Gr.12

Totaal: 50
Tyd: 1 uur

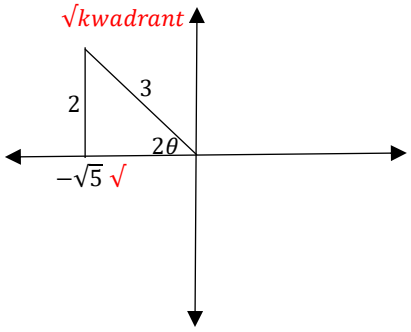
Kwartaal 2, Toets 3 (Trigonometrie) 2024 – Memorandum

Vraag 1

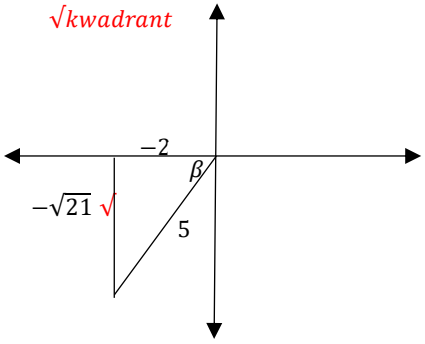
1.1 Gegee dat $12sin2\theta - 8 = 0$, waar $90° \leq 2\theta \leq 270°$ en $cos\beta = -\frac{2}{5}$, waar $\beta \epsilon [180°; 360°]$.

Met behulp van 'n diagram en sonder die gebruik van 'n sakrekenaar, bepaal die waardes van:

$sin2\theta = \frac{2}{3}$ $\sqrt{kwadrant}$



$cos\beta = -\frac{2}{5}$ $\sqrt{kwadrant}$



1.1.1 $tan2\theta$ (3)

$= -\frac{2}{\sqrt{5}}$ √

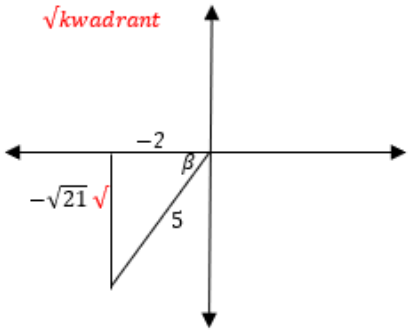
1.1.2 $sin\theta cos\theta$ (2)

$sin2\theta = 2sin\theta cos\theta$ √

$\frac{2}{3} = 2sin\theta cos\theta$

$sin\theta cos\theta = \frac{1}{3}$ √

1.1.3 $\cos(\beta + 45°)$ $cos\beta = -\frac{2}{5}$ $\sqrt{kwadrant}$ (6)



$= cos\beta.cos45° - sinB.sin45°$ √

$= \frac{-2}{5}.\frac{1}{\sqrt{2}} + \frac{\sqrt{21}}{5}$ √ $.\frac{1}{\sqrt{2}}$ √

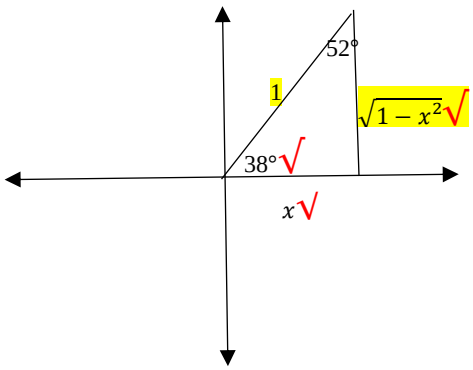
$= \frac{-2}{5}.\frac{\sqrt{2}}{2} + \frac{\sqrt{21}}{5}.\frac{\sqrt{2}}{2}$

$= \frac{-2\sqrt{2}}{10} + \frac{\sqrt{42}}{10}$

$= \frac{-2\sqrt{2}+\sqrt{42}}{10}$ √

1.2 Gegee: $sin38° = \sqrt{1-x^2}$

Druk, **met behulp van 'n diagram,** die volgende in terme van x uit:



$cos150°.cos(-52°) + sin30°.sin52°$ (8)

$= -cos30°\surd.cos\,52°\surd + sin30°.sin52°$
$= -\frac{\sqrt{3}}{2}.\sqrt{1-x^2} + \frac{1}{2}\surd.x\surd$
$= \frac{x-\sqrt{3}\sqrt{1-x^2}}{2}$
$= \frac{x-\sqrt{3-3x^2}}{2}\surd$

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Vraag 2

2.1 Bewys die identiteite:

2.1.1 $cos^{\,2}(180° + x) + tan(x - 180°).sin(720° - x).cosx = cos2x$ (6)

$LK = cos^{\,2}(-x) + tan\,x\surd.-sin\,x\surd.cosx$
$LK = cos^{\,2}x\surd + \frac{sinx}{cosx}\surd.-sin\,x.cosx$
$LK = cos^{\,2}x - sin^{\,2}x\surd$
$LK = cos2x\surd$
$\therefore LK = RK$

2.1.2 $\frac{sin2\alpha}{sin\alpha} - \frac{cos2\alpha}{cos\alpha} = \frac{1}{cos\alpha}$ (4)

$LK = \frac{sin2\alpha cos\alpha - cos2\alpha sin\alpha\surd}{sin\alpha cos\alpha\surd}$
$LK = \frac{sin(2\alpha-\alpha)\surd}{sin\alpha cos\alpha}$
$LK = \frac{sin\alpha}{sin\alpha cos\alpha}$
$LK = \frac{1}{cos\alpha}\surd$

2.2 Bepaal die algemene oplossing vir die volgende:

$$tan\,x = \frac{cos\,240°.sin\,150°}{tan\,315°}$$ (7)

$tan\,x = \frac{-cos60°.sin30°}{-tan45°}$ √
$tan\,x = -\frac{1}{2}.\frac{1}{2} \div -1$ √
$tan\,x = \frac{1}{4}$ √
1) $x = 14{,}04° + 180°k; k\epsilon Z$ √
3) $x = 180° + 14{,}04° + 180°k; k\epsilon Z$
1) $x = 194{,}04° + 180°k$ √

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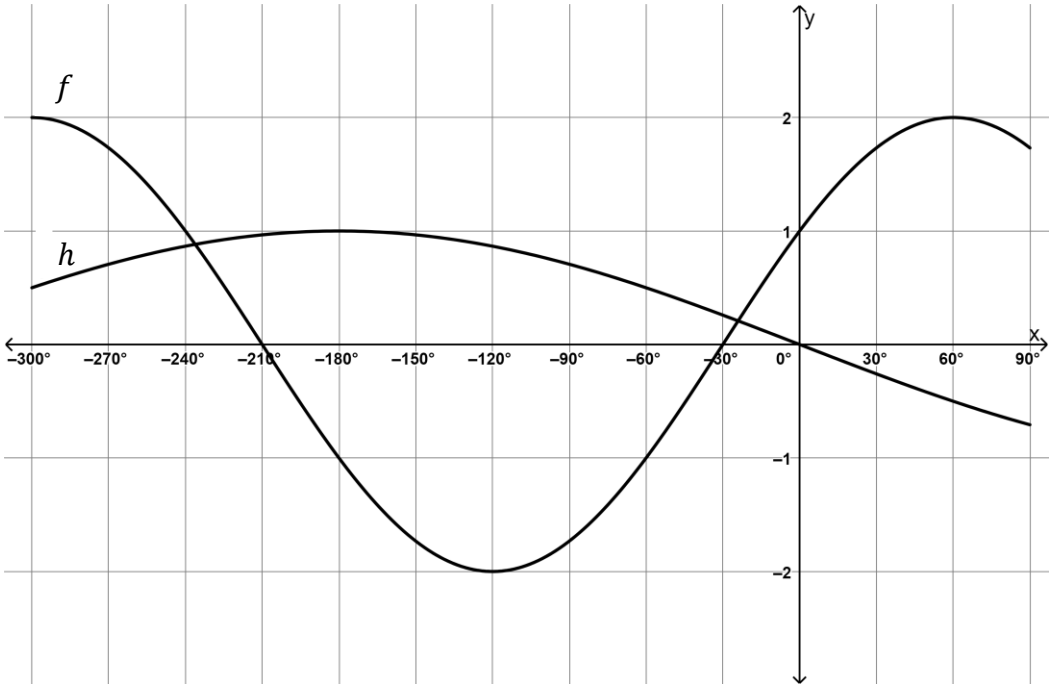
Vraag 3

In die onderstaande diagram is die grafieke van $f(x) = a\,cos(x + p)$ en $h(x) = c\,sin(dx)$ vir $x \in [-300°; 90°]$ geteken.



3.1 Skryf die waardes van *a* en p neer. (2)

$p = -60°$ √
$a = 2$ √

3.2 Beskryf die transformasie van f na k, indien $k(x) = -2sinx$. (2)

$f(x)$ word 30° na regs √ geskuif en in die x-as gereflekteer √.

3.3 Skryf die waardes van *c* en *d* neer. (2)

$c = -1$ √
$d = \frac{1}{2}$ √

3.4 Skryf die waarde(s) van x neer, waarvoor $x.f(x) < 0$. (2)

$x \in (-300°;210°)$√ $\cup\, x \in (-30°;0°)$√

3.5 Bepaal $2f(x+150°)$ in sy eenvoudigste vorm. (3)

$2f(x+120°) = 2[2cos(x-60°+150°)]$√
$2f(x+120°) = 4\,cos(x+90°)$√
$2f(x+120°) = 4\,cos(x+90°)$
$2f(x+120°) = -4sinx$√

3.6 Skryf die minimum waarde van g neer, indien $g(x) = \frac{1}{2}h(x) + 1$. (3)

$g(x) = \frac{1}{2}(-sin\left(\frac{1}{2}x\right)) + 1$
$g(x) = -\frac{1}{2}sin\left(\frac{1}{2}x\right)$√ $+ 1$√
Minimum waarde: $y = \frac{1}{2}$√

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Totaal: [50]