

KLASKAMER 10

GRAAD 12 WISKUNDE: EPISODE 60

TRIGONOMETRIE 4

Vandag kyk ons na Trigonometriese Vergelykings:

VRAAG 1

Los elk van die volgende trigonometriese vergelykings op vir $x \in [-90^\circ; 180^\circ]$

a. $2\sin^2 x = \sin 2x + \sin x - \cos x$ (8)

b. $15 \sin x - 4 \cos^2 x = 0$ (7)

BLIKslim

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TOTAAL: 15 PUNTE

GRAAD 12 WISKUNDE: EPISODE 60 (MEMORANDUM)

TRIGONOMETRIE 4

VRAAG 1

a. $2\sin^2 x = \sin 2x + \sin x - \cos x$

$$\therefore 2\sin^2 x = 2\sin x \cos x + \sin x - \cos x$$

$$\therefore 2\sin^2 x - 2\sin x \cos x - \sin x + \cos x = 0$$

$$\therefore 2\sin x(\sin x - \cos x) - (\sin x - \cos x) = 0 \checkmark$$

$$\therefore (\sin x - \cos x)(2\sin x - 1) = 0 \checkmark$$

$$\therefore \sin x - \cos x = 0 \text{ of } 2\sin x - 1 = 0$$

$$\therefore \sin x = \cos x \text{ of } \sin x = \frac{1}{2}$$

$$\therefore \tan x = 1 \text{ of } \sin x = \frac{1}{2}$$

Vir $\tan x = 1$: Kwadrante: 1 en 3; Verwysingshoek: 45°

1: $x = 45^\circ + k180^\circ; k \in \mathbb{Z} \checkmark$

3: $x = 180^\circ + 45^\circ + k180^\circ = 225^\circ + k180^\circ; k \in \mathbb{Z} \checkmark$

Vir $\sin x = \frac{1}{2}$: Kwadrante: 1 en 2; Verwysingshoek: 30°

1: $x = 30^\circ + k360^\circ; k \in \mathbb{Z} \checkmark$

2: $x = 180^\circ - 30^\circ + k180^\circ = 150^\circ + k360^\circ; k \in \mathbb{Z} \checkmark$

$$\therefore x = \{30^\circ; 45^\circ; 150^\circ\} \checkmark$$

b. $15 \sin x - 4\cos^2 x = 0$

$$\therefore 15 \sin x - 4(1 - \sin^2 x) \checkmark = 0$$

$$\therefore 15 \sin x - 4 + 4\sin^2 x = 0$$

$$\therefore 4\sin^2 x + 15\sin x - 4 = 0 \checkmark \therefore (4\sin x - 1)(\sin x + 4) = 0$$

$$\therefore \sin x = \frac{1}{4} \checkmark \text{ of } \sin x = -4 \text{ (Geen oplossing) } \checkmark$$

Vir $\sin x = \frac{1}{4}$: Kwadrante: 1 en 2; Verwysingshoek: $14,48^\circ$

1: $x = 14,48^\circ + k360^\circ; k \in \mathbb{Z} \checkmark$

2: $x = 180^\circ - 14,48^\circ + k360^\circ = 165,52^\circ + k360^\circ; k \in \mathbb{Z} \checkmark$

$$\therefore x = \{14,48^\circ; 165,52^\circ\} \checkmark$$