NASIONALE SENIOR SERTIFIKAAT-EKSAMEN
MEI 2022

WISKUNDE: VRAESTEL II

NASIENRIGLYNE

Tyd: 3 uur 150 punte

Hierdie nasienriglyne is opgestel vir gebruik deur eksaminators en hulp-eksaminators van wie verwag word om almal 'n standaardiseringsvergadering by te woon om te verseker dat die riglyne konsekwent vertolk en toegepas word by die nasien van kandidate se skrifte.

Die IEB sal geen bespreking of korrespondensie oor enige nasienriglyne voer nie. Ons erken dat daar verskillende standpunte oor sommige aangeleenthede van beklemtoning of detail in die riglyne kan wees. Ons erken ook dat daar sonder die voordeel van die bywoning van 'n standaardiseringsvergadering verskillende vertolkings van die toepassing van die nasienriglyne kan wees.

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AFDELING A

VRAAG 1

(a) (1) $m_{PQ} = \frac{8}{4} = 2$ ✓✓ (2)

(2) $\frac{t-9}{-6-2} = 2$ ✓✓ **OF** $\frac{t-17}{-6-6} = 2$

$t = -7$ ✓ (3)

(3) $m = -\frac{1}{2}$ ✓

Middelpunt van PQ is $(4;13)$. ✓

$13 = -\frac{1}{2}(4) + c$ ✓

$c = 15$ ✓

$y = -\frac{1}{2}x + 15$ ✓ (4)

(4) $y = -\frac{1}{2}(14) + 15$ ✓

$y = 8$ ✓

$H(14;4)$ en $P(2;9)$

$PH = \sqrt{(14-2)^2 + (4-9)^2}$ ✓

$PH = 13$ ✓ (4)

(b) $\tan\beta = 5$

$\beta = 78{,}7°$ ✓

$\tan\alpha = 1/2$ ✓

$\alpha = 26{,}6°$ ✓

$\theta = 52{,}1°$ ✓

(4)

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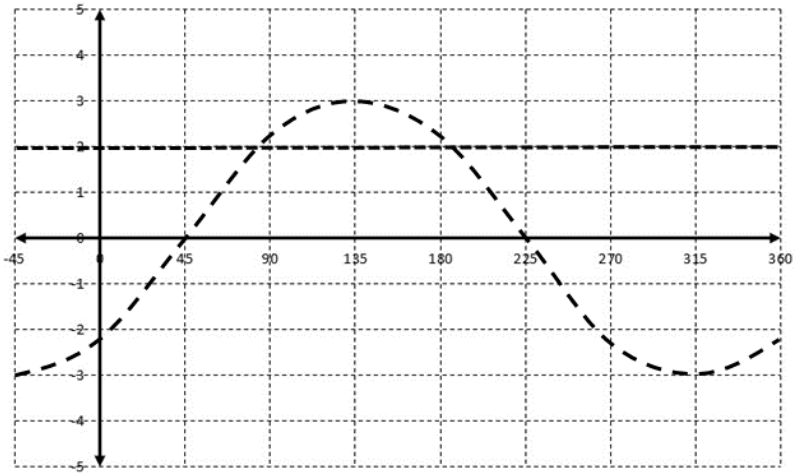
VRAAG 2

(a)



✓ Beginpunt
✓ *y*-afsnit
✓ Draaipunt
✓ Vorm

✓ Reguitlyn deur 2
✓ Eindpunte korrek

(6)

(b) $3\sin(x-45°)=2$

$\sin(x-45^{\circ})=2/3$ ✓

Verwysingshoek: $41{,}8°$ ✓

In kwadrante 1 en 2

Oplossing 1:

$(x-45°)=41{,}8°+k.360°$

$x=86{,}8°+k.360°$

Oplossing 2:

$(x-45°)=180°-41{,}8°+k.360°$

$x=183{,}2°+k.360°$

$x=\{86{,}8°;183{,}2°\}$ ✓✓ (4)

(c) $x\in(86{,}8°;183{,}2°)$ ✓ waardes ✓ notasie (2)

[12]

VRAAG 3

(a) (1) $\dfrac{\cos 2\theta + 1}{\sin 2\theta} + \tan\theta = \dfrac{1}{\sin\theta\cos\theta}$

$\dfrac{2\cos^2\theta - 1 + 1}{2\sin\theta\cos\theta} + \dfrac{\sin\theta}{\cos\theta}$ ✓✓✓

$\dfrac{\cos\theta}{\sin\theta} + \dfrac{\sin\theta}{\cos\theta}$ ✓

$\dfrac{\cos^2\theta + \sin^2\theta}{\sin\theta\cos\theta}$ ✓

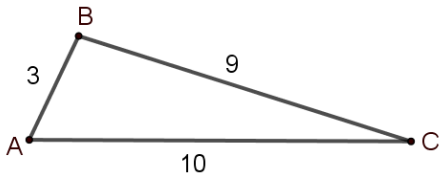
$\dfrac{1}{\sin\theta\cos\theta}$ (5)

(2) $\theta = \{0°; 90°\}$ ✓✓ (2)

(b) (1) $9^2 = 3^2 + 10^2 - 2(3)(10)\cos A$ ✓✓

$\cos A = 7/15$

$A = 62{,}2°$ ✓



(3)

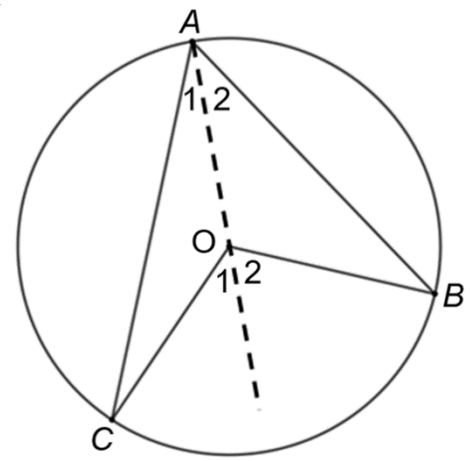
(2) Oppervlakte $\Delta ABC = \dfrac{1}{2}(3)(10)\sin 62{,}2°$ ✓✓

Oppervlakte $\Delta ABC = 13{,}3$ eenhede^2 ✓ (3)

[13]

VRAAG 4

(a) Konstruksie A deur O ✓



Bewys:

$O_1 = A_1 + C$ Buitehoek van driehoek ✓

$A_1 = C$ Gelykbenige driehoek ✓

$O_1 = 2A_1$ ✓

Net so

$O_2 = 2A_2$

Dus

$O_1 + O_2 = 2(A_1 + A_2)$ ✓

$2 \times CAB = COB$ (5)

(b) (1) $COD = 100°$ ✓ (Hoek by middelpunt $= 2\times$ hoek by omtrek) ✓

$D_2 = OCD = 40°$ (radii, gelykbenige Δ) ✓

$y = 18°$ ✓ (4)

(2) $x + y = 36°$ ✓ (Hoeke in dieselfde segment) ✓

Dus

$x = 18°$ ✓ (3)

(c) (1) $J_1 + J_2 = 90°$ ✓ (Hoeke in 'n halfsirkel) ✓

$RK = 10$ eenhede ✓

$JK^2 = 10^2 - 5^2$

$JK = \sqrt{75}$ ✓ (4)

(2) $M_2 = 90°$ ✓ Lyn van middelpunt na middelpunt van koord ✓

$OM^2 = 5^2 - \left(\frac{\sqrt{75}}{2}\right)^2$ ✓

$OM = \frac{5}{2}$ ✓

$ML = \frac{5}{2}$ ✓ (5)

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VRAAG 5

(a) $\frac{EC}{4}=\frac{9}{3}$ ✓ (Eweredigheidstelling) ✓

$EC=12$ eenhede ✓ (3)

(b) $\frac{EG}{12}=\frac{2}{3}$ ✓

$EG=8$ eenhede ✓

$\frac{FG}{8}=\frac{9}{12}$ ✓

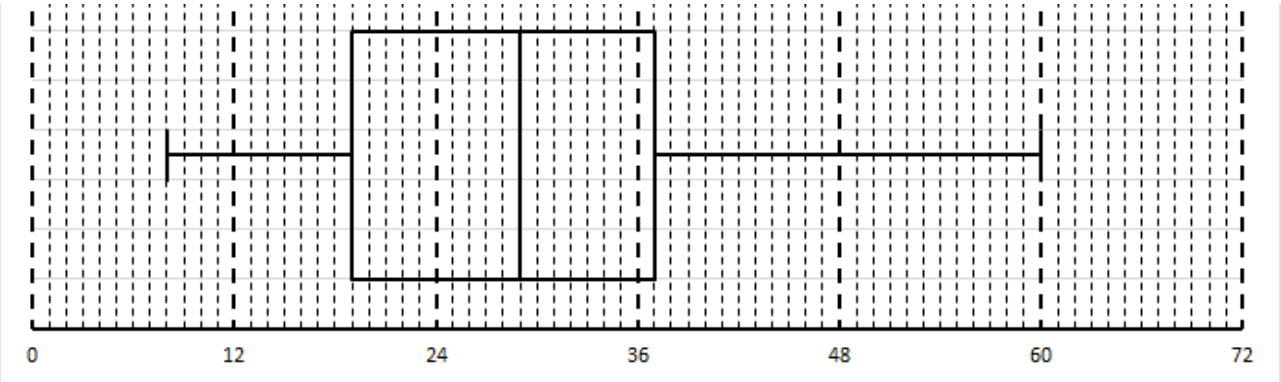
$FG=6$ eenhede ✓ (4)

[7]

VRAAG 6

(a) (1) $74-10=64$ mense ✓ (1)

(b) 8 ✓ 19 ✓ 29 ✓ 37 ✓ 60 (verwys na houer-en-punt-stipping) ✓



(5)

(c) $\frac{21}{80}\times 100=26,25\%$ ✓✓ (2)

[8]

78 punte

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AFDELING B

VRAAG 7

(a) Skeef na links of negatief skeef ✓ (1)

(b) Bly dieselfde ✓ (1)

(c) $\frac{9(5)+16(15)+25k}{25+k}=16,5$ ✓✓✓

$285+25k=412,5+16,5k$ ✓

$8,5k=127,5$

$k=15$ ✓ (5)

(d) (1) D 0,94 ✓ (1)

(2) B sal toeneem, aangesien die uitskieter T lyn minder steil maak ✓✓ (2)

(3) Die korrelasiekoëffisiënt sal afneem. ✓
Hierdie punt lê naby die lyn van beste passing. ✓ (2)

[12]

VRAAG 8

Konstruksie: ED

$EDC=x$ ✓ (Raaklyn-koord-stelling) ✓

Gelykbenige driehoek ✓ (Raaklyne van gemeenskaplike punt af getrek) ✓

$DCE=180°-2x$ ✓

$MKJ=180°-2x$ ✓ (Buitehoek van koordevierhoek) ✓

[7]

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VRAAG 9

(a) $D_3 = E$ ✓ (Raaklyn-koord-stelling) ✓

$D_1 = F_2$ ✓ (Verwisselende hoeke // lyne)

$\Delta FED /// \Delta GDF$ (HHH) ✓ (4)

(b) $\frac{ED}{DF} = \frac{FD}{GF}$ $\Delta FED /// \Delta GDF$ ✓

$FD^2 = ED.GF$ ✓

maar

$FD^2 = FH^2 + HD^2$ Pythagoras ✓

Dus

$FH^2 + HD^2 = ED.GF$ (3)

[7]

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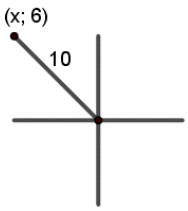
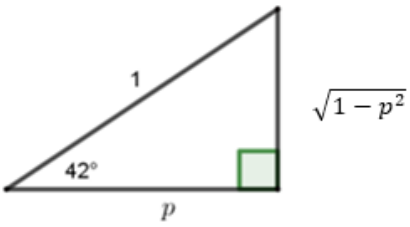
VRAAG 10

(a)





$x = -8$ ✓✓ ✓ vir diagram ✓ ontbrekende sy

$y = 6$

$r = 10$

$\cos(-A - 42°)$

$\cos A\cos 42° - \sin A\sin 42°$ ✓

$\frac{-8}{10}p - \frac{6}{10}\sqrt{1-p^2}$ ✓

OF

$\frac{-4p - 3\sqrt{1-p^2}}{5}$ (6)

(b) $4\sin^2\theta = \sin 2\theta$ ✓

$4\sin^2\theta - 2\sin\theta\cos\theta = 0$ ✓

$2\sin\theta(2\sin\theta - \cos\theta) = 0$

$2\sin\theta = 0$ ✓ OF $2\sin\theta = \cos\theta$ ✓

$\theta = k.180°$ ✓ $\tan\theta = \frac{1}{2}$

$\theta = 26{,}6° + k.180°$ ✓✓ (7)

(c) $\dfrac{BC}{\sin\left(180°-\left(\beta+\theta\right)\right)}=\dfrac{m}{\sin\beta}$ ✓✓

$$BC=\frac{m\sin\left(\beta+\theta\right)}{\sin\beta}$$ ✓

$CBD=\theta$ (Verwisselende hoeke // lyne)

$$\cos\theta=\frac{p}{BC}$$

$$BC=\frac{p}{\cos\theta}$$ ✓

Dus

$$\frac{m\sin\left(\beta+\theta\right)}{\sin\beta}=\frac{p}{\cos\theta}$$ ✓

$$\frac{m\left(\sin\beta\cos\theta+\sin\theta\cos\beta\right)}{\sin\beta}=\frac{p}{\cos\theta}$$ (5)

(d) $3^2=x^2+x^2-2x^2\cos30°$ ✓✓ $\left(\text{laat } BC=BD=x\right)$ **OF** $\dfrac{BD}{\sin75°}=\dfrac{3}{\sin30°}$ ✓✓

$$9=2x^2\left(1-\cos30°\right)$$

$$x=\sqrt{\frac{9}{2\left(1-\cos30°\right)}}$$

$x=5{,}8$ eenhede $=BD=BC$ ✓

Indien paal vertikaal is:

$\text{Tou}^2=4^2+2^2$ ✓

Tou moet $\sqrt{20}=4{,}5$ meter wees. ✓

Die toue moet 1,3 meter korter wees. ✓ (6)

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VRAAG 11

(a) $3(0)+4x=12$ ✓

$x=3$ ✓

$P(3;0)$

$M(0;4)$ ✓

$MP=\sqrt{25}=5$ ✓

Dus $NP=2$ ✓

Vergelyking van sirkel P: $(x-3)^2+y^2=4$ ✓✓ (7)

(b) $16k^2+9k^2=4$ ✓✓

$k=0,4$ ✓

Alternatief:

x-koördinaat van N is $\frac{3}{5}$ van 3 dus $\frac{9}{5}$ (lyn $\parallel$ sy van Δ) ✓✓

y-koördinaat van reguitlyn ✓

$N(1,8;1,6)$ ✓✓

$3y+4x=12$

$y=-\frac{4}{3}x+4$

Raaklyn

$1,6=\frac{3}{4}(1,8)+c$ ✓ vervang in

Vergelyking van raaklyn deur N

$y=\frac{3}{4}x+\frac{1}{4}$ ✓

Die y-afsnit is $\frac{1}{4}$ ✓

(8)

[15]

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VRAAG 12

$\left(x-\frac{5}{2}\right)^2+(y-3)^2=\frac{25}{4}$ ✓

$B\left(\frac{5}{2};3\right)$ ✓

$m_{BC}=-\frac{4}{3}$ ✓

Gradiënt vir $h(x)$ om 'n raaklyn by *C* te wees (raaklyn loodreg op radius):

$m=\frac{3}{4}$ ✓

'n Raaklyn by *C* sal 'n vergelyking hê van

$1=\frac{3}{4}(4)+c$

$y=\frac{3}{4}x-2$ ✓

$h(x)=\frac{1}{4}x+px+t$

Dus

$p=\frac{1}{2}$ ✓

$t=-2$ ✓

[7]

72 punte

Totaal: 150 punte

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