoon

- ✓ ja
- ✓ positiewe korrelasie

(2)

2.3 Sien Grafiek in 2.1

- ✓ korrekte lyn

(1)

**2.4 Wiskunde % \approx 38%
Aanvaar antwoorde vanaf 36% tot 40%**

- ✓ antwoord
- ✓ antwoord

(2)

[7]

VRAAG 3

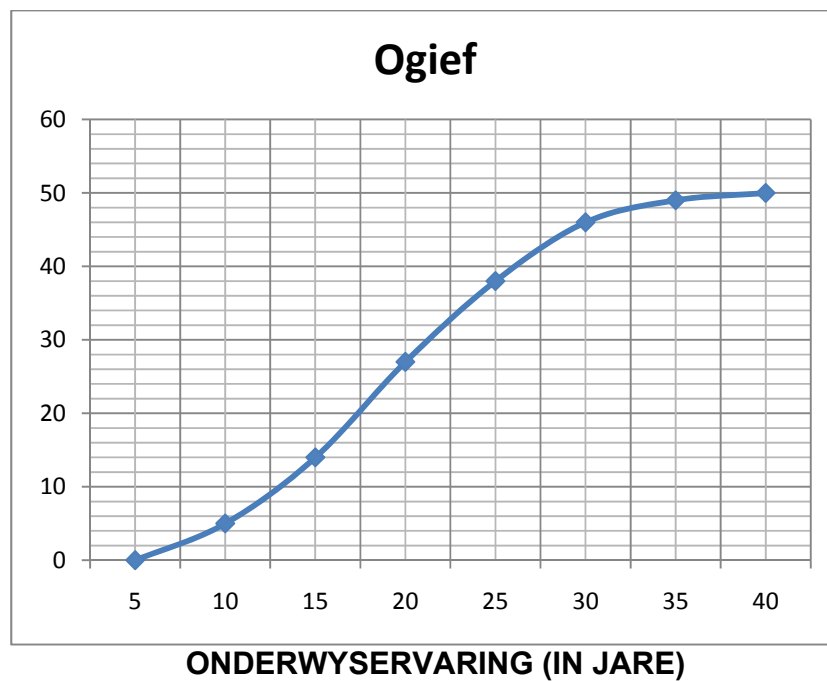
3.1

ONDERWYS- ERVARING (IN JARE)	FREKWENSIE	KUMULATIEWE FREKWENSIE
	5	5
	9	14
	13	27
	11	38
	8	46
	3	49
	1	50

- ✓ frekwensie
- ✓ kumulatiewe frekwensie

(2)

3.2



- ✓ punte by boonste limiete
- ✓ (5 ; 0)
- ✓ vorm

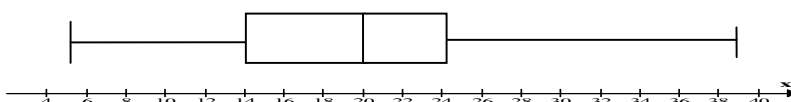
(3)

3.3

Min = 5
 $Q_1 \approx 14$
 $Q_2 \approx 20$
 $Q_3 \approx 24$
 Maks = 39

- ✓ min. en maks.
- ✓
- ✓ Q_1
- ✓ Q_2
- ✓ Q_3

(4)

3.4 ^y

- ✓ min en maks
- ✓ mond met mediaan

(2)

3.5 Skeef na links / negatief geskeef

✓ antwoord (1)
[12]**VRAAG 4**

$$4.1 \quad m_{PQ} = \frac{6-4}{1+3}$$

$$m_{PQ} = \frac{1}{2}$$

✓ instelling
✓ antwoord (2)

$$4.2 \quad M_{QS} = \left(\frac{1+2}{2}, \frac{6+1}{2} \right)$$

$$\therefore M_{QS} = \left(\frac{3}{2}, \frac{7}{2} \right)$$

✓ x-waarde
✓ y-waarde (2)

$$4.3 \quad \frac{3}{2} = \frac{-3+a}{2}$$

$$a = 6$$

$$\frac{7}{2} = \frac{4+b}{2}$$

$$b = 3$$

$$R(6;3)$$

$$OF$$

✓ instelling
✓ a = 6
✓ b = 3 (3)

$$b = 1 + 2 \quad \text{en} \quad a = 2 + 4$$

$$b = 3 \quad \text{en} \quad a = 6$$

$$m_{PQ} = m_{RS}$$

✓ $m_{PQ} = m_{RS}$
✓ a = 6
✓ b = 3
net antwoord:
volpunte (3)

$$4.4 \quad m_{RS} = \frac{1}{2} \quad (PQ \parallel RS)$$

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

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

OF

$$y = mx + c$$

$$1 = \frac{1}{2}(2) + c$$

$$c = 0$$

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

✓ $m_{RS} = \frac{1}{2}$
✓ korrekte
formule
✓ instelling
✓ antwoord (4)✓ korrekte
formule
✓ instelling
✓ c = 0
✓ antwoord (4)

$$\begin{aligned}
 4.5 \quad m_{OP} &= -\frac{4}{3} & \checkmark \tan P\hat{O}X &= -\frac{4}{3} \\
 \tan P\hat{O}X &= -\frac{4}{3} & \checkmark P\hat{O}X &= 126,87^\circ \\
 P\hat{O}X &= 126,87^\circ & \checkmark m_{OR} &= \frac{1}{2} \\
 m_{OR} &= \frac{1}{2} & \checkmark R\hat{O}X &= 26,57^\circ \\
 \tan R\hat{O}X &= \frac{1}{2} & \checkmark \text{antwoord} & \\
 R\hat{O}X &= 26,57^\circ & & \\
 P\hat{O}S &= 126,87^\circ - 26,57^\circ & & \\
 P\hat{O}S &= 100,30^\circ & & (5)
 \end{aligned}$$

$$\begin{aligned}
 4.6 \quad PQ &= \sqrt{(1+3)^2 + (6-4)^2} & \checkmark \text{instelling} \\
 PQ &= \sqrt{20} & \checkmark PQ &= \sqrt{20} \\
 PS &= \sqrt{(2+3)^2 + (1-4)^2} & \checkmark \text{instelling} \\
 RS &= \sqrt{34} & \checkmark PS &= \sqrt{34} \\
 PQRS &\text{ is nie 'n ruit nie.} & \checkmark \text{nie 'n ruit nie} & \\
 & & & (5) \\
 & & & [21]
 \end{aligned}$$

VRAAG 5

$$\begin{aligned}
 5.1 \quad BC &= \sqrt{(-1+1)^2 + (26-1)^2} & \checkmark BC &= 25 \\
 BC &= 25 & \checkmark \text{Pythagoras} & \\
 AB^2 &= 25^2 - 20^2 & \checkmark AB &= 15 \\
 AB &= 15 & \checkmark \tan \theta &= \frac{20}{15} \\
 \tan \theta &= \frac{20}{15} & & (4)
 \end{aligned}$$

$$\begin{aligned}
 5.2 \quad r &= 15 \text{ en middelpunt } (-1;1) & \checkmark r &= 15 \\
 (x+1)^2 + (y-1)^2 &= 15^2 & \checkmark \text{instelling} & \\
 \text{of } (x+1)^2 + (y-1)^2 &= 225 & \checkmark \text{instelling} & (3)
 \end{aligned}$$

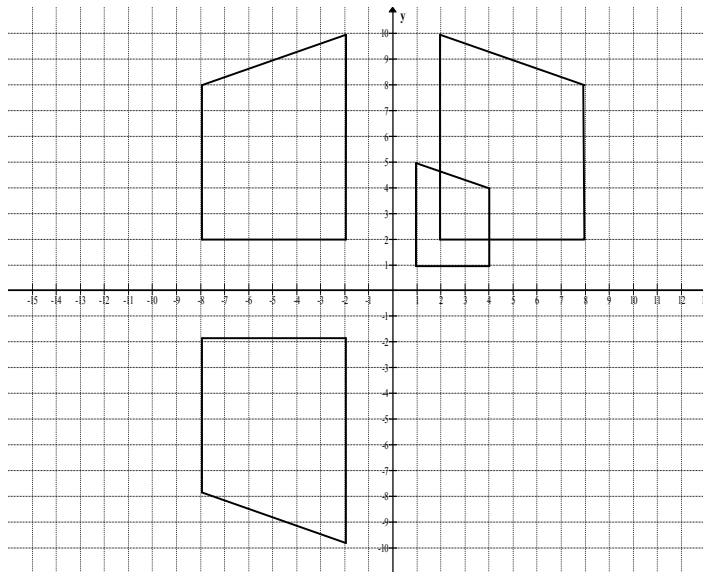
$$\begin{aligned}
 5.3 \quad m_{CR} &= \tan \theta & \checkmark m_{CR} &= \tan \theta \\
 m_{CR} &= \frac{20}{15} & \checkmark m_{CR} &= \frac{4}{3} \\
 m_{CR} &= \frac{4}{3} & & \\
 y - 26 &= \frac{4}{3}(x + 1) & \checkmark \text{instelling} & \\
 3y &= 4x + 82 & \checkmark \text{antwoord} & \\
 y &= \frac{4}{3}x + 27\frac{1}{3} & & (4)
 \end{aligned}$$

- 5.4 $m_{AB} = -\frac{3}{4}$ (rad. en raaklyn reghoekig) ✓ $m_{AB} = -\frac{3}{4}$
- $$y - 1 = -\frac{3}{4}(x + 1)$$
- $$4y = -3x + 1$$
- $$y = -\frac{3}{4}x + \frac{1}{4}$$
- ✓ instelling
✓ antwoord (3)
- 5.5 $\frac{4}{3}x + 27\frac{1}{3} = -\frac{3}{4}x + \frac{1}{4}$ ✓ gelykstelling
- $$16x + 328 = -9x + 3$$
- $$x = -13$$
- $$y = 10$$
- $$A(-13; 10)$$
- ✓ vereenvoudig
✓ $x = -13$
✓ $y = 10$ (4)
[18]

VRAAG 6

- 6.1 6.1.1 $E'(1; -5)$ ✓ x-waarde
✓ y- waarde (2)
- 6.1.2 $E'(0; 1)$ ✓ x- waarde
✓ y- waarde (2)
- 6.1.3 $E'(1; 5)$ ✓ x- waarde
✓ y- waarde (2)
- 6.2 6.2.1 $(x; y) \rightarrow (x; -y) \rightarrow (-x; y) \rightarrow (-\frac{1}{2}x; \frac{1}{2}y)$ ✓ x
✓ $-y$
✓ $-x$
✓ y
✓ $-\frac{1}{2}x$
✓ $\frac{1}{2}y$ (6)

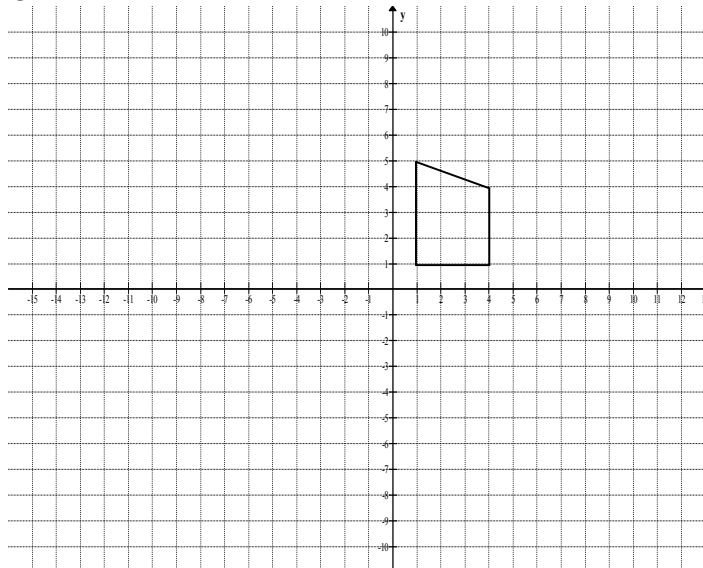
6.2.2



- ✓ refleksie om lyn $y = 0$
- ✓ rotasie deur 180°
- ✓ reduksie

(3)

OR



- ✓ twee punte korrek
- ✓ ander twee punte korrek
- ✓ vorm

LW: merk volgens 6.2.1 se antwoord

(3)

6.2.3 Transformasie van REAL na $R'''E'''A'''L'''$ is nie rigied nie omdat die grootte verander.

- ✓ nie rigied
- ✓ grootte verander

(2)

6.2.4 Omtrek van $R'''E'''A'''L''' = \frac{1}{2} p$ eenhede
Oppervlakte van $R'''E'''A'''L''' = \frac{1}{4} q^2$ vierkante eenhede

- ✓ omtrek $\frac{1}{2} p$
- ✓ oppervlakte $\frac{1}{4} q^2$

(3)

[20]

VRAAG 7

$$7.1 \quad x' = x \cos \theta + y \sin \theta$$

$$p = -4 \cos 120^\circ + q \sin 120^\circ$$

$$p = 2 + \frac{\sqrt{3}}{2} q \quad (1)$$

$$y' = y \cos \theta - x \sin \theta$$

$$2 = q \cos 120^\circ + 4 \sin 120^\circ$$

$$2 = -\frac{1}{2} q + 4 \left(\frac{\sqrt{3}}{2} \right)$$

$$q = 4\sqrt{3} - 4 \quad (2)$$

$$p = 2 + \frac{\sqrt{3}}{2} (4\sqrt{3} - 4)$$

$$p = 8 - 2\sqrt{3}$$

✓ instelling

$$✓ p = 2 + \frac{\sqrt{3}}{2} q$$

✓ instelling

$$✓ q = 4\sqrt{3} - 4$$

$$✓ p = 8 - 2\sqrt{3} \quad (5)$$

OF

$$x \cos \theta - y \sin \theta$$

$$p = -4 \cos (-120^\circ) - q \sin (-120^\circ)$$

$$p = 2 + \frac{\sqrt{3}}{2} q \quad (1)$$

$$y' = y \cos \theta + x \sin \theta$$

$$2 = q \cos (-120^\circ) + 4 \sin (-120^\circ)$$

$$2 = -\frac{1}{2} q + 4 \left(\frac{\sqrt{3}}{2} \right)$$

$$q = 4\sqrt{3} - 4 \quad (2)$$

$$p = 2 + \frac{\sqrt{3}}{2} (4\sqrt{3} - 4)$$

$$p = 8 - 2\sqrt{3}$$

✓ instelling

$$✓ p = 2 + \frac{\sqrt{3}}{2} q$$

✓ instelling

$$✓ q = 4\sqrt{3} - 4$$

$$✓ p = 8 - 2\sqrt{3}$$

(5)

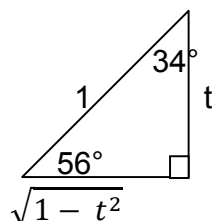
[5]**VRAAG 8**

$$8.1 \quad 8.1.1 \quad \sin (-236^\circ) = \sin 56^\circ$$

$$= t$$

✓ $\sin 56^\circ$ ✓ t (2)

8.1.2



✓ korrekte

diagram

✓ $\cos 56^\circ$

✓ antwoord (3)

$$\sin 34^\circ = \cos 56^\circ$$

$$= \sqrt{1 - t^2}$$

OF

$$\sin 34^\circ = \cos 56^\circ$$

$$= \sqrt{1 - \sin^2 56^\circ}$$

$$= \sqrt{1 - t^2}$$

✓ $\cos 56^\circ$ ✓ $\sqrt{1 - \sin^2 56^\circ}$

✓ antwoord (3)

$$\begin{aligned}
 8.1.3 \quad \cos 4^\circ &= \cos (60^\circ - 56^\circ) \\
 &= \cos 60^\circ \cos 56^\circ + \sin 60^\circ \sin 56^\circ \\
 &= \frac{1}{2} \cdot \sqrt{1-t^2} + \frac{\sqrt{3}}{2} \cdot t
 \end{aligned}$$

- ✓ $60^\circ - 56^\circ$
- ✓ uitbreiding
- ✓ instelling
- ✓ instelling

(4)

$$\begin{aligned}
 8.2 \quad \frac{\sin(P+Q)}{\cos P \cos Q} &= \frac{\sin P \cos Q + \cos P \sin Q}{\cos P \cos Q} \\
 &= \frac{\sin P}{\cos P} + \frac{\sin Q}{\cos Q} \\
 &= \tan P + \tan Q \\
 &= 1 + 2 \\
 &= 3
 \end{aligned}$$

- ✓ $\sin P \cos Q + \cos P \sin Q$
- ✓ $\frac{\sin P}{\cos P} + \frac{\sin Q}{\cos Q}$
- ✓ $\tan P + \tan Q$
- ✓ antwoord

(4)

[13]**VRAAG 9**

$$\begin{aligned}
 9.1 \quad \frac{\cos(x - 180^\circ) \cdot \tan x \cdot \sin 538^\circ}{\sin(180^\circ - 2x) \cdot \cos 92^\circ} \\
 &= \frac{-\cos x \cdot \frac{\sin x}{\cos x} \cdot \sin 2^\circ}{\sin 2x \cdot (-\sin 2^\circ)} \\
 &= \frac{\sin x}{\sin x} \\
 &= \frac{2 \sin x \cos x}{1} \\
 &= \frac{1}{2 \cos x}
 \end{aligned}$$

- ✓ $-\cos x$
- ✓ $\frac{\sin x}{\cos x}$
- ✓ $\sin 2^\circ$
- ✓ $\sin 2x$
- ✓ $-\sin 2^\circ$

- ✓ $2 \sin x \cos x$

- ✓ antwoord

(7)

$$\begin{aligned}
 9.2 \quad 9.2.1 \quad LK &= \frac{\sin^2 x}{\cos x - \cos^2 x} \\
 &= \frac{1 - \cos^2 x}{1 - \cos^2 x} \\
 &= \frac{\cos x (1 - \cos x)}{(1 + \cos x)(1 - \cos x)} \\
 &= \frac{\cos x (1 - \cos x)}{\cos x (1 - \cos x)} \\
 &= \frac{1 + \cos x}{\cos x} = RK
 \end{aligned}$$

- ✓ $1 - \cos^2 x$
- ✓ $\cos x (1 - \cos x)$
- ✓ $(1 + \cos x)(1 - \cos x)$

- ✓ antwoord

(4)

$$\begin{aligned}
 9.2.2 \quad x &= 0^\circ \\
 x &= 90^\circ
 \end{aligned}$$

- ✓ $x = 0^\circ$
- ✓ $x = 90^\circ$

(2)

$$\begin{aligned}
 9.3 \quad \cos 2x - 2 \sin 2x &= -1 \\
 2 \cos^2 x - 1 - 4 \sin x \cos x &= -1 \\
 2 \cos x (\cos x - 2 \sin x) &= 0 \\
 \cos x = 0 \text{ of } 2 \sin x &= \cos x \\
 \cos x = 0 \text{ of } \tan x &= 0,5 \\
 x = 90^\circ + k \cdot 360^\circ \\
 \text{of} \\
 x = 270^\circ + k \cdot 360^\circ &\text{ of} \\
 x = 26,57^\circ + k \cdot 180^\circ \\
 (k \in \mathbb{Z})
 \end{aligned}$$

- ✓ $2 \cos^2 x - 1$
- ✓ $4 \sin x \cos x$
- ✓ faktore
- ✓ $\cos x = 0$
- ✓ $\tan x = 0,5$
- ✓ $90^\circ + k \cdot 360^\circ$
- ✓ $270^\circ + k \cdot 360^\circ$
- ✓ $26,57^\circ + k \cdot 180^\circ$
- ✓ $k \in \mathbb{Z}$

(9)

[22]

VRAAG 10

$$10.1 \quad \frac{LM}{\sin 11,8^\circ} = \frac{30}{\sin 150^\circ}$$

$$LM = 60 \sin 11,8^\circ$$

$$\tan \theta = \frac{KL}{LM}$$

$$KL = LM \tan \theta$$

$$KL = 60 \tan \theta \sin 11,8^\circ$$

- ✓ $11,8^\circ$
- ✓ instel in sinusreël
- ✓ $LM = 60 \sin 11,8^\circ$
- ✓ $\tan \theta = \frac{KL}{LM}$
- ✓ antwoord (5)

$$10.2 \quad KL = 60 \tan \theta \sin 11,8^\circ$$

$$KL = 60 \tan 52,7^\circ \cdot \sin 11,8^\circ$$

$$KL = 16,11 \text{ m}$$

- ✓ instelling
- ✓ antwoord (2)

$$10.3 \quad \text{area van } \triangle LMN = \frac{1}{2} (30)(12,27) \sin 18,2^\circ$$

$$= 57,49 \text{ m}^2$$

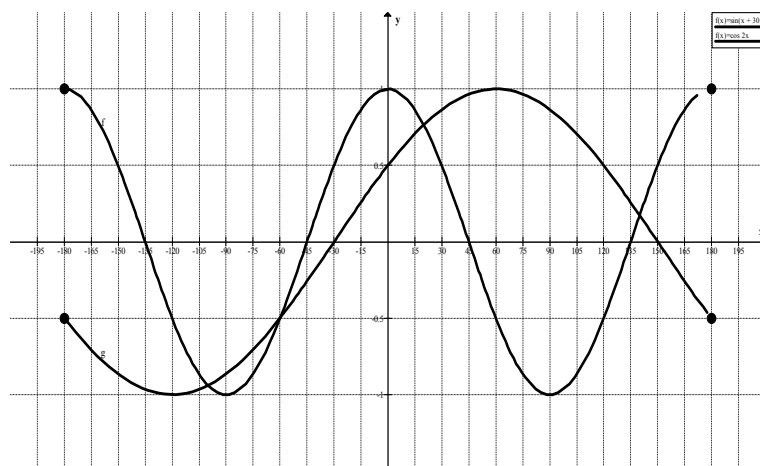
- ✓ instelling
 - ✓ antwoord (2)
- [9]**

VRAAG 11

$$11.1 \quad 180^\circ$$

- ✓ antwoord (1)

11.2



- ✓ $\sin(x + 30^\circ)$
- ✓ x-afsnitte
- ✓ y-afsnit
- ✓ amplitude
- ✓ $\cos 2x$
- ✓ x-afsnit
- ✓ y-afsnit
- ✓ amplitude

(6)

$$11.3 \quad 4$$

- ✓ antwoord (1)

$$11.4 \quad f(x) = \sin(x - 30^\circ)$$

$$g(x) = \cos 2x + 2$$

- ✓ $\sin(x - 30^\circ)$
- ✓ $\cos 2x + 2$ (2)

$$11.5 \quad 2$$

- ✓ antwoord
- ✓ antwoord (2)

$$11.6 \quad -90^\circ < x < 0^\circ$$

OF

$$x \in (-90^\circ; 0^\circ)$$

- ✓ waardes
 - ✓ notasie
- (2)
- [15]**

TOTAAL: 150