



Kwartaal 2 Toets 2022- Memorandum

Vraag 1

1.1 Los op vir x :

1.1.1 $-7 \leq -2x - 1 < 3$ (2)

$$-6 \leq -2x < 4\checkmark$$

$$3 \geq x > -2\checkmark \text{grense +notasie}$$

1.1.2 $\frac{1}{4}(4x + 16) = \frac{15x-6}{3}$ (3)

$$x + 4\checkmark = \frac{15x - 6}{3}$$

$$3x + 12 = 15x - 6\checkmark$$

$$18 = 12x$$

$$\frac{3}{2} = x\checkmark$$

1.1.3 $\frac{x+1}{5} - \frac{x-1}{3} = \frac{1}{2}$ (4)

$$\frac{6x + 6\checkmark - 10x + 10\checkmark}{30} = \frac{15}{30\checkmark}$$

$$-4x = -1$$

$$x = \frac{1}{4}\checkmark$$

1.1.4 $\frac{x-6}{x^3-2x^2} = \frac{1}{2-x}$ (6)

$$\frac{x-6}{x^2(x-2)\checkmark} = -\frac{1}{(x-2)}$$

$$x - 6 = -x^2\checkmark$$

$$x^2 + x - 6 = 0\checkmark$$

$$(x + 3)(x - 2) = 0\checkmark$$

$$x = -3\checkmark \text{ en } x \neq 2\checkmark$$

$$1.1.5 \quad \frac{2}{x^2+5x+6} = \frac{1}{x^2+2x-3} - \frac{3}{x^2+x-2} \quad (7)$$

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

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

$$4x = -5$$

$$x = \frac{-5}{4}\sqrt{}$$

$$1.2 \quad \text{Los op vir } x \text{ en } y: \quad \sqrt{3^{2x} \cdot 3^{2x} \cdot 9} = 3^{x+y} \quad \text{en} \quad 3x + 2y = -3 \quad (7)$$

$$\sqrt{3^{4x+2}\sqrt{}} = 3^{x+y}$$

$$3^{2x+1}\sqrt{}} = 3^{x+y}$$

$$x - y = -1\sqrt{}} \dots \dots \dots (1)$$

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

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

$$5x = -5 \dots \dots \dots (1) + (2) \sqrt{}}$$

$$x = -1\sqrt{}}$$

Stel $x = -1$ in (1)

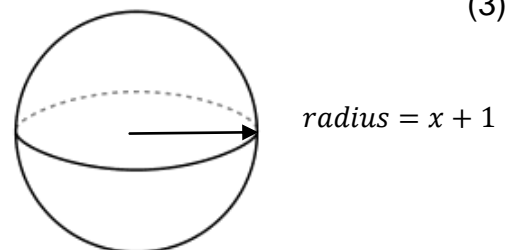
$$-1 - y = -1\sqrt{}}$$

$$0 = y\sqrt{}}$$

$$\therefore x = -1 \text{ en } y = 0$$

1.3 In die onderstaande skets word die afmetings van die radius van die sfeer in terme van x gegee. Indien dit gegee word dat die volume van die sfeer $36\pi \text{ cm}^3$ is, bereken die waarde van x . (3)

$$\text{Volume} = \frac{4}{3}\pi r^3$$



$$36\pi = \frac{4}{3}\pi(x + 1)^3\sqrt{}}$$

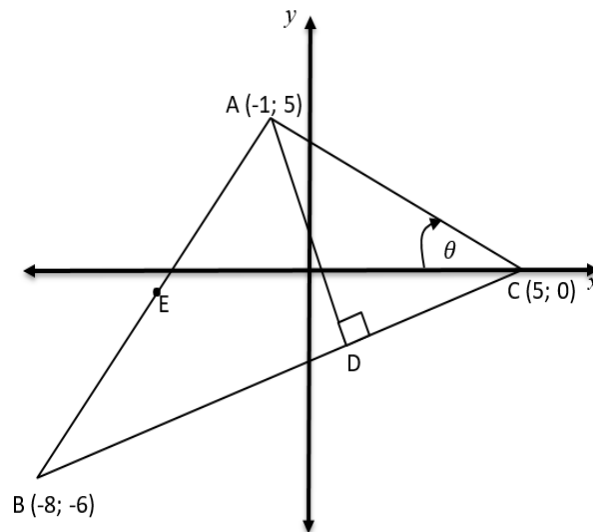
$$27 = (x + 1)^3\sqrt{}}$$

$$3 = x + 1$$

$$2 = x\sqrt{}}$$

Vraag 2

In die diagram is $A(-1; 5)$, $B(-8; -6)$ en $C(5; 0)$ hoekpunte van $\triangle ABC$. E is 'n punt op AB, en D is 'n punt op BC. Die hoek θ is 'n skerphoek.



2.1 Bereken die lengte van BC.

(3)

$$BC = \sqrt{(-8 - 5)^2 + (-6)^2} \checkmark \checkmark$$

$$BC = \sqrt{205} \text{ of } 14,32 \text{ eenhede} \checkmark$$

2.2 Bereken die gradiënt van BC.

(2)

$$m_{BC} = \frac{0 + 6}{5 + 8} \checkmark$$

$$m_{BC} = \frac{6}{13} \checkmark$$

2.3 Bepaal die vergelyking van lynstuk AD in die vorm $y = mx + c$.

(5)

$$m_{AD} = -\frac{13}{6} \text{ (} AD \perp BC \text{)} \checkmark$$

$$y = -\frac{13}{6}x + c \checkmark$$

Stel in $A(-1; 5)$

$$5 = -\frac{13}{6}(-1) + c \checkmark$$

$$\frac{17}{6} = c \checkmark$$

$$y = -\frac{13}{6}x + \frac{17}{6} \checkmark$$

2.4 Bereken die grootte van θ .

(3)

$$\tan\theta = m_{AC}\checkmark$$

$$\tan\theta = \frac{5}{-1-5}\checkmark$$

$$\tan\theta = \frac{5}{-6}$$

$$\theta = \tan\left(\frac{5}{6}\right)^{-1}$$

$$\theta = 33,81^\circ\checkmark$$

2.5 Bepaal die koördinate van E, die middelpunt van AB.

(2)

$$M = \left(\frac{-8-1}{2}; \frac{-6+5}{2}\right)\checkmark$$

$$M = \left(\frac{9}{2}; \frac{-1}{2}\right)\checkmark$$

[15]

Vraag 3

3.1 Gegee: $A(x; y)$, $B(x - a; y - a)$, en $C(x - 2a; y - 2a)$

3.1.1 Bepaal die gradiënt van AB en BC.

(6)

$$m_{AB} = \frac{y - (y - a)}{x - (x - a)}\checkmark$$

$$m_{AB} = \frac{a}{a}\checkmark$$

$$m_{AB} = 1\checkmark$$

$$m_{BC} = \frac{y - a - (y - 2a)}{x - a - (x - 2a)}\checkmark$$

$$m_{BC} = \frac{a}{a}\checkmark$$

$$m_{BC} = 1\checkmark$$

3.1.2 Vervolgens: Kies die regte opsie:

(1)

A: $AB \parallel BC\checkmark$

B: $AB \perp BC$

C: $AB = BC$

[7]

Vraag 4

4.1 Indien $x = 22,5^\circ$ en $y = 15,23^\circ$, bereken met die hulp van 'n sakrekenaar:

4.1.1 $\sin\left(\frac{xy}{3}\right)$ (1)

$$= \sin\left(\frac{22,5 \times 15,23}{3}\right)$$

$$= 0,91\checkmark$$

4.1.2 $\sin^2(2x + y)$ (1)

$$= \sin^2(2x + y)$$

$$= \sin^2(2(22,5) + 15,23)$$

$$= 0,75\checkmark$$

4.1.3 $\frac{2\sin x \cdot \cos 2y}{\tan 2y}$ (1)

$$= \frac{2\sin(22,5) \cdot \cos 2(15,23)}{\tan 2(15,23)}$$

$$= 1,12\checkmark$$

4.2 Los op vir β :

4.2.1 $\frac{1}{2}\tan\beta + 1 = 9$ (2)

$$\frac{1}{2}\tan\beta = 8$$

$$\tan\beta = 16\checkmark$$

$$\beta = \tan^{-1}(16)$$

$$\beta = 86,42^\circ\checkmark$$

4.2.2 $\cos(60^\circ - 2\beta) = \sin 60^\circ$ (2)

$$60^\circ - 2\beta = \cos^{-1}(\sin 60^\circ)$$

$$60^\circ - 2\beta = 30^\circ\checkmark$$

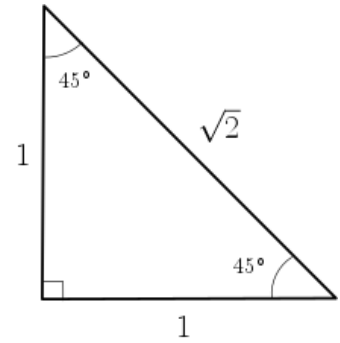
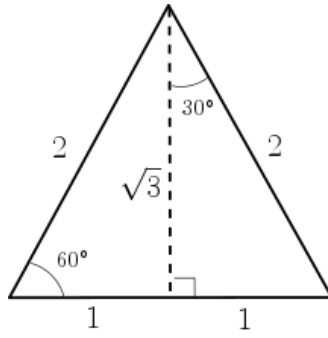
$$-2\beta = -30^\circ$$

$$\beta = 15^\circ\checkmark$$

4.3 Bepaal, sonder 'n sakrekenaar:

(5)

$$\frac{\tan^2 30^\circ \cdot \cos 45^\circ}{2 \sin 90^\circ}$$



$$= \frac{\left(\frac{1}{\sqrt{3}}\right)^2 \sqrt{} \times \frac{1}{\sqrt{2}} \sqrt{}}{2 \times 1 \sqrt{}}$$

$$= \frac{\frac{1}{3} \times \frac{1}{\sqrt{2}}}{2}$$

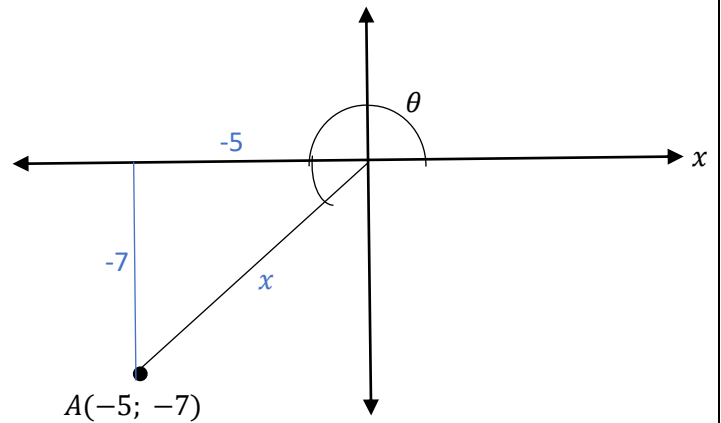
$$= \frac{\frac{1}{3\sqrt{2}} \sqrt{}}{2}$$

$$= \frac{1}{6\sqrt{2}} \sqrt{}$$

4.4 Beskou die meegaande skets en bereken:

(4)

$$\sin^2 \theta + \cos^2 \theta$$



$$x^2 = (-7)^2 + (-5)^2 \text{ (pyth)} \checkmark$$

$$x^2 = 74$$

$$x = \sqrt{74} \text{ eenhede} \checkmark$$

$$= \left(\frac{-7}{\sqrt{74}}\right)^2 + \left(\frac{-5}{\sqrt{74}}\right)^2 \checkmark$$

$$= 1 \checkmark$$

[16]

Totaal: [70]