

# PolyMathic

Die beste eksamen voorbereiding  
Kry 20x vraestelle, 20x Memos en  
Videos waarin elke vraag stap-vir-stap  
verduidelik word vir slegs R25pm

Vir meer inligting gaan na:  
[PolyMathic.co.za](http://PolyMathic.co.za) of  
Whatsapp: 081 697 6555

**Lees asseblief die  
inligting op die  
volgende bladsy  
aandagtig deur!**

# Jou Handleiding

**Hierdie is jou “handleiding”, lees hom asseblief deeglik deur.**

1. Hierdie PDF bestaan uit 10 vraestelle en 10 memos.
2. Die vraestelle en memos is gerangskik as Vraestel 1/Memo1/ Vraestel 2/Memo 2 ens.
3. Voor elke vraestel is ’n blad wat aandui dat jy met ’n nuwe vraestel en memo begin.
4. Die voorblaaie, instruksies en formule bladsye is verwyder om papier te spaar. Direk na hierdie bladsy is ’n enkele “instruksies” blad sowel as ’n “Formule blad”.
5. Moet asseblief nie onnodig print nie. Probeer hiermee werk sonder om te print, dit sal ongelooflik wees vir die omgewing (en jou gatsak – ink en papier is duur).
6. Hierdie is vorige skool en departementele vraestelle wat verniet beskikbaar is op die internet. Dit beteken dat daar foute is in die memos maar dat dit reg is in die video’s. Dit beteken ook jy kan hierdie pdf deel maar nie verkoop nie (jy het nie hierdie pdf by ons gekoop nie – maar die video’s).
7. Jy gaan die meeste baat vind by hierdie program as jy die vraestelle uitwerk asof jy in ’n eksamen sit (in die voorgeskrewe tyd en sonder hulp van jou handboek). Merk dit dan met die memos en kyk laastens die video’s van die vrae wat jy nie verstaan nie.
8. Die Video’s is beskikbaar op ons webblad: PolyMathic waar jy die betaling gemaak het. Gebruik die epos en Password wat jy gebruik het met “signup” om in te teken, gaan dan na “dashboard” en laastens klik jy op die “course”.
9. Ek maak ook foute – daar is definitief foute wat deurglip. As jy dink iets is nie reg nie – kontak my! Jy het my nommer. Of klik op “questions and answers” op die kursus en laat weet my so.
10. Die belangrikste van alles kragtens jou subskripsie. Jy subskripsie hardloop van die dag wat jy gekoop het, tot die dag wat jy hom self kanselleer. Aan die einde van die jaar verwyder ek jou van die graad waarop jy tans is en plaas ek jou op die volgende graad. As jy kies om nie die subskripsie te stop deur die loop van jou skoolloopbaan nie moet

jy steeds onthou om hom te stop aan die einde van Gr12 anders gaan jy verewig aanhou betaal!

11. As enigiets nie werk soos dis moet nie (bv. 'n video wil nie speel nie) laat weet my op WhatsApp of direk op die kursus. Moet asb. nie 'n Facebook comment gaan los iewers nie – dis onmoontlik om by hulle almal uit te kom.

# Instruksies en Inligting

## wat voor op 'n Vraestel

### verskyn.

Hierdie is min of meer hoe die instruksies vooraan elke vraestel lyk.

**LEES DIE BLAD OP JOU AMPTELIKE VRAESTEL AANDAGTIG DEUR!** Dit gaan waarskynlik effens verskil van die een.

Tyd: (dis hoe lank jy het om die vraestel te voltooi)

Punte: (uit hoeveel die vraestel tel)

1. Skryf jou naam en klas (bv. 11A) op die antwoordboek wat voorsien is.
2. Hierdie vraestel bestaan uit "x" vrae. Beantwoord ALLE vrae in die antwoordboek behalwe Vraag "y" wat op die grafiekpapier wat verskaf is beantwoord moet word. Vul jou naam in die aangeduide spasie bo-aan die grafiekpapier in.
3. Begin elke vraag op 'n nuwe bladsy
4. Nommer die antwoorde PRESIES soos in die vraestel
5. Los 'n lyn oop tussen opeenvolgende vrae.
6. 'n Nie-programmeerbare sakrekenaar mag gebruik word.
7. Jy mag toepaslike Wiskunde instrumente gebruik
8. Gebruik jou formuleblad!
9. Toon alle formules, vervangings en stappe
10. Rond alle antwoorde af tot "z" desimale plekke. (Gewoonlik 2 maar kan verskil).
11. Gee kort motiverings waar nodig
12. Skryf netjies en leesbaar

# Formuleblad

Let asb op - hierdie is 'n Graad 12 Formuleblad. Gebruik slegs die formules wat jy nodig het vir die Graad waarin jy tans is.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1 + ni)$$

$$A = P(1 - ni)$$

$$A = P(1 - i)^n$$

$$A = P(1 + i)^n$$

$$T_n = a + (n - 1)d$$

$$S_n = \frac{n}{2}[2a + (n - 1)d]$$

$$T_n = ar^{n-1}$$

$$S_n = \frac{a(r^n - 1)}{r - 1}; r \neq 1$$

$$S_\infty = \frac{a}{1 - r}; -1 < r < 1$$

$$F = \frac{x[(1 + i)^n - 1]}{i}$$

$$P = \frac{x[1 - (1 + i)^{-n}]}{i}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x + h) - f(x)}{h}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c$$

$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \tan \theta$$

$$(x - a)^2 + (y - b)^2 = r^2$$

$$\text{In } \triangle ABC: \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$

$$\text{oppervlakte } \triangle ABC = \frac{1}{2} ab \cdot \sin C$$

$$\sin(\alpha + \beta) = \sin \alpha \cdot \cos \beta + \cos \alpha \cdot \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cdot \cos \beta - \cos \alpha \cdot \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \sin \alpha \cdot \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \sin \alpha \cdot \sin \beta$$

$$\cos 2\alpha = \begin{cases} \cos^2 \alpha - \sin^2 \alpha \\ 1 - 2\sin^2 \alpha \\ 2\cos^2 \alpha - 1 \end{cases}$$

$$\sin 2\alpha = 2\sin \alpha \cdot \cos \alpha$$

$$\bar{x} = \frac{\sum x}{n}$$

$$\sigma^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \text{ of } B) = P(A) + P(B) - P(A \text{ en } B)$$

$$\hat{y} = a + bx$$

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$

PolyMathic

Vraestel 1

Algebra

Eksamen

PolyMathic

## Graad 10 Wiskunde Vraestel

### Algebra

#### Junie eksamen

Totaal: 70

Tyd: 90min

### Vraag 1 [12]

1.1 Klassifiseer die volgende getalle as rasionaal, irrasionaal of nie-reeel.

1.1.1  $\sqrt{-25}$  (1)

1.2  $\sqrt{25}$  (1)

1.3  $\sqrt[3]{25}$  (1)

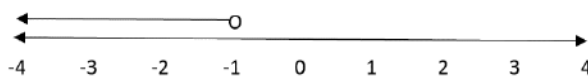
1.2 Skryf die volgende as gewone breuke in eenvoudigste vorm. Toon alle bewerkings. (Geen sakrekenaars).

1.2.1  $\sqrt{12\frac{1}{4}}$  (2)

1.2.2  $0,6\dot{4}$  (3)

1.3 Skryf die volgende as 'n ongelijkheid:  $(-5; 8]$  (2)

1.4 Skryf in intervalnotasie: (2)



### Vraag 2 [14]

Faktoriseer volledig:

2.1.1  $3m^2 - 19m + 20$  (2)

2.1.2  $y^3 - \frac{1}{8}$  (2)

Vereenvoudig:

2.2.1  $\frac{5 \cdot 2^x - 3 \cdot 2^x}{2^x}$  (3)

2.2.2  $\frac{x^2 - 4}{3x - 6}$  (3)

2.3 Die oppervlakte van 'n reghoek is  $2x^2 - x - 3 \text{ cm}^2$

2.3.1 Bepaal die lengte en breedte van die reghoek in terme van x. (2)

2.3.1 Vir watter waardes van x sal die reghoek 'n vierkant wees? (2)

### Vraag 3 [20]

Los op vir x

3.1  $\frac{7x+4}{2} \geq 3x - 1$  (2)

3.2  $2(x - 3) - x = -3(x - 2)$  (3)

3.3  $\frac{5x+2}{3} + \frac{x}{5} = \frac{3x-5}{15} + x$  (3)

3.4  $x^2 = 8x + 20$  (4)

3.5  $2^{x+1} \times 2^x = 64$  (4)

3.6  $2a(x - b) = 3(a - x)$  (4)

Vraag 4 [5]

Los op vir x en y:

$6x - y - 4 = 0$  en  $9x + 1 = -2y$  (5)

Vraag 5 [4]

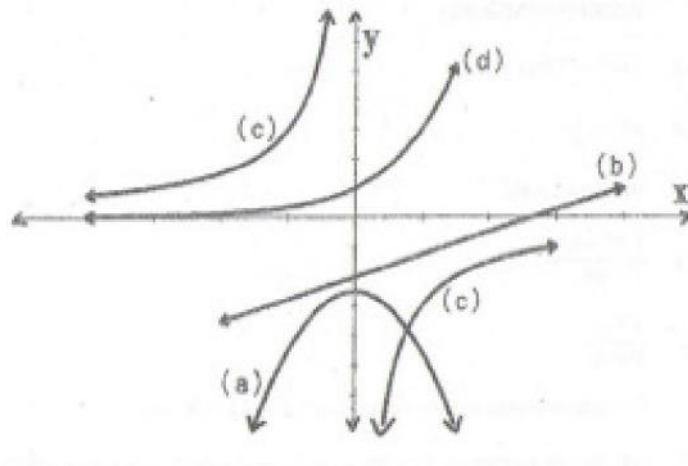
Kies elke keer 'n letter van die grafiek wat pas by die vergelyking. Akryf slegs die korrekte letter langs die nommer neer.

5.1  $y = \frac{k}{x}$

5.2  $y = a^x$

5.3  $y = mx + c$

5.4  $y = ax^2 + q$



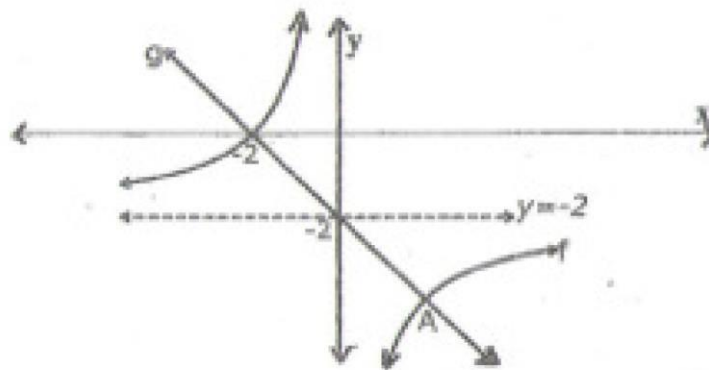
Vraag 6 [9]

Gegee is grafieke van  $f(x) = \frac{k}{x} + q$  en  $g(x) = mx - 2$  een van hulle sny punte is op die x-as.

6.1 Bepaal die waardes van k, q en m. (4)

6.2 Bepaal die koördinate van A, die sny punt van die grafieke. Toon alle stappe. (4)

6.3 Bepaal die vergelyking van die simmetrie-as van f met 'n positiewe helling. (1)



Vraag 7 [6]

Gegee:  $g(x) = 3^x + 1$

- 7.1 Skets  $g$  en toon alle afsnitte met die asse en asymptote, waar nodig. (3)
- 7.2 Gee die vergelyking van  $g$  se refleksie in die  $y$ -as. Noem dit  $k$ . (1)
- 7.3 Skryf die vergelyking van die funksie indien  $g$ , 5 eenhede na onder beweeg. Noem dit  $p$ . (1)
- 7.4 Gebruik jou antwoord in 7.3 en skryf neer die koördinate van die  $y$ -afsnit van  $p$ . (1)

-----EINDE-----



Vraag 1

- 1.1.1. Nie - Reël ✓ (1)
- 1.1.2. Rasionaal ✓ (1)
- 1.1.3. Irrasionaal ✓ (1)

1.2.1.  $\sqrt{\frac{1}{12\frac{1}{4}}}$   
 $= \sqrt{\frac{4}{48}} = \frac{1}{\sqrt{12}} = \frac{1}{2\sqrt{3}}$  (2)

1.2.2. 0,64  
 $x = 0,644\dots$   
 $10x = 6,44\dots$   
 $100x = 64,44\dots$   
 $90x = 58$   
 $x = \frac{58}{90} = \frac{29}{45}$  (3) *Answer only 0*

- 1.3.  $-5 < x \leq 8$  (2)
  - 1.4.  $(-\infty; -1)$  Hakies ook korrek (2)
- [12]

Vraag 2

2.1.1.  $3m^2 - 19m + 20$   
 $(3m - 4)(m - 5)$  ✓✓ *albei korrek* (2)

2.1.2.  $y^3 - \frac{1}{8}$   
 $(y - \frac{1}{2})(y^2 + \frac{1}{2}y + \frac{1}{4})$  (2)

2.2.  $\frac{5 \cdot 2^x - 3 \cdot 2^x}{2^x}$   
 $= \frac{2^x(5-3)}{2^x}$  *Faktoriserings*  
 $= 2$  (3)

2.2.  $\frac{x^2-4}{3x-6} = \frac{(x-2)(x+2)}{3(x-2)}$   
 $= \frac{x+2}{3}$  (3)

2.3.  $2x^2 - x - 3$   
 2.3.1.  $(2x-3)(x+1)$  ✓✓ *albei korrek* (2)

2.2.2.  $2x - 3 = x + 1$   
 $x = 4$  ✓ *(Answer only)* (2)

[14]

Vraag 3

3.1.  $\frac{7x+4}{2} \geq 3x-1$   
 $7x+4 \geq 6x-2$   
 $x \geq -6$  ✓ (2)

3.2.  $2(x-2) - x = -3(x-2)$   
 $2x-4-x = -3x+6$  *verenv.*  
 $4x = 12$  ✓ *CA*  
 $x = 3$  ✓ (3)

3.3.  $\frac{5x+2}{3} + \frac{x}{5} = \frac{3x-5}{15} + x$   
 $5(5x+2) + 3x = 3x-5 + 15x$  *aanw. met 15*  
 $25x+10+3x = 18x-5$   
 $10x = -15$  *verenv.*  
 $x = -\frac{3}{2}$  ✓ *antw.* (3)

3.4.  $x^2 = 8x + 20$   
 $x^2 - 8x - 20 = 0$   
 $(x+2)(x-10) = 0$   
 $x = -2$  ✓ of  $x = 10$  ✓ (4)

3.5.  $2^{x+1} \times 2^x = 64$   
 $2^{2x+1} = 2^6$   
 $2x+1 = 6$   
 $x = \frac{5}{2}$  ✓ (4)

3.6.  $2a(x-b) = 3(a-x)$  *verenv.*  
 $2ax - 2ab = 3a - 3x$   
 $2ax + 3x = 3a + 2ab$   
 $x(2a+3) = 3a + 2ab$   
 $x = \frac{3a+2ab}{2a+3}$  ✓  
 of  $\frac{a(3+2b)}{2a+3}$  (4)

[20]

Vraag 4

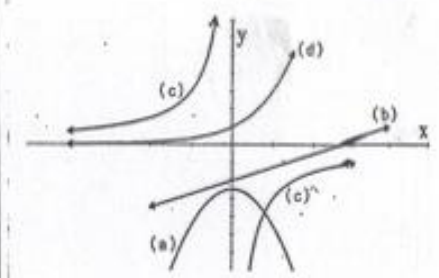
$6x - y - 4 = 0$  en  $9x + 1 = -2y$   
 $6x - 4 = y$  ..... ① ✓  
 $9x + 1 = -2y$  ..... ② ✓

$\therefore 9x + 1 = -2(6x - 4)$  ✓  
 $9x + 1 = -12x + 8$   
 $21x = 7$  ✓  
 $x = \frac{1}{3}$  ✓  
 $y = -2$  ✓

OF:  $6x - y = 4$  ..... ① ✓  
 $9x + 2y = -1$  ..... ② ✓  
 $12x - 2y = 8$  ..... ③ ✓  
 $21x = 7$  ✓  
 $x = \frac{1}{3}$  ✓  
 $y = -2$  ✓

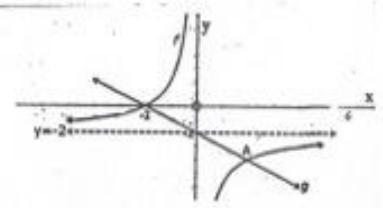
[5]

Vraag 5



- 5.1.1. (c) ✓
  - 5.1.2. (d) ✓
  - 5.1.3. (b) ✓
  - 5.1.4. (a) ✓
- [4]

Vraag 6



6.1.  $f(x) = \frac{k}{x} - 2$   
 $(-2; 0)$ :  $0 = \frac{k}{-2} - 2$  *instel pt*  
 $2 = \frac{k}{-2}$   
 $k = -4$  ✓  
 $g = -2$  ✓  
 $m = -1$  ✓ (4)

$f(x) = \frac{-4}{x} - 2$   
 $g(x) = -x - 2$

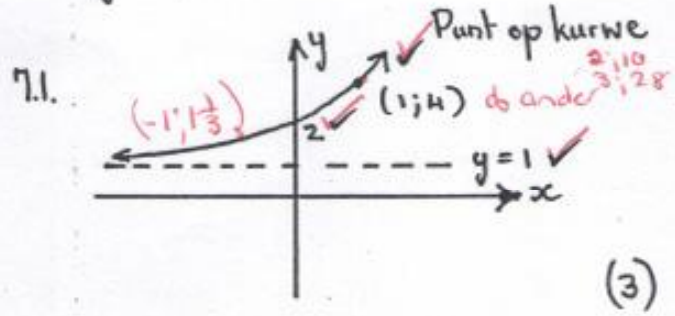
6.2.  $\frac{-4}{x} - 2 = -x - 2$  ✓  
 $-4 - 2x = -x^2 - 2x$  ✓  
 $x^2 - 4 = 0$   
 $x = \pm \sqrt{4} = \pm 2$  ✓ (kan staps 2 omrekenen)

$\therefore y = -2 - 2 = -4$   
 $\therefore A(2; -4)$  ✓ ✓ Staps antw:  $\frac{2}{4}$   
 (4)

6.3.  $y = x - 2$  ✓  
 (1)  
 [9]

Vraag 7

$g(x) = 3^x + 1$



7.2.  $k(x) = (\frac{1}{3})^x + 1$  ✓  
 OF  $k(x) = (3)^{-x} + 1$  ✓  
 (1)

-1 notatie

7.3.  $p(x) = 3^x - 4$  ✓ (1)

7.4.  $(0; -3)$  ✓ (1)  
 (Moet koördinate wees)  
 [6]

PolyMathic

Vraestel 2

Meetkunde

& Trig

Eksamen

PolyMathic

## Graad 10 Wiskunde Vraestel

### Meetkunde en Trig

#### Junie eksamen

Totaal: 40

Tyd: 1uur

### Vraag 1 [10]

Vereenvoudig die volgende sonder 'n sakrekenaar (toon al jou stappe).

1.1  $\cos 30^\circ \cdot \tan 60^\circ$  (3)

1.2  $\frac{\cos^2 45^\circ}{\sin 30^\circ}$  (3)

1.3  $\frac{\sin \theta \cdot \operatorname{cosec} \theta}{\cos \theta \cdot \sec \theta}$  (4)

### Vraag 2 [7]

As  $\sin \theta = \frac{7}{10}$  en  $\theta$  is 'n stomphoek, maak 'n skets en bepaal die volgende (sonder om 'n sakrekenaar te gebruik). Los jou antwoord in vereenvoudigde wortelvorm. (2)

2.1  $\cos \theta$  (1)

2.2  $\tan^2 \theta$  (2)

2.3  $\frac{\cos \theta}{\sin \theta}$  (2)

### Vraag 3 [18]

3.1 Los op vir  $\theta$  as  $0^\circ \leq \theta \leq 90^\circ$  (Toon alle stappe).

3.1.1  $3 \sin(\theta + 10^\circ) = \frac{3}{2}$  (2)

3.1.2  $\cos 3\theta = 0,8$  (2)

3.1.3  $3 \tan \theta + 1 = 2,736$  (2)

3.2 In  $\triangle ABC$  is  $\hat{C} = 90^\circ$ ;  $\hat{A} = 50,79^\circ$  en  $\hat{B} = 39,21^\circ$ . Bepaal:

3.2.1  $\frac{1}{\cot A}$  (2)

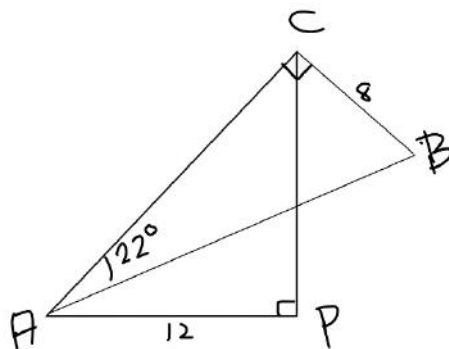
3.2.2  $\frac{\tan^3(4A-B)}{2}$  (2)3.3

$\triangle APC$  en  $\triangle ABC$  is reghoekige driehoeke met  $BC = 8$ ,  $AP = 12$  en  $\hat{CAB} = 22^\circ$ . Bereken:

3.3.1  $AC$  (3)

3.3.2  $\hat{CAP}$  (2)

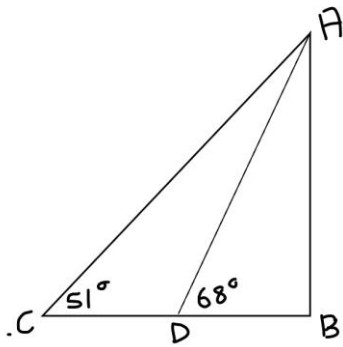
3.3.3  $MP$  (3)



#### Vraag 4 [5]

Danie staan 16 meter Wes van 'n gebou en kyk met 'n hoogtehoek van  $68^\circ$  na die toppunt van die gebou. Carel staan verder Wes van Danie en kyk met 'n hoogtehoek van  $51^\circ$  na die toppunt van dieselfde gebou. Bereken:

- 4.1 Die hoogte van die gebou (AB). (2)
- 4.2 Die afstand tussen Danie en Carel (CD). (3)



-----EINDE-----

Meno

Vraag 1

1.1  $\cos 30^\circ \tan 60^\circ$   
 $= \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{1}$   
 $= \frac{3}{2}$  (3)  
 Moet ten minste een reg. om te CA.

1.2.  $\frac{\cos^2 45^\circ}{\sin 30^\circ}$   
 $= \left(\frac{1}{\sqrt{2}}\right)^2 \div \frac{1}{2}$   
 $= \frac{1}{2} \times \frac{2}{1} = 1$  (3)

1.3.  $\frac{\sin \theta \cdot \operatorname{cosec} \theta}{\cos \theta \cdot \sec \theta}$   
 $= \frac{\sin \theta \cdot \frac{1}{\sin \theta}}{\cos \theta \cdot \frac{1}{\cos \theta}}$   
 $= 1$  (4)  
 Nic CA [10]

Vraag 2

Kwadraat (+/-)

2.  $\sin \theta = \frac{7}{10}$   
 $x^2 = 10^2 - 7^2$   
 $x = \pm\sqrt{51} \therefore x = -\sqrt{51}$  (2)  
 Kwadraat + verhoudingskorrek

2.1.  $\cos \theta = \frac{-\sqrt{51}}{10}$  (1)

2.2.  $\tan^2 \theta = \left(\frac{7}{-\sqrt{51}}\right)^2$   
 $= \frac{49}{51}$  (3)

2.3.  $\frac{\cos \theta}{\sin \theta} = \frac{-\sqrt{51}}{10} \times \frac{10}{7}$   
 $= \frac{-\sqrt{51}}{7}$  (2)  
 Nic CA [11]

Vraag 3

BD. 10 afreek

3.1.1  $3 \sin(\theta + 10^\circ) = \frac{3}{2}$   
 $\sin(\theta + 10^\circ) = \frac{1}{2}$  } bewerking  
 $\theta + 10^\circ = 30^\circ$   
 $\theta = 20^\circ$  (2)  
 antw.

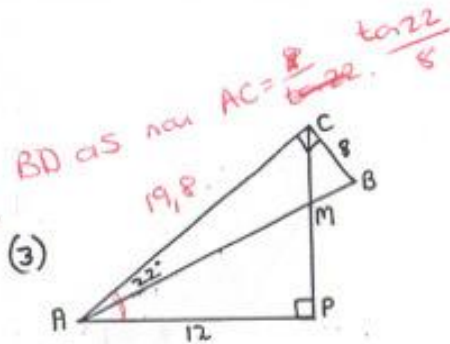
3.1.2.  $\cos 3\theta = 0,8$   
 $3\theta = 36,86989765$   
 $\theta = 12,29^\circ$  (2)  
 korrek afgerond

3.1.3.  $3 \tan \theta + 1 = 2,736$   
 $3 \tan \theta = \frac{2,17}{1,736} / 1,736$  } bewerking  
 $\tan \theta = \frac{2,17}{3,75} / 0,5786666...$   
 $\theta = 30,06^\circ$  (2)  
 Moet afraad

3.2.1.  $\frac{1}{\cot A} = 1 \div \frac{1}{\tan A}$   
 $= \tan 50,79$   
 $= 1,23$  (2)  
 Moet afraad.

3.2.2.  $\frac{\tan^3(4A - B)}{2}$   
 $= \frac{[\tan(4 \times 50,79 - 39,21)]^3}{2}$   
 $= -0,01$  (2)  
 Nic CA

3.3.1.  $\tan 22^\circ = \frac{8}{AC}$   
 $AC = \frac{8}{\tan 22^\circ}$   
 $= 19,80$  eenh. (3)



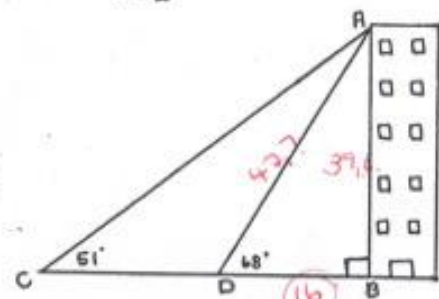
3.3.2.  $\cos \hat{C}AP = \frac{12}{19,8}$  CA vanaf 3.3.1  
 $\hat{C}AP = 52,69^\circ$  (2)

3.3.3.  $\hat{M}AP = 30,69^\circ$  CA vanaf 3.3.2  
 $\therefore \tan 30,69 = \frac{MP}{12}$   
 $MP = 7,12$  eenh. (3)  
 [18]

Vraag 4

4.1.  $\tan 68^\circ = \frac{AB}{16}$   
 $AB = 39,60$  m (2)

4.2.  $\tan 51^\circ = \frac{39,6}{CB}$   
 $CB = 32,07$   
 $\therefore CD = 32,07 - 16$   
 $= 16,07$  meter (3)



Totaal: 40

[5]

PolyMathic

Vraestel 3

Algebra

Eksamen

PolyMathic

# Algebra Vraestel

Totaal: 50

Tyd: 60

## VRAAG 1

1.1 Skryf 0,88 oor as 'n gewone breuk. (1)

1.2 Vir watter waarde(s) van  $x$  is die uitdrukking ongedefinieer as

$$f(x) = \sqrt{\frac{9}{11-x}} \text{ en } x \in \{-5, 0, 11\}?$$
 (1)

1.3 Bepaal tussen watter twee heelgetalle die volgende irrasionale getal lê.

$$\sqrt{45}$$
 (2)  
[4]

## VRAAG 2

2.1 Vereenvoudig:

2.1.1  $(2x+3)(2x^2-x-2)$  (2)

2.1.2  $\frac{x+3}{x-3} \times \frac{x^3-27}{x^2-9} \times \frac{x-3}{x^2+3x+9}$  (3)

2.1.3  $\frac{2x^2y^{-2} \times 8x^{-5}y^8}{(2x^{-2}y^4)^2}$  (3)

2.2 Faktoriseer volledig:

2.2.1  $2a^2 + 9a - 5$  (2)

2.2.2  $a^2 + a(4+b) + 4b$  (3)  
[13]

## VRAAG 3

3.1 Los op vir  $x$ :

3.1.1  $(x-a)(x+b) = 0$  (2)

3.1.2  $2^x + 2^{x-1} = 12$  (4)

3.2 Los op vir  $x$  en stel jou antwoord op 'n getallelyn voor as  $x = N_0$ .

$2(2x-3) - 18 \geq 2x$  (4)



3.3 Los vir  $x$  en  $y$  gelyktydig op:

$$2x + y = 6$$

$$4x + 3y = 10$$

(5)  
[15]

#### VRAAG 4

4.1 Gegee die getalpatroon:  $\frac{1}{2}$  ;  $\frac{2}{5}$  ;  $\frac{6}{8}$  ;  $\frac{8}{11}$  ...

4.1.1 Skryf die volgende TWEE terme in die patroon neer. (1)

4.1.2 Bepaal die algemene term. (3)

4.2 Gegee:  $T_n = -2n^3$

4.2.1 Bepaal die 8<sup>ste</sup> term. (1)

4.2.2 Watter term is  $-432$ ? (2)  
[7]

#### VRAAG 5

5.1 Gegee:  $f(x) = x^2 - 2$  en  $g(x) = 3^x$

5.1.1 Skets die grafiek vir  $f(x)$  en  $g(x)$  op dieselfde assestelsel. Dui alle afsnitte op die grafiek duidelik aan. (4)

5.1.2 Vir watter waarde(s) van  $x$  is  $g(x) > 1$ ? (1)

5.1.3 Skryf die waardeversameling van  $f(x)$  neer. (1)

5.1.4 Beskryf die transformasie van  $f(x)$  na  $h(x) = (x - 2)(x + 2)$ . (2)

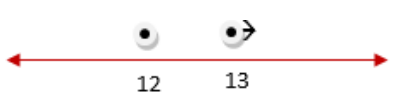
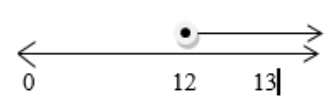
5.2 Bepaal die vergelyking van die funksie  $g(x) = \frac{a}{x} + q$ , waar  $y = -2$  die asimptoot is. Die reguit lyn  $f(x) = -x$  sny die grafiek van  $g(x)$  by die punt  $(5; -5)$ . (3)  
[11]

**TOTAAL: 50**

# Memo

VRAAG 1					
1.1		$0,88 = \frac{88}{100} = \frac{44}{50} = \frac{22}{25}$	✓Enige aanvaardbare gewone breuk	(1)	
1.2		$x = 11$ ongedefinieerd	11✓	(1)	
1.3		Tussen 6 en 7	6✓,7✓	(2)	
					[4]
VRAAG 2					
2.1	2.1.1	$(2x + 3)(2x^2 - x - 2)$ $= 4x^3 - 2x^2 - 4x + 6x^2 - 3x - 6$ $= 4x^3 + 4x^2 - 7x - 6$	vermenigvuldiging✓ vereenvoudiging✓	(2)	
	2.1.2	$\frac{x+3}{x-3} \times \frac{x^3-27}{x^2-9} \times \frac{x-3}{x^2+3x+9}$ $= \frac{x+3}{x-3} \times \frac{(x-3)(x^2+3x+9)}{(x-3)(x+3)} \times \frac{x-3}{x^2+3x+9}$ $= 1$	$(x-3)(x^2+3x+9)$ $(x-3)(x+3)$ ✓✓ 1✓	(3)	
	2.1.3	$\frac{2x^2y^{-2} \times 8x^{-5}y^8}{(2x^{-2}y^4)^2}$ $= \frac{16x^{-3}y^6}{4x^{-4}y^8}$ $= 4xy^{-2}$ $= \frac{4x}{y^2}$	$x^{-3}y^6$ ✓ $4x^{-4}y^8$ ✓ $\frac{4x}{y^2}$ ✓	(3)	

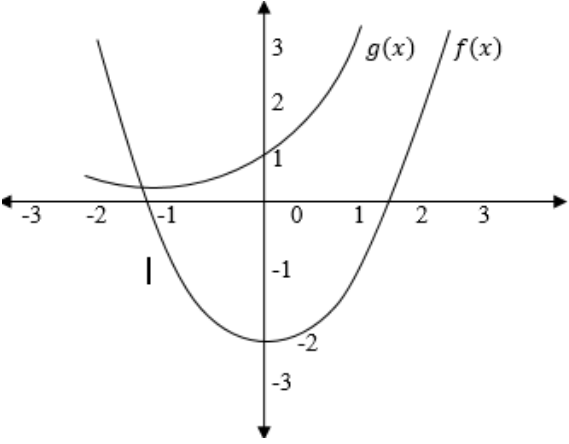
		OR $= \frac{2x^2 y^{-2} 8x^{-5} y^8}{4x^{-4} \cdot y^8}$ $= \frac{2x^2 \cdot x^4 \cdot 8y^8}{4y^8 \cdot y^2 \cdot x^5}$ $= 4xy^{-2}$ $= \frac{4x}{y^2}$	OR $x^{-4}y^8 \checkmark$ $2x^2 \cdot x^4 \cdot 8y^8 \checkmark$ $\frac{4x}{y^2} \checkmark$		
--	--	--	---	--	--

2.2	2.2.1	$(2a - 1)(a + 5)$	$(2a - 1)✓$ $(a + 5)✓$	(2)	
	2.2.2	$a^2 + a(4 + b) + 4b$ $=a^2 + 4a + ab + 4b$ $=(a^2 + 4a) + (ab + 4b)$ $=a(a + 4) + b(a + 4)$ $=(a + b)(a + 4)$	$4a + ab ✓$ $a(a + 4) + b(a + 4)✓$ Aanvaar alterniewe groepering $(a + b)(a + 4) ✓$	(3)	
					[13]
<b>VRAAG 3</b>					
3.1	3.1.1	$(x - a)(x + b) = 0$ $x - a = 0$ or $x + b = 0$ $x = a$ or $x = -b$	$x = a ✓$ $x = -b ✓$	(2)	
	3.1.2	$2^x + 2^{x-1} = 12$ $2^x \left(1 + \frac{1}{2}\right) = 12$ $2^x = 8$ $x = 3$	$2^x ✓$ $\left(1 + \frac{1}{2}\right) ✓$ of $(1 + 2^{-1})$ $8 ✓$ of $2^3$ $x = 3 ✓$	(4)	
3.2		$2(2x - 3) - 18 \geq 2x$ $4x - 6 - 18 \geq 2x$ $4x - 2x \geq 6 + 18$ $2x \geq 24$ $x \geq 12$  	Vereenvoudiging $4x - 6 ✓$ $x \geq 12 ✓$  Aanduiding op die getallyn en 12 moet ingesluit wees ✓ pypunt ✓  NB: Indien 12 ingesluit is en lyn - lpunt	(4)	

3.3	$2x + y = 6 \dots\dots\dots 1$ $4x + 3y = 10 \dots\dots\dots 2$ $y = 6 - 2x \dots\dots\dots 3$ Verv. 3 in 2 $4x + 3(6 - 2x) = 10$  $4x + 18 - 6x = 10$ $-2x = -8$ $x = 4$ Verv $x = 4$ in verg. 1 $2(4) + y = 6$ $8 + y = 6$ $y = -2$ Alternatiewe metode (eliminasiemetode) $2x + y = 6 \dots\dots\dots 1$ $4x + 3y = 10 \dots\dots\dots 2$ Vermenigvuldig verg. 1 met 2 $4x + 2y = 12 \dots\dots\dots 3$ $4x + 3y = 10 \dots\dots\dots 2$ Trek vergelyking 2 van verg. 3 af. $-y = 2$ $\therefore y = -2$ Verv. $y = -2$ in verg. 2 $4x + 3(-2) = 10$ $4x - 6 = 10$ $4x = 16$ $x = 4$	$y = 6 - 2x \checkmark$ vervanging $\checkmark$  $18 - 6x \checkmark$ $x = 4 \checkmark$  $y = -2 \checkmark$          Vermenigvuldig met 2 $\checkmark$      Elimineer $x \checkmark$   $y = -2 \checkmark$   Vervanging $\checkmark$   $x = 4 \checkmark$	(5)	[15]
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VRAAG 4					
4.1	4.1.1	$\frac{10}{14}; \frac{12}{17}$	$\checkmark 14 \checkmark 17$	(1)	
	4.1.2	Bo-aan = $2n$ Onder = $3n - 1$ $T_n = \frac{2n}{3n-1}$	$3n \checkmark - 1 \checkmark$	(3)	
4.2	4.2.1	$T_n = -2n^3$ $T_8 = -2(8)^3$ $T_8 = -1024$	$-1024 \checkmark$	(1)	
	4.2.2	$-432 = -2n^3$ $\frac{-432}{-2} = \frac{-2n^3}{-2}$ $216 = n^3$ $6 = n$	$T_n = -432 \checkmark$ $6 = n \checkmark$	(2)	
					[7]

## VRAAG 5

5.1	5.1.1	$f(x) = x^2 - 2$ $g(x) = 3^x$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td><math>x</math></td> <td>-1</td> <td>0</td> <td>1</td> </tr> <tr> <td><math>y</math></td> <td>-1</td> <td>-2</td> <td>-1</td> </tr> </table> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td><math>x</math></td> <td>-1</td> <td>0</td> <td>1</td> </tr> <tr> <td><math>y</math></td> <td><math>\frac{1}{3}</math></td> <td>1</td> <td>3</td> </tr> </table> 	$x$	-1	0	1	$y$	-1	-2	-1	$x$	-1	0	1	$y$	$\frac{1}{3}$	1	3	$f(x)$ en $g(x)$ $y$ -afsnit ✓✓  ✓✓ vorm van altwee grafieke	(4)
$x$	-1	0	1																	
$y$	-1	-2	-1																	
$x$	-1	0	1																	
$y$	$\frac{1}{3}$	1	3																	
	5.1.2	$x > 0$	$x > 0$ ✓	(1)																
	5.1.3	$y \geq -2$ <b>OR</b> $[-2; \infty)$	$y \geq -2$ ✓ <b>OR</b> $[-2; \infty)$ ✓ (brackets MUST be correct)	(1)																
	5.1.4	2 eenhede af	2 af ✓✓	(2)																
5.2	$g(x) = \frac{a}{x} + q$ $-5 = \frac{a}{5} - 2$ $-15 = a$ $g(x) = \frac{-15}{x} - 2$	vervanging ✓ van asimptote  vervanging (5;-5) ✓  $a = -15$ ✓	(3)	[11]																
<b>TOTAAL:</b>				<b>50</b>																

PolyMathic

Vraestel 4

Meetkunde

& Trig

Eksamen

PolyMathic



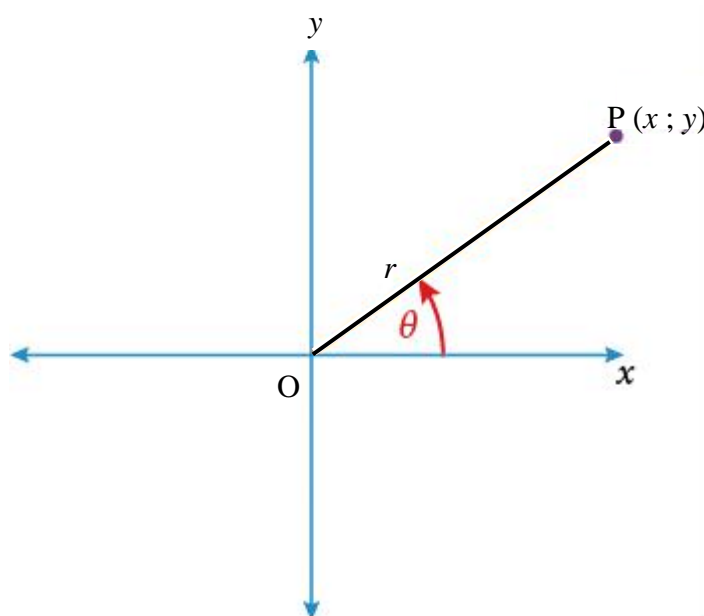
# Meetkunde en Trig

Totaal: 50

Tyd: 60min

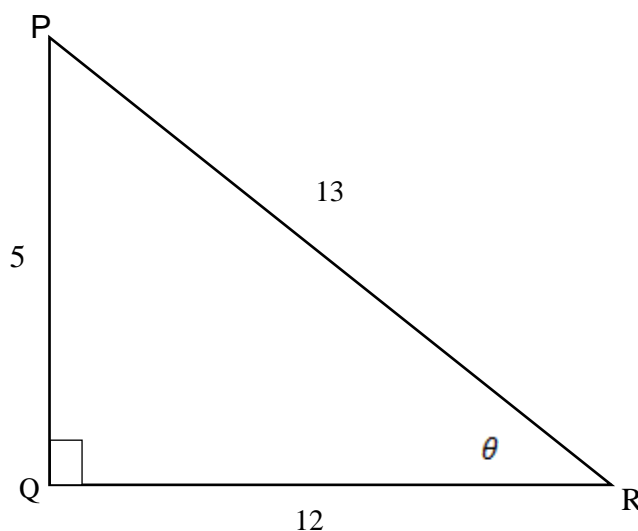
## VRAAG 1

- 1.1 Indien punt  $P(x; y)$  'n punt op die Kartesiese vlak is en  $OP = r$  eenhede. Bepaal  $\frac{\sin \theta}{\cos \theta}$ .



(3)

- 1.2 In  $\triangle PQR$ ,  $\hat{Q} = 90^\circ$  en  $\hat{R} = \theta$ .  $PQ = 5$  eenhede,  $QR = 12$  eenhede en  $PR = 13$  eenhede.



Gee die waardes van ...

1.2.1  $\sin \theta$

(1)

1.2.2  $\sec \theta$

(1)

1.2.3  $\tan \theta$

(1)

[6]

**VRAAG 2**

Indien  $4 \tan \theta = -3$  en  $\cos \theta$  positief is, gebruik 'n skets om die waarde van die volgende te bereken:

2.1  $5 \sin \theta + 3 \cot \theta$  (5)

2.2  $25 \cos^2 \theta$  (2)

[7]

**VRAAG 3**

3.1 Indien  $x = 42^\circ$  en  $y = 68^\circ$ , maak gebruik van jou sakrekenaar en bepaal die waarde van:

3.1.1  $\sin x + 2 \cos 3y$  (2)

3.1.2  $3 \tan^2(x + y)$  (2)

3.2 Bepaal die waarde van  $\theta$ , indien  $\theta \in 0^\circ \leq \theta \leq 90^\circ$ , korrek tot 3 desimale plekke.

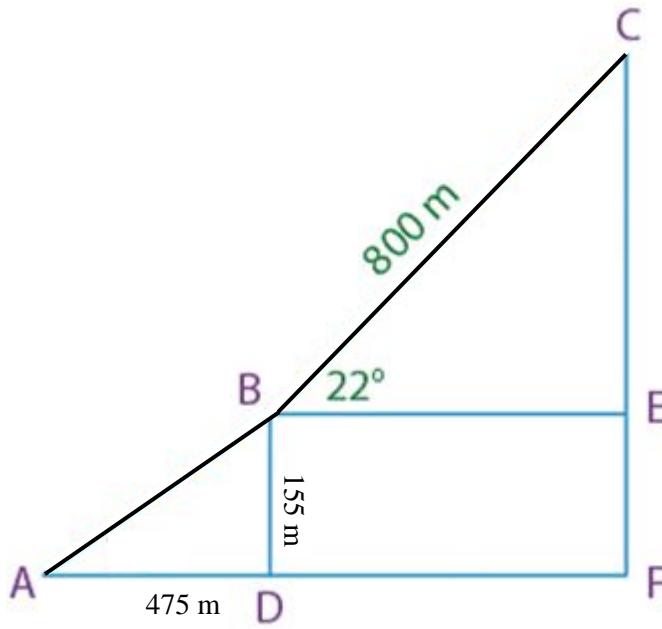
3.2.1  $2 \sin \theta = 1,432$  (2)

3.2.2  $\tan 3\theta = 6,345$  (3)

[9]

## VRAAG 4

- 4.1 In die diagram hieronder is BDFE 'n reghoek, met  $BD = 155$  m.  $AD = 475$  m en  $BC = 800$  m. Die hoogtehoek van B na C is  $22^\circ$ .



Bereken:

4.1.1  $\hat{A}$  (2)

4.1.2 CF (3)

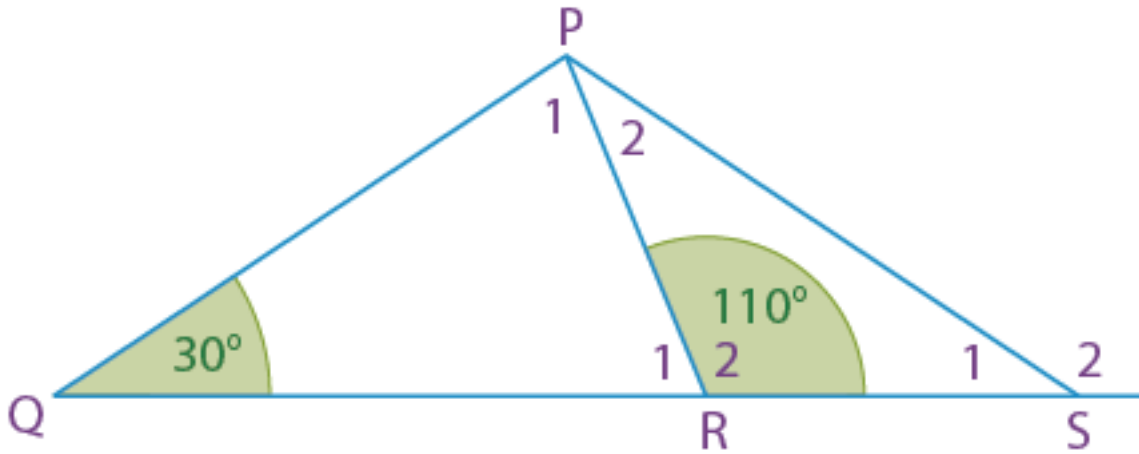
- 4.2 Bereken die waarde van die volgende sonder om jou sakrekenaar te gebruik:

$$\sin^2 45^\circ - \cos 60^\circ + \tan 10^\circ \cdot \cot 10^\circ \quad (4)$$

[9]

**VRAAG 5**

In die diagram,  $\hat{Q} = 30^\circ$ ,  $\hat{R}_2 = 110^\circ$  en  $PR = RS$ .



Bepaal, met redes, die groottes van die volgende hoeke:

5.1  $\hat{P}_1$

(2)

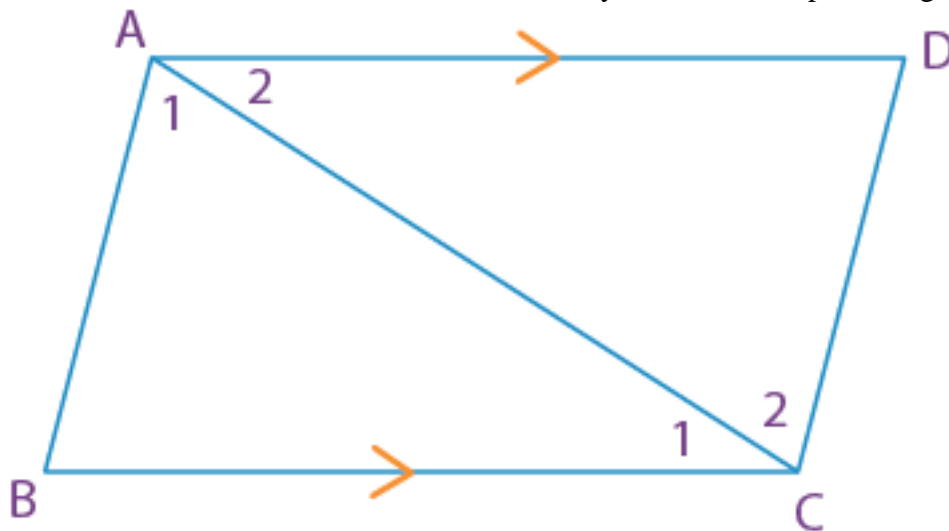
5.2  $\hat{P}_2$

(3)

[5]

**VRAAG 6**

In vierhoek  $ABCD$ ,  $AD \parallel BC$  en  $\hat{B} = \hat{D}$ . Bewys dat  $ABCD$  'n parallelogram is.

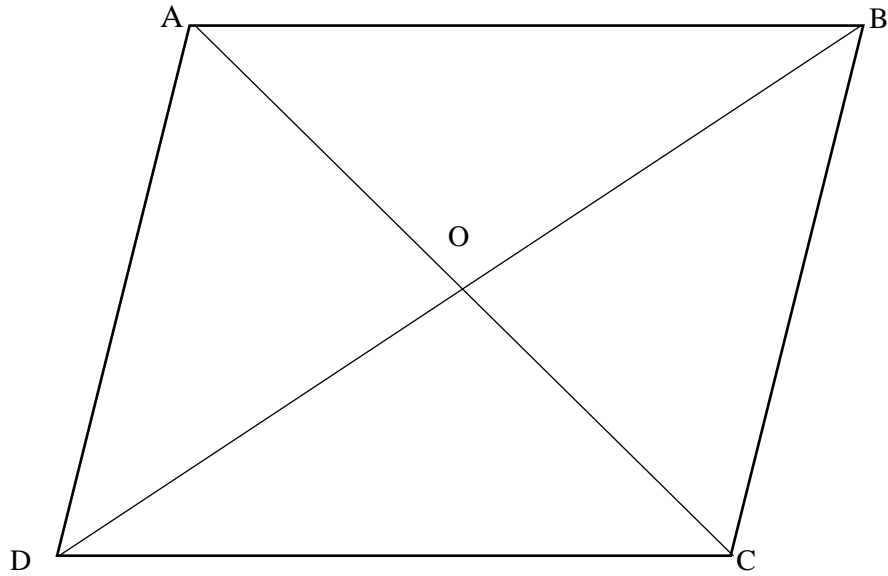


(5)

[5]

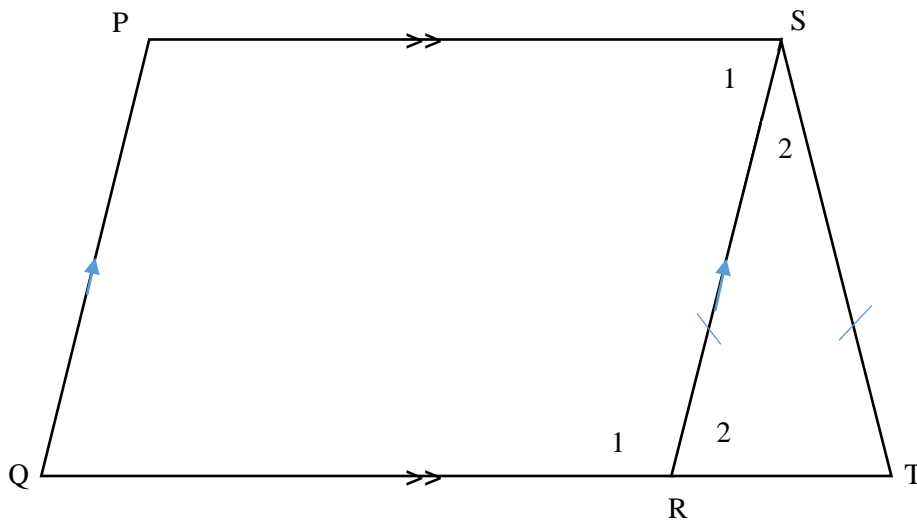
**VRAAG 7**

7.1 In die onderstaande vierhoek halveer diagonale AC en BD by O. Indien  $AC = 4xy$ ;  $BC = x^2 + y^2$  en  $BD = 2x^2 - 2y^2$ , bewys dat ABCD 'n rombus is.



(5)

7.2 PQRS is 'n parallelogram,  $SR = ST$  en  $\hat{P} = 120^\circ$ .



Indien  $\hat{S}_2 = 4x$ , bereken die waarde van  $x$ .

(4)

[9]

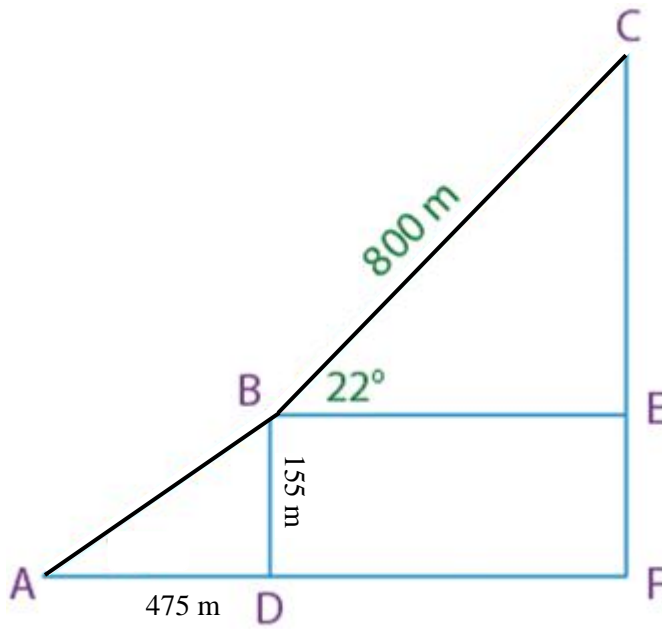
**TOTAAL: 50**

ANTWOORDVEL 1

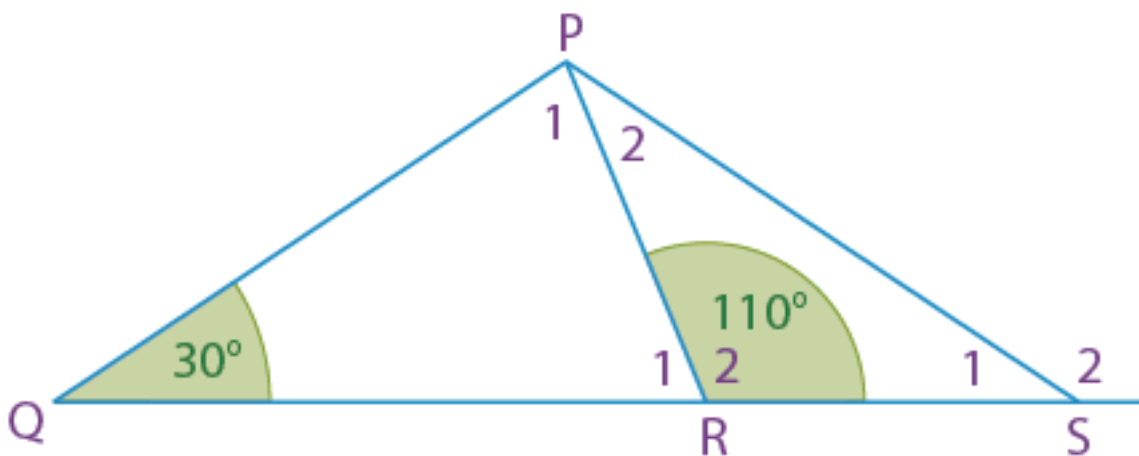
NAAM VAN LEERDER: \_\_\_\_\_

GRAAD: \_\_\_\_\_

VRAAG 4



VRAAG 5

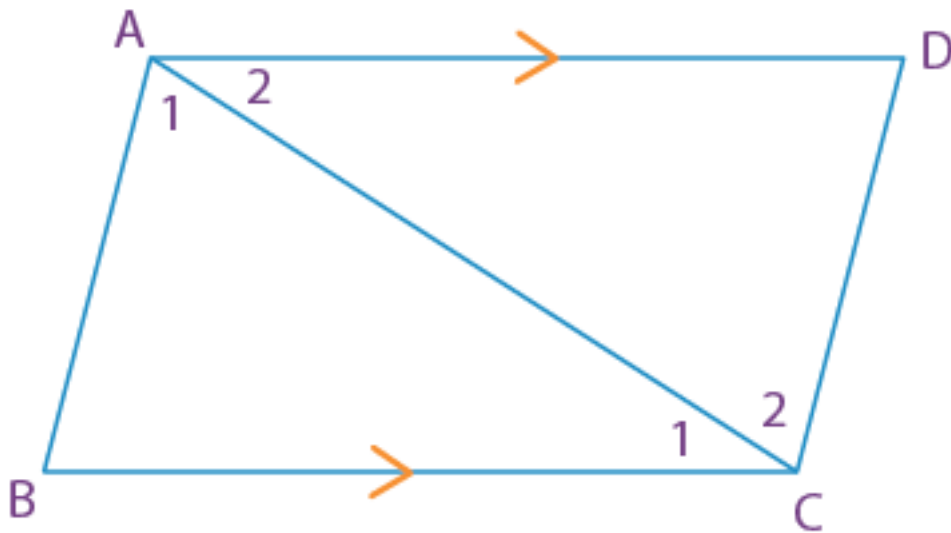


ANTWOORDVEL 2

NAAM VAN LEERDER: \_\_\_\_\_

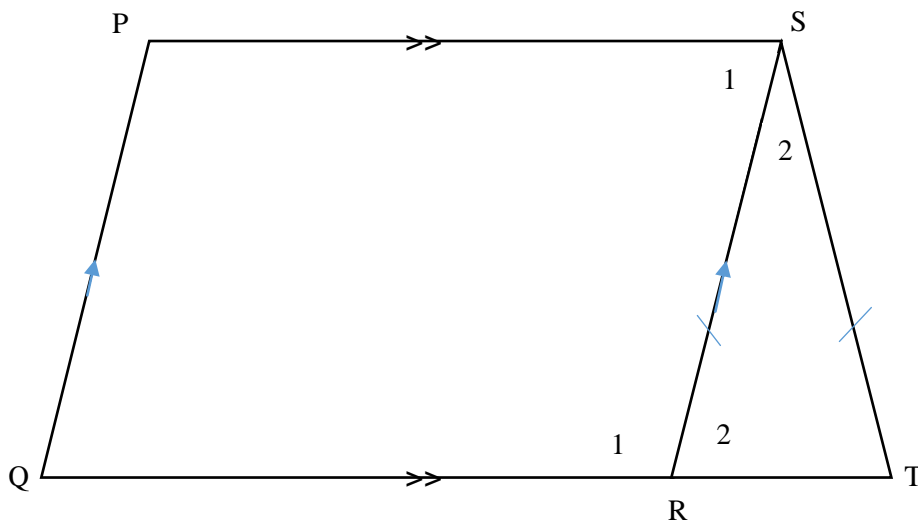
GRAAD: \_\_\_\_\_

VRAAG 6



VRAAG 7

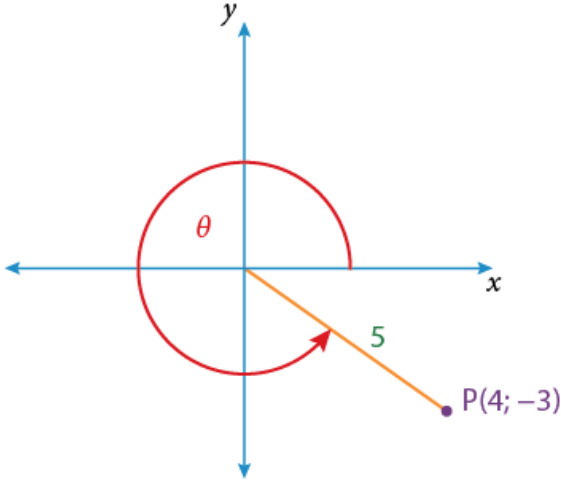
7.2



# Memo

VRAAG 1			
1.1	$\frac{\sin\theta}{\cos\theta} = \frac{y}{r} \div \frac{x}{r}$ $= \frac{y}{r} \times \frac{r}{x}$ $= \frac{y}{x}$	✓ verhouding  ✓ vereenvoudig  ✓ gevolgtrekking (3)	
1.2.1	$\sin \theta = \frac{PQ}{PR} = \frac{5}{13}$	✓ antwoord (1)	
1.2.2	$\sec \theta = \frac{PR}{QR} = \frac{13}{12}$	✓ antwoord (1)	
1.2.3	$\tan \theta = \frac{PQ}{QR} = \frac{5}{12}$	✓ antwoord (1)	
			<b>[6]</b>



VRAAG 2			
2.1		✓korrekte kwadrant	
	$4 \tan \theta = -3$ $\therefore \tan \theta = -\frac{3}{4} = \frac{y}{x}$ $r^2 = x^2 + y^2$ $r^2 = (4)^2 + (-3)^2$ $r = 5$	✓ $r = 5$	
	$5 \sin \theta + 3 \cot \theta$ $= 5 \left( \frac{-3}{5} \right) + 3 \left( \frac{4}{-3} \right)$ $= -3 - 4 = -7$	$\checkmark \left( \frac{-3}{5} \right)$ $\checkmark \left( \frac{4}{-3} \right)$ $\checkmark -7$	(5)
2.2	$25 \cos^2 \theta$ $= 25 \left( \frac{4}{5} \right)^2$ $= 25 \left( \frac{16}{25} \right)$ $= 16$	$\checkmark$ vervanging  $\checkmark$ antwoord	(2)
			[7]

VRAAG 3			
3.1.1	$\sin x + 2 \cos 3y$ $= \sin(42^\circ) + 2 \cos(3 \times 68^\circ)$ $= \sin(42^\circ) + 2 \cos 204^\circ$ $= -1,16$	Geen penaliseer vir afronding  $\checkmark\checkmark$ antwoord (2)	
3.1.2	$3 \tan^2(x + y)$ $= 3 \tan^2(42^\circ + 68^\circ)$ $= 3 \tan^2 110^\circ$ $= 22,65$	Geen penaliseer vir afronding  $\checkmark\checkmark$ antwoord (2)	
3.2.1	$2 \sin \theta = 1,432$ $\therefore \sin \theta = 0,716$ $\therefore \theta = 45,725^\circ$	$\checkmark \div 2$  $\checkmark$ antwoord (2)	
3.2.2	$\tan 3\theta = 6,345$ $3\theta = 81,044^\circ$ $\therefore \theta = 27,015^\circ$	Penaliseer vir afronding  $\checkmark 3\theta$ $\checkmark 81,044^\circ$ $\checkmark$ antwoord (3)	
		Penaliseer slegs in 3.2.1 of 3.2.2 vir afronding	<b>[9]</b>

	<b>VRAAG 4</b>		
4.2			
	$\begin{aligned} & \sin^2 45^\circ - \cos 60^\circ + \tan 10^\circ \cdot \cot 10^\circ \\ & = \left(\frac{\sqrt{2}}{2}\right)^2 - \frac{1}{2} + 1 \\ & = \frac{1}{2} - \frac{1}{2} + 1 \\ & = 1 \end{aligned}$	$\begin{aligned} & \checkmark \sin^2 45^\circ = \frac{1}{2} \\ & \checkmark \tan 10^\circ \cdot \cot 10^\circ = 1 \\ & \checkmark \cos 60^\circ = \frac{1}{2} \\ & \checkmark \text{antwoord} = 1 \end{aligned}$ <p style="text-align: right;">(4)</p>	
			<b>[9]</b>

VRAAG 5			
5.1	$\hat{P}_1 + \hat{Q} = \hat{R}_2$ (buitehoek = som van teenoorstaande binnehoeke) $\hat{P}_1 + 30^\circ = 110^\circ$ $\hat{P}_1 = 110^\circ - 30^\circ$ $= 80^\circ$	✓ rede  ✓ antwoord (2)	
5.2	$\hat{P}_2 = \hat{S}_1$ ( $\sphericalangle^e$ teenoor gelyke sye is gelyk) $\hat{P}_2 + \hat{R}_2 + \hat{S}_1 = 180^\circ$ (Som van $\sphericalangle^e$ van 'n driehoek = $180^\circ$ ) $\therefore \hat{P}_2 + 110^\circ + \hat{P}_2 = 180^\circ$ (Gegee : $\hat{R}_2 = 110^\circ$ en $\hat{P}_2 = \hat{S}_1$ ) $\therefore 2\hat{P}_2 = 180^\circ - 110^\circ$ $\therefore 2\hat{P}_2 = 70^\circ$ $\therefore \hat{P}_2 = 35^\circ$ OF $\hat{P}_2 = \hat{S}_1$ ( $\sphericalangle^e$ teenoor gelyke sye is gelyk) $\hat{R}_1 = \hat{P}_2 + \hat{S}_1$ (buitehoek = som van teenoorstaande binnehoeke) $\therefore \hat{P}_2 = 35^\circ$	✓ stelling met rede ✓ stelling met rede ✓ vereenvoudiging  ✓ stelling met rede ✓ stelling met rede ✓ vereenvoudiging (3)	
			[5]
VRAAG 6			
	In $\triangle ABC$ en $\triangle CDA$ $\hat{B} = \hat{D}$ (gegee) AC is gemeenskaplik $\hat{C}_1 = \hat{A}_2$ (verwisselende $\sphericalangle^e$ ; AD // BC) $\therefore \triangle ABC \equiv \triangle CDA$ ( $\sphericalangle$ ; $\sphericalangle$ ; S) ✓ $\therefore AD = BC$ ✓ ( $\triangle ABC \equiv \triangle CDA$ ) $\therefore ABCD$ is 'n parallelogram (een sy = //) OF In $\triangle ABC$ en $\triangle CDA$ $\hat{B} = \hat{D}$ (gegee) AC is gemeenskaplik $\hat{C}_1 = \hat{A}_2$ (verwisselende $\sphericalangle^e$ ; AD // BC) $\therefore \triangle ABC \equiv \triangle CDA$ ( $\sphericalangle$ ; $\sphericalangle$ ; S) ✓ $\therefore AD = BC$ ✓ ( $\triangle ABC \equiv \triangle CDA$ ) $\therefore AB = DC$ ✓ ( $\triangle ABC \equiv \triangle CDA$ ) CD is 'n parallelogram teenoorstaande sy =	✓ Stelling $\hat{C}_1 = \hat{A}_2$  ✓ Rede (AD // BC) ✓ S + R ✓ AD = BC ✓ rede (een sy = //)  ✓ Stelling $\hat{C}_1 = \hat{A}_2$  ✓ Rede (AD // BC) ✓ S + R ✓ AD = BC ✓ rede teenoorstaande sy =	
			[5]

	<b>VRAAG 7</b>		
7.1	$AO + OC = 4xy$ (gegee – diagonale halveer) $OC = 2xy$	✓ $OC = 2xy$	
	$BO + OD = 2x^2 - 2y^2$ (gegee – diagonale halveer) $BO = x^2 - y^2$	✓ $BO = x^2 - y^2$	
	$LHS = BC^2$	✓ LK	
	$= (x^2 + y^2)^2$	✓ RK	
	$OF = x^4 + 2x^2y^2 + y^4$	✓ rede	
	$RHS = BO^2 + OC^2$ $= (x^2 - y^2)^2 + (2xy)^2$ $= x^4 - 2x^2y^2 + y^4 + 4x^2y^2$ $= x^4 + 2x^2y^2 + y^4$ $OF = (x^2 + y^2)^2$		
	<p>∴ ΔBOC is a reghoekige driehoek  OF bewys ΔAOD is n reghoekige driehoek  ∴ Diagonale halveer by 90°  ∴ ΔAOD is n reghoekige driehoek</p>		
		(5)	
7.2	$\hat{R}_1 = 120^\circ$ (oorstaande hoek van a // <sup>m</sup> )	✓ $\hat{R}_1 = 120^\circ$	
	$\hat{R}_2 = 60^\circ$ (hoeke op 'n reguit lyn)	✓ $\hat{T} = 60^\circ$	
	$\hat{T} = 60^\circ$ (hoeke teenoor gelyke sye)	✓ $\hat{S}_2 = 60^\circ$	
	$\hat{S}_2 = 60^\circ$ (som van hoeke van 'n driehoek)	✓ $x = 15^\circ$	(4)
	<p>∴ <math>4x = 60^\circ</math>  <math>x = 15^\circ</math></p>		[9]

**TOTAAL: 45**

**PolyMathic**

**Vraestel 5 en  
Vraestel 6**

**Algebra en  
Meetkunde &  
Trig**

**PolyMathic**

# Graad 10 Wiskunde

## Junie eksamen

### Algebra: Vraag 1 tot Vraag 4

### Meetkunde en Trig: Vraag 5 tot Vraag 9

Totaal: 150

Instruksies:

- Toon alle stappe
- 'n Sakrekenaar mag gebruik word
- Rond af tot twee desimale plekke tensy anders vermeld word
- Diagramme is nie noodwendig volgens skaal geteken nie.

#### Vraag 1 - [22]

1.1 Brei die volgende uit:  $(2x+1)(3x^2-x-5)$  (4)

1.2 Vereenvoudig die volgende:  $\frac{6^x \cdot 9^{x-1} \cdot 2}{18^{x+1}}$  (4)

1.3 Faktoriseer die volgende:  $x^3 - 8y^3$ . (3)

1.4 Vereenvoudig die volgende:  $\frac{3}{4x^2} + \frac{5}{2x}$  (3)

1.5 Vereenvoudig die volgende:  $\frac{6ab - 2a - 4b + 3a^2}{10b + 5a} \div \frac{3a^2 + 7a - 6}{a^2 - 9}$  (8)

**Vraag 2** - **[15]**

- 2.1 Beskou die volgende getal patroon:  $-4 ; 1 ; 6 ; 11 ; \dots$
- 2.1.1 Skryf die volgende twee terme in die patroon neer. (2)
- 2.1.2 Skryf die  $n_{de}$  term neer in die vorm  $T_n = \dots$  (2)
- 2.1.3 Watter term in die reeks sal 'n waarde van 451 hê? (2)
- 2.2 Beskou die volgende getal patroon:  $x - 4 ; 2x - 1 ; 3x + 2 ; \dots$
- 2.2.1 Skryf die volgende twee terme van die reeks neer. (2)
- 2.2.2 Skryf die  $n_{de}$  term van die reeks neer in die vorm  $T_n = \dots$  (3)
- 2.2.3 As die 20ste term 'n waarde van 153 het - bepaal  $x$ . (4)



**Vraag 3 - [23]**

3.1 Los op vir x:

3.1.1  $(x - 2)^2 = 9$  (3)

3.1.2  $(3^x - 9)(5^x - 125) = 0$  (3)

3.1.3  $3x^2 + 5x - 2 = 0$  (3)

3.1.4  $2x(x - 1) + 3(x - 1) = 0$  (3)

3.1.5  $\frac{x - 2}{x + 1} = \frac{x + 1}{x - 7}$  (4)

3.1.6  $4^x = 72$  (2)

3.2 Los die volgende twee vergelykings gelyktydig op om x en y te bepaal. (5)

$$2x + 3y = 12$$

$$x - y - 1 = 0$$

**Vraag 4 - [10]**

4.1 Los op vir x:  $\frac{1}{x} = \frac{1}{w} + \frac{1}{v}$  (4)

4.2  $2 - 3x \geq x + 4$ ,  $x \in \mathbb{R}$  – Los op vir x. (2)

4.2.1 Toon nou jou antwoord op 'n getallelyn. (2)

4.2.2 Toon nou jou antwoord met interval-notasie. (2)

**Vraag 5 - [20]**

5.1 As  $A = 64^\circ$  en  $B = 37^\circ$ , gebruik 'n sakrekenaar (vir 5.1.1, 5.1.2 en 5.1.3)

5.1.1  $\sin(A + B)$  (2)

5.1.2  $\tan^2 A + \cos^2 A$  (2)

5.1.3  $\operatorname{cosec} 2A$  (2)

5.2.1 Teken die diagram van driehoeke wat jy sal gebruik om trigonometriese verhoudings vir die volgende spesiale hoeke te bepaal ( $0^\circ$ ;  $30^\circ$ ;  $45^\circ$ ;  $60^\circ$ ;  $90^\circ$ ). (4)

5.2.2 Gebruik jou diagram om  $\cos^2 30^\circ - \sin^2 30^\circ$  te bepaal. (2)

5.2.3 Gebruik jou diagram om  $\frac{\cos 60^\circ \cdot \sin 45^\circ \cdot \tan 60^\circ}{\sin 30^\circ \cdot \tan 30^\circ \cdot \cos 45^\circ}$  te bepaal. (5)

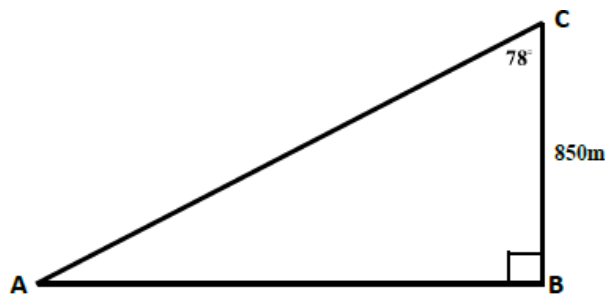
5.3 As  $x < 90^\circ$ , los op vir x in die volgende vergelyking:

$2 \cos(x - 20^\circ) = 1.14$  (3)

**Vraag 6 - [21]**

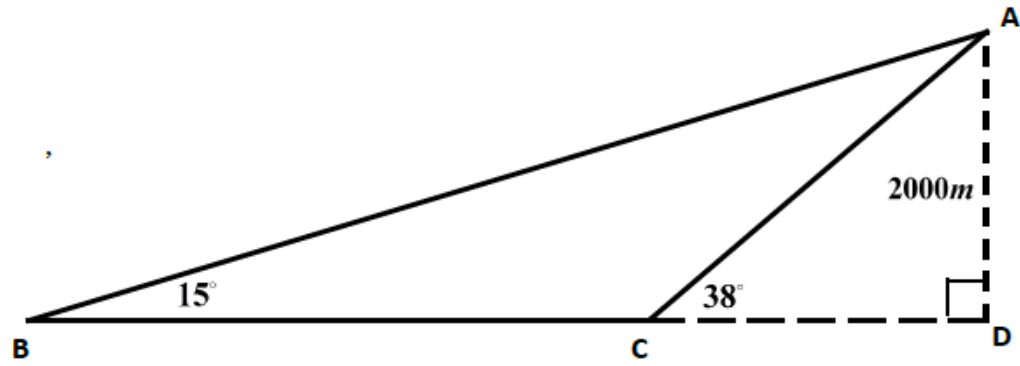
6.1 Daar is 140 passasiers op 'n vliegtuig. Almal sit in een van twee klasse – Economy en Business. Die Economy passasiers mag 'n maksimum van 20kg bagasie saamvat terwyl die Business passasiers 'n maksimum van 30kg mag vat. As al die passasiers hul maksimum gewig in bagasie pak en die totale gewig van al die bagasie 3040kg is, bepaal die hoeveelheid passasiers wat Business klas vlieg. (5)

6.2 Die diagram hieronder toon die bo-aansig van die aanloopbaan by 'n lughawe. 'n Vliegtuig word eers ge-“taxi” vanaf B na C voor hy vanaf C na A ry om op te styg. Bepaal die afstand wat vir die vliegtuig beskikbaar is om mee om te styg. (4)



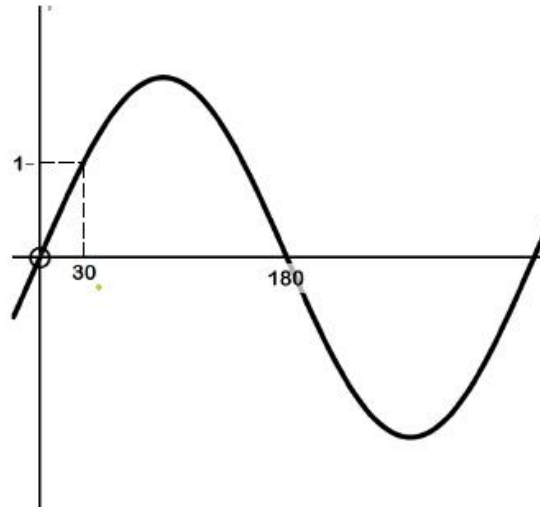
6.3 A.g.v. sterk winde vlieg die vliegtuig 200km/h vinniger vanaf Kaapstad na Bloemfontein (1000km) as wat hy terug vlieg. Die totale verskil in die vlugtye van die twee vlugte is 15 minute. Teen watter spoed het die vliegtuig gevlieg vanaf Kaapstad na Bloemfontein en teen watter spoed het hy gevlieg terug na Kaapstad? (7)

- 6.4 Soos wat die vliegtuig die lughawe nader teen 'n hoogte van 2000m maak die instrumente van die vliegtuig 'n konneksie met die twee bakens aan die begin en einde van die aanloopbaan, soos gesien kan word in die diagram hieronder. Bereken die lengte van BC (die aanloopbaan). (5)



**Vraag 7 - [6]**

In die grafiek hieronder word die funksie van  $f(x) = a \cdot \sin(x)$  getoon.



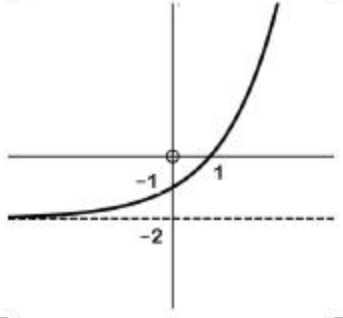
- 7.1 Bepaal die waarde van a. (2)
- 7.2 Wat is die amplitude van die grafiek? (1)
- 7.3 Wat is die minimum waarde van  $f(x)$ ? (1)
- 7.4 Gebruik die grafiek om die waardes te bepaal van X-as  $f(x) = -1$  (1)
- 7.5 Wat is die periode van  $f(x)$ ? (1)

**Vraag 8 - [18]**

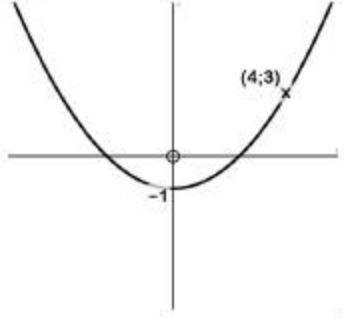
8.1 Pas die regte funksie by die regte grafiek (daar is meer funksies as grafieke so maak dubbel seker van jou keuses.

$y = 2 \tan x - 1$	$y = 2^x - 2$	$y = \frac{1}{4}x^2 - 1$
$y = \left(\frac{1}{10}\right)^x - 1$	$y = 10^{-x} - 1$	$y = 2 \sin x + 1$
$y = \frac{-1}{x}$	$y = -2 \sin x$	$y = 4^x - 1$
$y = -2 \cos x$	$y = -x^2 + 4$	$y = \tan x - 1$
$y = -2x^2 + 2$	$y = -\frac{1}{x} + 2$	$y = \frac{2}{x} - 2$
	$y = 2 \cos x + 1$	

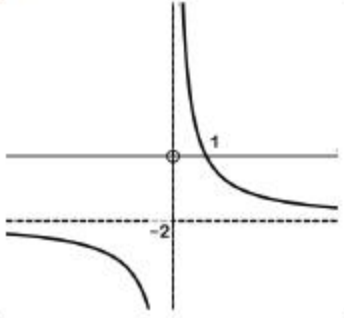
8.1



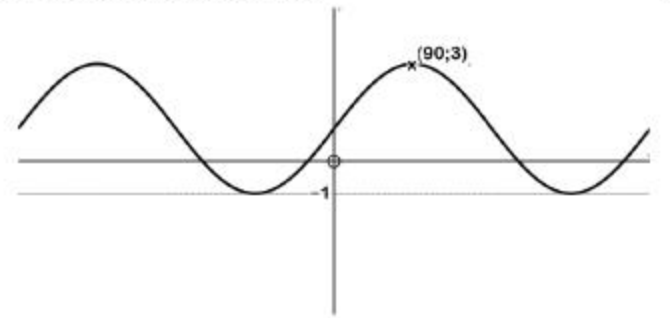
8.2



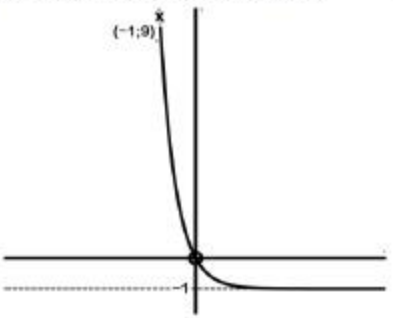
8.3



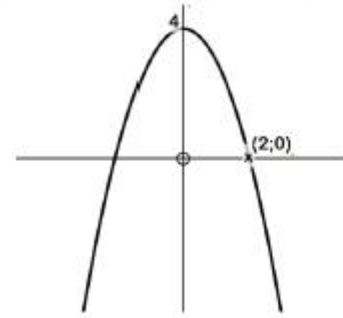
8.4



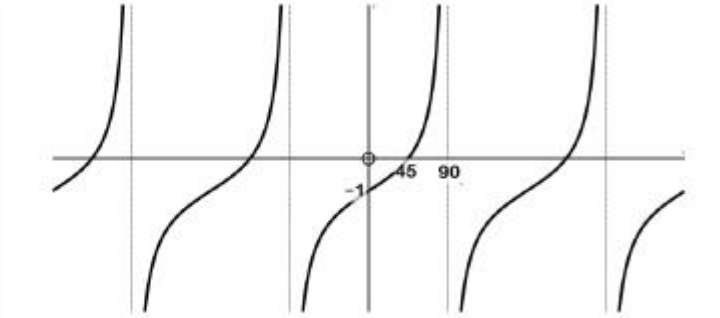
8.5



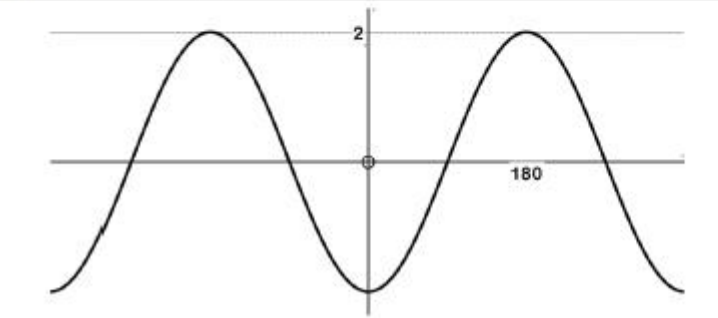
8.6



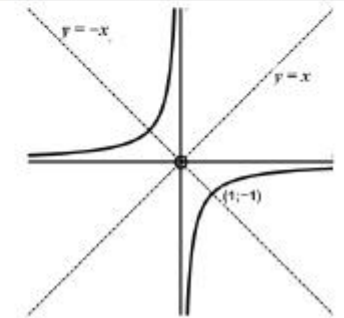
8.7



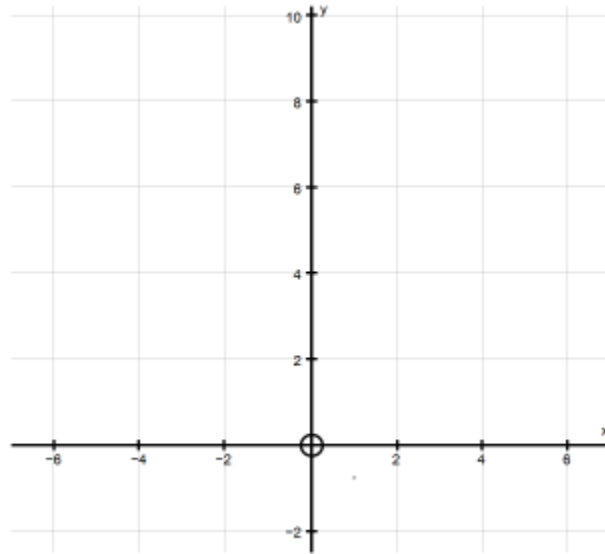
8.8



8.9



**Vraag 9 - [15]**



Gegee:  $f(x) = x + 2$

En  $g(x) = \frac{1}{4}x^2 - 1$

- 9.1 Skets die grafiek van  $f(x)$  deur die koördinate van die sny punte met die asse te bepaal. (3)
- 9.2 Bepaal die koördinate van die sny punte van  $g(x)$  met die asse. (3)
- 9.3 Bepaal die koördinate van die punte waar  $g(x)$  en  $f(x)$  sny. (4)
- 9.4 Skets nou ook die grafiek van  $g(x)$  op dieselfde assestelsel. (3)
- 9.5 Bepaal die waardeversameling van  $g(x)$  (2)



Vraag 1

$$\begin{aligned}
 1.1 \quad & (2x+1)(3x^2-x-5) \\
 & = 6x^3 - 2x^2 - 10x + 3x^2 - x - 5 \\
 & = 6x^3 + x^2 - 11x - 5
 \end{aligned} \tag{4}$$

$$\begin{aligned}
 1.2 \quad & \frac{6^x \cdot 9^{x-1} \cdot 2}{18^{x+1}} \\
 & = \frac{(2 \cdot 3)^x \cdot (3^2)^{x-1} \cdot 2}{(2 \cdot 3^2)^{x+1}} \\
 & = 2^{x+1-x-1} \cdot 3^{x+2x-2-2x-2} \\
 & = 2^0 \cdot 3^{x-4} = 3^{x-4} = \frac{3^x}{81}
 \end{aligned} \tag{4}$$

$$\begin{aligned}
 1.3 \quad & x^3 - 8y^3 \\
 & = (x-2y)(x^2 + 2xy + 4y^2)
 \end{aligned} \tag{3}$$

$$\begin{aligned}
 1.4 \quad & \frac{3}{4x^2} + \frac{5}{2x} \\
 & = \frac{3+10x}{4x^2}
 \end{aligned} \tag{3}$$

$$\begin{aligned}
 1.5 \quad & \frac{6ab - 2a - 4b + 3a^2}{10b + 5a} \div \frac{3a^2 + 7a - 6}{a^2 - 9} \\
 & = \frac{2b(3a-2) + a(3a-2)}{5(2b+a)} \times \frac{(a-3)(a+3)}{(3a-2)(a+3)} \\
 & = \frac{\cancel{(3a-2)} (2b+a)}{5(2b+a)} \times \frac{(a-3) \cancel{(a+3)}}{\cancel{(3a-2)} \cancel{(a+3)}} \\
 & = \frac{a-3}{5}
 \end{aligned} \tag{8}$$

## Vraag 2

2.1.1

$$16 ; 21 ; \dots \quad (2)$$

2.1.2

$$T_n = -4 + (n-1)5 = 5n - 9 \quad (2)$$

2.1.3

$$451 = 5n - 9 \Rightarrow 5n = 460$$
$$\therefore n = 92 \quad (2)$$

2.2.1

$$\dots ; 4x + 5 ; 5x + 8 ; \dots \quad (2)$$

2.2.2

$$T_n = nx + (-4 + 3(n-1))$$
$$T_n = nx + 3n - 7 \quad (3)$$

2.2.3

$$T_n = nx + 3n - 7$$
$$153 = 20x + 53 \quad (4)$$
$$\Rightarrow x = 5$$

[15]

### Vraag 3

3.1

$$3.1.1 \quad (x-2)^2 = 9$$

$$(x-2) = \pm 3 \quad \text{OF:} \quad x^2 - 4x + 4 - 9 = 0$$

$$\therefore x = 5, \text{ of } -1$$

$$\therefore x^2 - 4x - 5 = 0$$

$$(x-5)(x+1) = 0$$

$$\therefore x = 5 \text{ of } -1 \quad (3)$$

$$3.1.2 \quad (3^x - 9)(5^x - 125) = 0$$

$$3^x = 9 \quad \text{OF:} \quad 5^x = 125$$

$$\therefore x = 2 \text{ of } x = 3 \quad (3)$$

$$3.1.3 \quad 3x^2 + 5x - 2 = 0$$

$$\therefore (3x-1)(x+2) = 0$$

$$\therefore x = \frac{1}{3} \text{ of } x = -2 \quad (3)$$

$$3.1.4 \quad 2x(x-1) + 3(x-1) = 0$$

$$\therefore (x-1)(2x+3) = 0$$

$$\therefore x = 1 \text{ of } x = -\frac{3}{2} \quad (3)$$

$$3.1.5 \quad \frac{x-2}{x+1} = \frac{x+1}{x-7}$$

$$\therefore \frac{(x-2)\cancel{(x+1)}(x-7)}{\cancel{(x+1)}} = \frac{(x+1)(x+1)\cancel{(x-7)}}{\cancel{(x-7)}}$$

$$\therefore (x-2)(x-7) = (x+1)(x+1)$$

$$\therefore x^2 - 9x + 14 = x^2 + 2x + 1$$

$$\therefore 13 = 11x \quad \therefore x = \frac{13}{11} \quad (4)$$

$$3.1.6 \quad 4^x = 72 \quad \text{Hou aan raai totdat hul by antwoord kom.}$$

$$x = 3,085 = 3,1 \quad (1 \text{ d.p}) \quad (2)$$

3.2

$$2x + 3y = 12 \quad (1)$$

$$x - y = 1 \quad (2)$$

$$(2): x = 1 + y \quad \text{OF}$$

$$2(1 + y) + 3y = 12 \quad (3)$$

$$(3): 2 + 2y + 3y = 12$$

$$5y = 10$$

$$\therefore y = 2 \quad \text{en} \quad x = 3$$

$$(2) \times 2: 2x - 2y = 2 \quad (3)$$

$$2x + 3y = 12 \quad (1)$$

$$(1) - (3): 5y = 10$$

$$\therefore y = 2 \quad \text{en} \quad x = 3$$

$\sqrt{m}$

$\sqrt{m}$

$\sqrt{m}$

$\sqrt{a} \sqrt{a}$

(5)  
[23]

#### Vraag 4

4.1

$$\frac{1}{x} = \frac{1}{w} + \frac{1}{v}$$

$$\frac{1}{x} = \frac{v + w}{vw}$$

$$x = \frac{vw}{v + w}$$

(4)

4.2

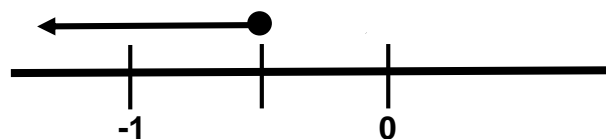
$$2 - 3x + 3x - 4 \geq x + 4 + 3x - 4$$

$$\therefore -2 \geq 4x$$

$$\therefore -\frac{1}{2} \geq x \quad \text{of} \quad x \leq -\frac{1}{2}$$

(2)

4.2.1



(2)

4.2.2

$$x \in (-\infty; -\frac{1}{2}] , x \in \mathfrak{R}$$

(2)

[10]

## Vraag 5

5.1

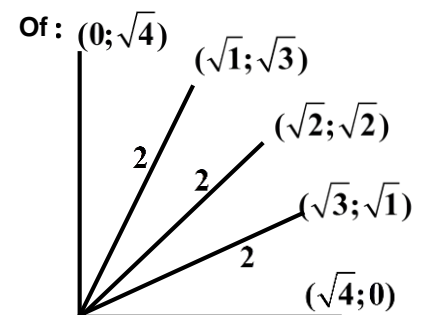
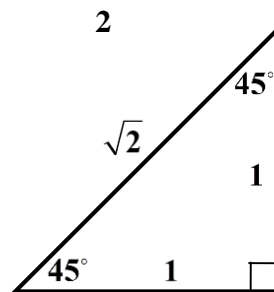
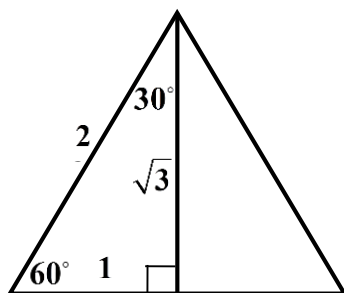
$$\begin{aligned} 5.1.1 \quad \sin(A+B) &= \sin(64^\circ + 37^\circ) \\ &= \sin 101^\circ = 0,98 \end{aligned} \quad (2)$$

$$\begin{aligned} 5.1.2 \quad \tan^2 A + \cos^2 A &= \tan^2 64^\circ + \cos^2 64^\circ = 4,40 \end{aligned} \quad (2)$$

$$\begin{aligned} 5.1.3 \quad \operatorname{cosec} 2A &= \frac{1}{\sin 128^\circ} = 1,27 \end{aligned} \quad (2)$$

5.2 1

5.2.1



(4)

$$5.2.2 \quad \cos^2 30^\circ - \sin^2 30^\circ$$

$$\begin{aligned} &= \left(\frac{\sqrt{3}}{2}\right)^2 - \left(\frac{1}{2}\right)^2 \\ &= \frac{3}{4} - \frac{1}{4} = \frac{1}{2} \end{aligned} \quad (2)$$

5.2.3

$$\frac{\cos 60^\circ \cdot \sin 45^\circ \cdot \tan 60^\circ}{\sin 30^\circ \cdot \tan 30^\circ \cdot \cos 45^\circ}$$

$$= \frac{\frac{1}{2} \cdot \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{3}}{1}}{\frac{1}{2} \cdot \frac{1}{\sqrt{3}} \cdot \frac{1}{\sqrt{2}}} = \frac{\sqrt{3}}{1} \times \frac{\sqrt{3}}{1} = 3 \quad (5)$$

5.3

$$2 \cos(x - 20^\circ) = 1,14$$

$$\cos(x - 20^\circ) = 0,57$$

$$\therefore x - 20^\circ = 55,25^\circ$$

$$\therefore x = 75,25^\circ \quad (3)$$

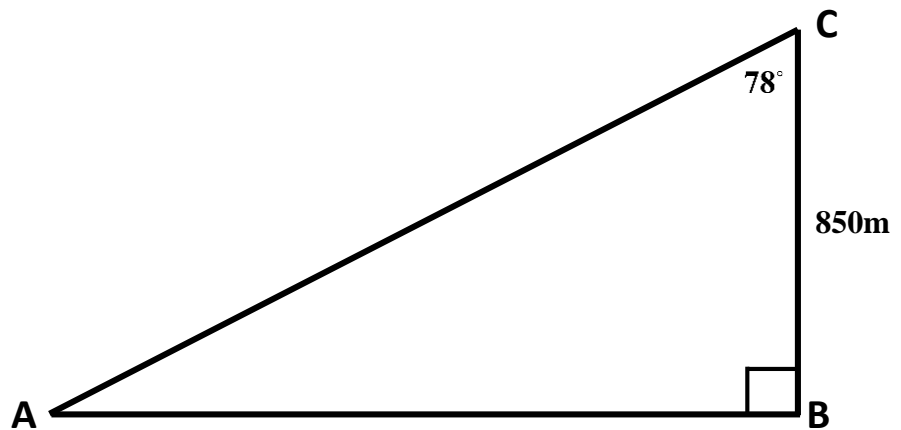
[20]

**Vraag 6**

$$20x + 4200 - 30x = 3040$$

$$\therefore 1160 = 10x$$

$$\therefore x = 116 \quad (5)$$



$$\cancel{\cos 78^\circ} \times \frac{AC}{\cancel{\cos 78^\circ}} = \frac{850}{AC} \times \frac{AC}{\cancel{\cos 78^\circ}}$$

$$\therefore AC = 4088,27m \quad (4)$$

6.3

$$\frac{1000}{x-200} - \frac{1000}{x} = \frac{1}{4}$$

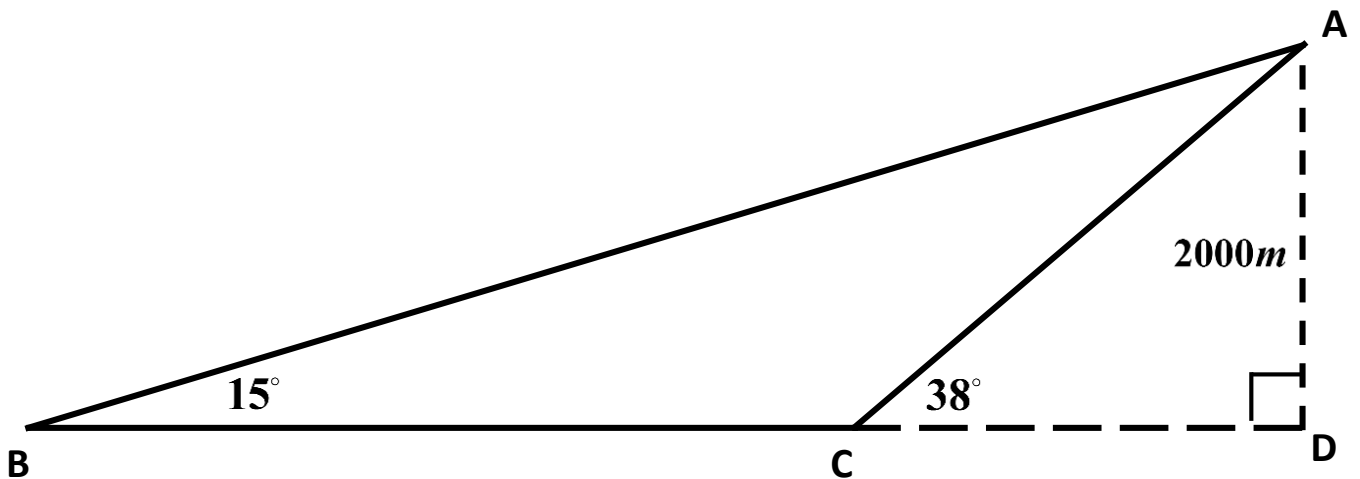
$$\therefore \frac{1000 \times 4x \cancel{(x-200)}}{\cancel{(x-200)}} - \frac{1000 \times 4 \cancel{x} (x-200)}{\cancel{x}} = \frac{1 \times 4x(x-200)}{4}$$

$$\therefore \cancel{4000x} - \cancel{4000x} + 800000 = x^2 - 200x$$

$$\therefore x^2 - 200x - 800000 = 0$$

$$\therefore (x+800)(x-1000) = 0$$

$$\therefore x = 1000 \text{ kmh}^{-1} \text{ weg} \quad 800 \text{ kmh}^{-1} \text{ terug} \quad (7)$$



$$BC = BD - CD$$

$$\text{In } \triangle ACD, \tan 38^\circ = \frac{2000}{CD}$$

$$\therefore CD = \frac{2000}{\tan 38^\circ} = 2559,8833$$

$$\text{In } \triangle ABD, \tan 15^\circ = \frac{2000}{BD}$$

$$\therefore BD = \frac{2000}{\tan 15^\circ} = 7464,1016$$

$$BC = 4904,22m$$

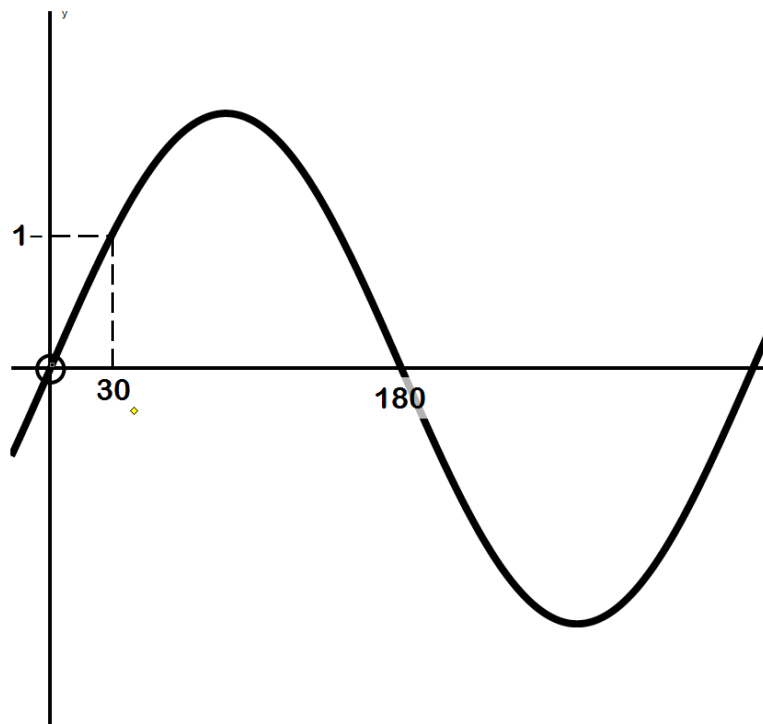
(5)

[21]



Vraag 7

$$f(x) = a \cdot \sin x$$



7.1

$$\begin{aligned} \therefore 1 &= a \sin 30^\circ \\ \therefore a &= 2 \end{aligned} \quad (2)$$

7.2

$$\text{amplitude} = 2 \quad (1)$$

7.3

$$\text{amplitude} = -2 \quad (1)$$

7.4

$$210^\circ \text{ en } 330^\circ \quad (1)$$

7.5

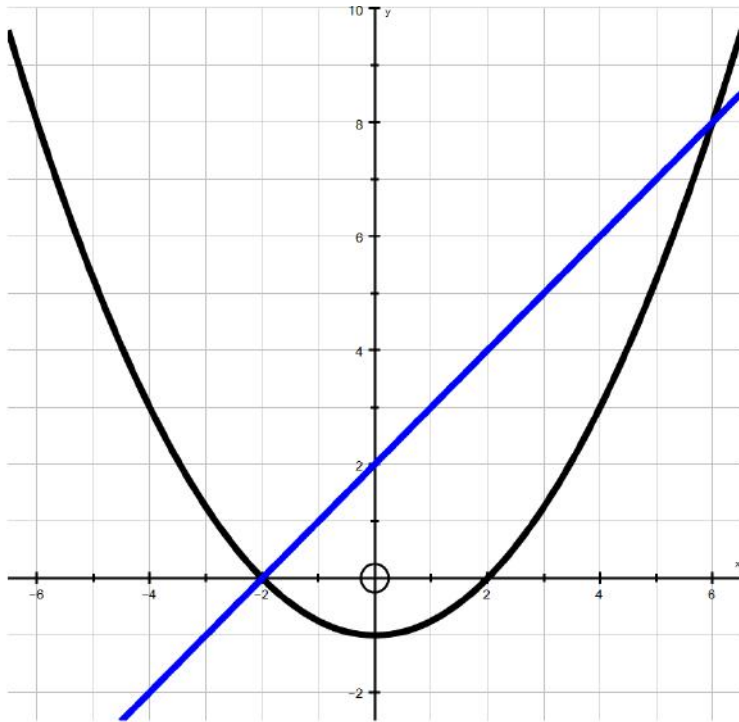
$$360^\circ \quad (1)$$

[6]

Vraag 8

<p>8.1 ... <math>y = 2^x - 2</math> ...</p>	<p>8.2 ... <math>y = \frac{1}{4}x^2 - 1</math> ...</p>	<p>8.3 ... <math>y = \frac{2}{x} - 2</math> .....</p>
<p>8.4 ..... <math>y = 2\sin x + 1</math> .....</p>		<p>8.5 <math>y = 10^{-x} - 1</math> or <math>y = (\frac{1}{10})^x - 1</math> .....</p>
<p>8.6 ... <math>y = -x^2 + 4</math> .....</p>	<p>8.7 ... <math>y = \tan x - 1</math> .....</p>	
<p>8.8 ... <math>y = -2\cos x</math> .....</p>	<p>8.9 ..... <math>y = \frac{-1}{x}</math> .....</p>	

### Vraag 9



9.1

$$y\text{-int: } x = 0 \quad \therefore y = -1 \quad (0; -1)$$

$$x\text{-int: } y = 0 \quad \therefore 0 = \frac{1}{4}x^2 - 1$$

$$1 = \frac{1}{4}x^2 \quad \therefore x^2 = 4 \quad (-2; 0) \text{ \& } (2; 0) \quad (3)$$

9.2

$$y\text{-int: } x = 0 \quad \therefore y = 2 \quad (0; 2)$$

$$x\text{-int: } y = 0 \quad \therefore 0 = x + 2 \quad \therefore x = -2 \quad (-2; 0) \quad (3)$$

9.3

$$f = g \quad \frac{1}{4}x^2 - 1 = x + 2$$

$$\therefore x^2 - 4 = 4x + 8 \text{ en, so } \therefore x^2 - 4x - 12 = 0$$

$$\therefore (x - 6)(x + 2) = 0 \quad \therefore x = 6 \text{ en } x = -2$$

$$(6; 8) \text{ en } (-2; 0) \quad (4)$$

9.4 **Skets** (3)

9.5

$$y \in \mathfrak{R} \quad y \geq -1 \text{ of: } y \in [-1; \infty) \quad (2)$$

[15]

PolyMathic

Vraestel 7 en

Vraestel 8

Algebra en

Meetkunde &

Trig

PolyMathic

# Graad 10 Wiskunde

## Junie eksamen

### Algebra: Vraag 1 tot Vraag 7

### Meetkunde en Trig: Vraag 8 en Vraag 9

Totaal: 100

Tyd: 2ure

Instruksies:

- Toon alle stappe
- Sakrekenaars mag gebruik word
- Rond af tot twee desimale plekke tensy anders vermeld word.
- Sterkte!

### Vraag 1 - [6]

1.1.1 Skryf  $0,6\dot{9}$  as 'n gewone breuk. (4)

1.1.2 Tussen watter twee positiewe, natuurlike getalle lê:  $\sqrt[3]{150}$  ? (2)

### Vraag 2 - [6]

Vereenvoudig die volgende:

2.1.1  $(4x - 5)(16x^2 + 10x + 25)$  (2)

2.1.2  $2x^{\frac{1}{2}}\left(5x^{\frac{1}{3}} - x^{-\frac{1}{2}}\right)$  (2)

2.2 As  $x - \frac{5}{x} = 6$  Bepaal die waarde van  $x^2 + \frac{25}{x^2}$  sonder die gebruik van 'n sakrekenaar. (2)

**Vraag 3** - **[14]**

Faktoriseer die volgende, sonder die gebruik van 'n sakrekenaar.

3.1.  $3x^5 + x^4 - 48x - 16$  (5)

3.2.  $\frac{1}{2}x^2 - \frac{5}{2}x - 3$  (2)

3.3.  $-2x^{\frac{3}{4}} + 8x^{\frac{3}{2}} - 15$  (2)

3.4.  $8 \cdot 2^{2x} + 2 \cdot 2^x - 1$  (2)

3.5.  $2^{x+1} - 3 \cdot 2^{x-2}$  (3)

**Vraag 4** - **[9]**

Vereenvoudig sonder die gebruik van 'n sakrekenaar

4.1.  $\frac{12^{3x} \cdot \left(\frac{1}{8}\right)^{-2x}}{72^{x-1}}$  (4)

4.2.  $\frac{\frac{x-y}{y-x}}{y^3-x^3}$  (5)

**Vraag 5** - **[8]**

5.1 Gegee:  $-3 < 2x - 3 \leq 11$

5.1.1 Los die ongelykheid op om "x" te vind. (2)

5.1.2 Stel die antwoord wat jy gekry het in 5.1.1 voor op:

5.1.2.1 'n Getallelyn. (1)

5.1.2.2 As interval-notasie. (1)

5.2 Los die volgende gelyktydig op om waardes vir x en y te kry: (4)

$$3x - y + 23 = 0$$

$$34 + 4x - 3y = 0$$

**Vraag 6** - [24]

Vind vir elk van die volgende die waarde vir “x”:

6.1.  $\frac{x-2}{x+3} = \frac{x}{x+3} - \frac{2}{x+3}$  (2)

6.2.  $0 = -\frac{5}{x+3} + 4$  (2)

6.3.  $x^2 = 3x$  (3)

6.4.  $-12x^2 + 10x + 12 = 0$  (3)

6.5.  $\frac{x+1}{8-x} = \frac{3(x-1)}{x+1}$  (4)

6.6.  $2^{x-3} = 17$  (2)

6.7.  $2 \cdot 2^{3x+1} = \sqrt{2}$  (without the use of a calculator) (4)

6.8.  $3x^{-\frac{2}{3}} - 8 = 0$  (4)

**Vraag 7** - [7]

7.1 Gegee: -7;2;11; ...

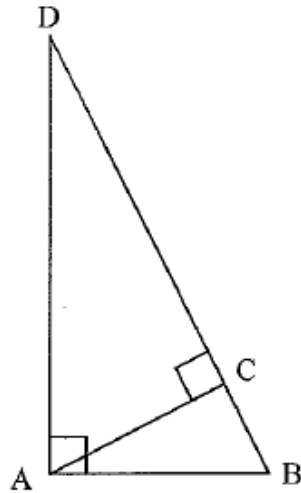
7.1.1 Vind die algemene term ( $T_n$ ) van die getal patroon en vereenvoudig. (3)

7.1.2 Watter getal in die ry sal 'n waarde van 1784 hê? (2)

7.2 Bepaal die waarde van x as:  $-3x + 2$ ;  $7x - 1$ ;  $9x + 10$  drie opeenvolgende terme in 'n rekenkundige reeks is. (2)

**Vraag 8 - [17]**

8.1.  $AB \perp AD$  en  $BD \perp AC$  :



Skryf, in terme van AB, BC, AC, AD, CD en BD, twee verhoudings neer om  $\cos(D)$  voor te stel. (2)

8.2. As  $x = 100^\circ$ , bereken :

8.2.1.  $1 - \cos^2 x$  2

8.2.2.  $\frac{\sin 2(x + 10^\circ)}{3 \tan x + 10}$  3 (5)

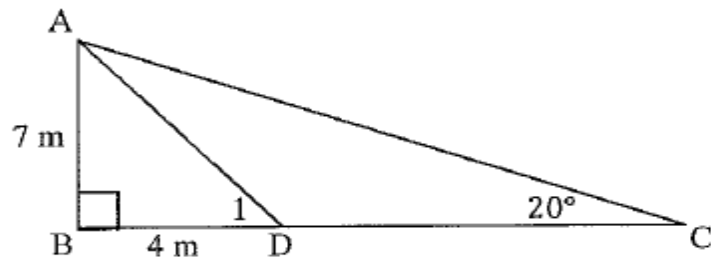
8.3. Los op vir  $x$  :

8.3.1.  $\frac{\sin x}{4} = \frac{\sin 20^\circ}{3}$   $(0^\circ < x < 90^\circ)$  2

8.3.2.  $6 - 4 \tan 8(x - 7^\circ) = 1$   $(0^\circ < 8(x - 7^\circ) < 90^\circ)$  3 (5)



8.4 Die punte B, D en C lê op dieselfde horisontale vlak. AB is 'n vertikale toring met hoogte 7m. Die punt D lê 4m vanaf die voet van die toring. Die hoogtehoek vanaf C na die boonste punt op die toring is  $20^\circ$ .



Bereken :

- 8.4.1.  $\hat{D}_1$  2
- 8.4.2. DC 3 (5)

### Vraag 9 - [9]

9.1.1 Teken die diagramme wat gebruik word om die volgende spesiale hoeke te bereken,  $0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ$ . (3)

9.1.2 Bepaal nou die volgende (toon alle stappe): (3)

9.1.2.1  $\cos 30^\circ$

9.1.2.2  $\sin 45^\circ$

9.1.2.3  $\cos 0^\circ$

9.2 As  $\cos \theta = -\frac{4}{5}$  en  $\sin \theta < 0$  teken 'n diagram in die regte kwadrant om die waarde vir  $\tan \theta$  te bepaal. (3)

Graad 10 Wiskunde

Junie eksamen

Memorandum

Totaal: 100

Tyd: 2 ure

11.	$100x = 69,6969\dots$		2.2.	$(x - \frac{5}{x})^2 = (6)^2$	
	$x = 0,6969\dots$			$(x - \frac{5}{x})(x - \frac{5}{x}) = 36$	
	$99x = 69$			$x^2 - 5 - 5 + \frac{25}{x^2} = 36$	
	$x = \frac{69}{99}$			$x^2 - 10 + \frac{25}{x^2} = 36 \checkmark$	
	$= \frac{23}{33} \checkmark$	4		$x^2 + \frac{25}{x^2} = 46 \checkmark$	2
1.2.	$5^3 = 125$				
	$6^3 = 216$				
	$\therefore \sqrt[3]{150}$ le tussen		3.1.	$3x^5 + x^4 - 48x - 16$	
	5 en 6 $\checkmark$			$= x^4(3x+1) - 16(3x+1)$	
		2		$= (3x+1)(x^4-16) \checkmark$	
				$= (3x+1)(x^2+4)(x^2-4) \checkmark$	
				$= (3x+1)(x^2+4)(x+2)(x-2) \checkmark$	5
2.1.	$(4x-5)(16x^2+10x+25)$				
	$= 64x^3 + 40x^2 + 100x - 80x^2 - 50x - 125$		3.2.	$\frac{1}{2}x^2 - \frac{5}{2}x - 3$	
	$= 64x^3 - 40x^2 + 50x - 125$	2		$= \frac{x^2}{2} - \frac{5x}{2} - 3$	
	$\checkmark$			$= \frac{x^2 - 5x - 6}{2}$	
2.1.	$2x^{\frac{1}{2}}(5x^{\frac{1}{3}} - x^{-\frac{1}{2}})$			$= \frac{(x-6)(x+1)}{2} \checkmark$	2
	$= 10x^{\frac{5}{6}} - 2x^0$				
	$= 10x^{\frac{5}{6}} - 2$	2			

3.3.  $-2x^{\frac{3}{4}} + 8x^{\frac{3}{2}} - 15$   
 $= 8x^{\frac{3}{2}} - 2x^{\frac{3}{4}} - 15$   
 $k = x^{\frac{3}{4}}$   
 $\therefore (k)^2 = (x^{\frac{3}{4}})^2$   
 $k^2 = x^{\frac{3}{2}}$   
 $\therefore 8k^2 - 2k - 15$   
 $= (2k - 3)(4k + 5)$   
 $= (2x^{\frac{3}{4}} - 3)(4x^{\frac{3}{4}} + 5)$  2  
 $\checkmark$

3.4.  $8 \cdot 2^{2x} + 2 \cdot 2^x - 1$   
 $k = 2^x$   
 $\therefore (k)^2 = (2^x)^2$   
 $= 2^{2x}$   
 $\therefore 8k^2 + 2k - 1$   
 $= (4k - 1)(2k + 1)$   
 $= (4 \cdot 2^x - 1)(2 \cdot 2^x + 1)$  2  
 $\checkmark$  or 0

3.5.  $2^{x+1} - 3 \cdot 2^{x-2}$   
 $= 2^x \cdot 2^1 - 3 \cdot 2^x \cdot 2^{-2}$   
 $= 2^x (2 - 3 \cdot 2^{-2})$   
 $= 2^x (2 - \frac{3}{2^2})$   
 $= 2^x (2 - \frac{3}{4})$   $\frac{3}{4} \checkmark$   
 $= 2^x (\frac{8-3}{4})$   
 $= 2^x \cdot \frac{5}{4}$  3  
 $\checkmark$

4.1.  $\frac{12^{3x} (\frac{1}{8})^{-2x}}{72^{x-1}}$   
 $12 = 2^2 \cdot 3$   
 $\frac{1}{8} = \frac{1}{2^3} = 2^{-3}$   
 $72 = 2^3 \cdot 3^2$   
 $\therefore \frac{(2^2 \cdot 3)^{3x} (2^{-3})^{-2x}}{(2^3 \cdot 3^2)^{x-1}} \checkmark$   
 $= \frac{2^{6x} 3^{3x} 2^{6x}}{3^{2x-2} 2^{3x-3}} \checkmark$   
 $= \frac{2^{12x} \cdot 3^{3x}}{3^{2x-2} 2^{3x-3}}$   
 $= 2^{12x - (3x-3)} \cdot 3^{3x - (2x-2)}$   
 $= 2^{12x-3x+3} \cdot 3^{3x-2x+2}$   
 $= 2^{9x+3} \cdot 3^{x+2} \checkmark \checkmark$   
 $= 2^{9x} \cdot 2^3 \cdot 3^x \cdot 3^2$   
 $= 2^{9x} \cdot 8 \cdot 3^x \cdot 9$   
 $= 72 \cdot 2^{9x} \cdot 3^x$  4  
 $\checkmark$

4.2.  $\frac{\frac{x}{y} - \frac{y}{x}}{y^3 - x^3}$   
 $= \frac{x^2 - y^2}{xy} \times \frac{1}{y^3 - x^3} \checkmark$   
 $= \frac{(x-y)(x+y)}{xy} \times \frac{1}{(y-x)(y^2+xy+x^2)} \checkmark$   
 $= \frac{-(y-x)(x+y)}{xy} \times \frac{1}{(y-x)(y^2+xy+x^2)}$   
 $= \frac{x+y}{xy(y^2+xy+x^2)} \checkmark$  5  
 $\checkmark$

5.1.	1.	$-3 < 2x - 3 \leq 11$		$\therefore x = -7 \checkmark$	
		$0 < 2x \leq 14 \checkmark$		(1) $3(-7) - y = -23 \checkmark$	
		$0 < x \leq 7 \checkmark$	2	$2 = y \checkmark$	
		$\xrightarrow{\quad \quad \quad}$			
5.1.	2.1.	$0 \text{ --- } 7 \checkmark$	1		
				6.1. $\frac{x-2}{x+3} = \frac{x}{x+3} - \frac{2}{x+3}$	
5.1.	2.2	$x \in (0; 7] \checkmark$	1	LUP = $(x+3)$	
		$\xrightarrow{\quad \quad \quad}$		( $\therefore x \neq -3$ )	
5.2.		$3x - y + 23 = 0 \quad \dots 1$			
		$34 + 4x - 3y = 0 \quad \dots 2$		$x - 2 = x - 2$	
		Substitutie		$0 = 0$	
		(1): $3x + 23 = y \checkmark \quad \dots 2$		$\therefore x \in \mathbb{R}$	
		(2): $34 + 4x - 3(3x + 23) = 0 \checkmark$		So,	
		$\therefore 34 + 4x - 9x - 69 = 0$		$x \in \mathbb{R}, x \neq -3 \checkmark$	2
		$-35 = 5x$		$\xrightarrow{\quad \quad \quad}$	
		$-7 = x \checkmark$			
		(3): $3(-7) + 23 = y$		6.2. $0 = -\frac{5}{x+3} + 4$	
		$2 = y \checkmark$	4	LUP = $(x+3)$	
		$\xrightarrow{\quad \quad \quad}$		( $\therefore x \neq -3$ )	
		• elimination			
		$3x - y = -23 \quad \dots 1$		$0 = -5 + 4(x+3) \checkmark$	
		$4x - 3y = -34 \quad \dots 2$		$0 = -5 + 4x + 12$	
		(1) $x-3$ : $-9x + 3y = 69 \checkmark$		$-7 = 4x$	
		(2) : $4x - 3y = -34$		$-\frac{7}{4} = x \checkmark$	2
		$\xrightarrow{\quad \quad \quad}$		$\xrightarrow{\quad \quad \quad}$	
		$-5x = 35$			

6.3.	$x^2 = 3x$		6.7.	$2 \cdot 2^{3x+1} = \sqrt{2}$	
	$x^2 - 3x = 0 \checkmark$			$\sqrt{2}^{3x+2} = 2^{\frac{1}{2}} \checkmark$	
	$x(x-3) = 0 \checkmark$			$3x+2 = \frac{1}{2} \checkmark$	
	$x = 0 \text{ or } 3 \checkmark$	3		$3x = -\frac{3}{2}$	
	<u><math>x = 0 \text{ or } 3 \checkmark</math></u>			$x = -\frac{1}{2} \checkmark$	4
6.4.	$-12x^2 + 10x + 12 = 0$		6.8.	$3x^{-4/3} - 8 = 0$	
	$\div -2: 6x^2 - 5x - 6 = 0 \checkmark$			$x^{-2/3} = \frac{8}{3} \checkmark$	
	$(2x-3)(3x+2) = 0 \checkmark$			$(x^{-2/3})^{-3/2} = \pm \left(\frac{8}{3}\right)^{-3/2} \checkmark$	
	$\therefore x = \frac{3}{2} \text{ or } -\frac{2}{3} \checkmark$	3		$x = \pm 0,23 \checkmark$	4
	<u><math>x = \frac{3}{2} \text{ or } -\frac{2}{3} \checkmark</math></u>			<u><math>x = \pm 0,23 \checkmark</math></u>	
6.5.	$\frac{x+1}{8-x} = \frac{3(x-1)}{x+1}$				
	LCD = $(8-x)(x+1)$		7.1.	$-7; 2; 11; \dots$	
	$(\because x \neq 8 \text{ or } -1)$			$\underbrace{\quad}_9 \quad \underbrace{\quad}_9$	
	$(x+1)(x+1) = 3(x-1)(8-x) \checkmark$			$d \checkmark$	
	$x^2 + 2x + 1 = 3(8x - x^2 - 8 + x) \checkmark$				
	$x^2 + 2x + 1 = 3(-x^2 + 9x - 8) \checkmark$		7.1. 1.	$T_n = a + (n-1)d$	
	$2x^2 + 2x + 1 = -3x^2 + 27x - 24 \checkmark$			$= -7 + (n-1)(9) \checkmark$	
	$\therefore 4x^2 - 25x + 25 = 0 \checkmark$			$= -7 + (9n-9) \checkmark$	
	$(x-5)(4x-5) = 0 \checkmark$			$= -7 + 9n - 9 \checkmark$	
	$\therefore x = 5 \text{ or } \frac{5}{4} \checkmark$	4		$= 9n - 16 \checkmark$	3
	<u><math>x = 5 \text{ or } \frac{5}{4} \checkmark</math></u>			<u><math>= 9n - 16 \checkmark</math></u>	
6.6.	$2^{x-3} = 17$		7.1. 2.	$T_n = 9n - 16$	
	$x-3 = \frac{\log 17}{\log 2} \checkmark \log 5$			$1784 = 9n - 16 \checkmark$	
	$x = 7,09 \checkmark$	2		$200 = n \checkmark$	2
	<u><math>x = 7,09 \checkmark</math></u>			<u><math>200 = n \checkmark</math></u>	

$$7.2. \quad 7x-1 - (-3x+2) = 9x+10 - (7x-1)$$

$$7x-1+3x-2 = 9x+10-7x+1$$

$$10x-3 = 2x+11$$

$$8x = 14$$

$$x = \frac{7}{4} \checkmark$$

→

2

$$8.1. \quad \cos \hat{D} = \frac{AD}{BD} \text{ of } \frac{CD}{AD}$$

2

$$8.2. \quad 1. \quad 1 - \cos^2 100^\circ$$

$$= 1 - (\cos 100^\circ)^2$$

$$= 1 - (-0,173 \checkmark \dots)^2$$

$$= 0,97 \checkmark$$

2

$$8.2. \quad 2. \quad \frac{\sin 2(100^\circ + 10^\circ)}{3 \tan 100^\circ + 10}$$

$$= \frac{-0,642 \dots \checkmark}{-7,013 \dots \checkmark}$$

$$= 0,09 \checkmark$$

3

$$8.3. \quad 1. \quad \frac{\sin x}{4} = \frac{\sin 20^\circ}{3}$$

$$\sin x = 0,456 \dots$$

$$x = \sin^{-1}(0,456 \dots)$$

$$= 27,13^\circ \rightarrow$$

2

$$8.3. \quad 2. \quad 6 - 4 \tan 8(x-7^\circ) = 1$$

$$A = 8(x-7^\circ)$$

$$6 - 4 \tan A = 1$$

$$\tan A = \frac{5}{4} \checkmark$$

$$A = \tan^{-1}\left(\frac{5}{4}\right)$$

$$= 51,34 \dots^\circ$$

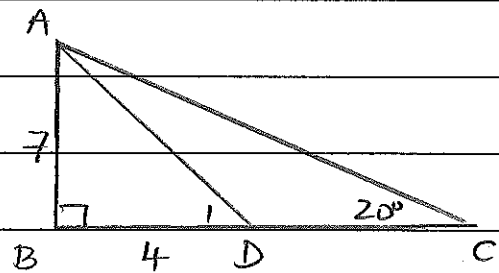
$$\therefore 8(x-7^\circ) = 51,34 \dots^\circ$$

$$x - 7^\circ = 6,417 \dots^\circ$$

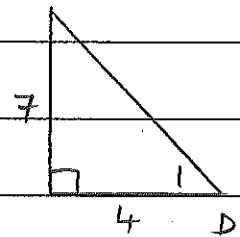
$$x = 13,42^\circ \rightarrow$$

3

8.4.



8.4. 1.



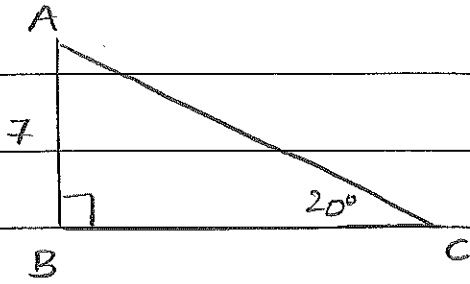
$$\tan \hat{D}_1 = \frac{7}{4} \quad \frac{o}{a}$$

$$\hat{D}_1 = \tan^{-1}\left(\frac{7}{4}\right)$$

$$= 60,26^\circ \rightarrow$$

2

8.4. 2.



$$\tan 20^\circ = \frac{7}{BC} \checkmark$$

$$BC \cdot \tan 20^\circ = 7$$

$$BC = \frac{7}{\tan 20^\circ} \\ = 19,232... \checkmark$$

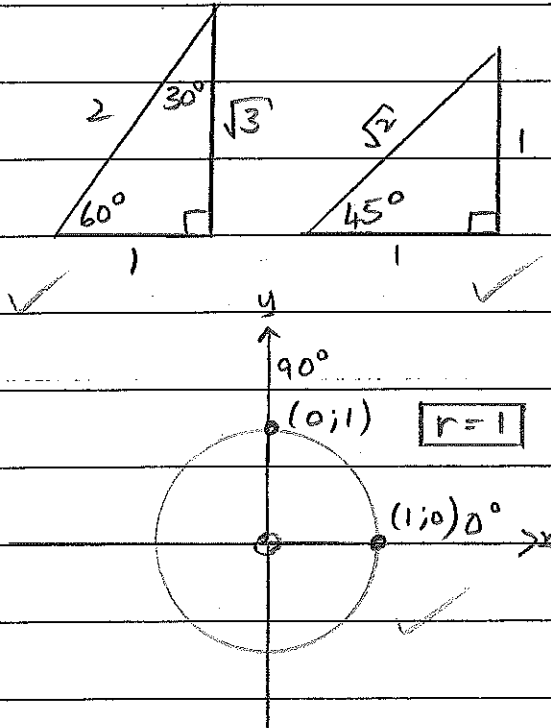
$$\therefore DC = BC - 4$$

$$= 19,232... - 4$$

$$= \underline{15,23 \text{ m}} \checkmark$$

3

9.1. 1.



3

9.1.

$$2.1. \cos 30^\circ = \frac{a}{h} \\ = \frac{\sqrt{3}}{2} \checkmark$$

9.1.

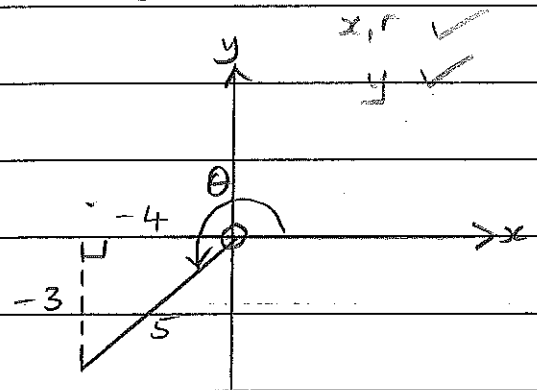
$$2.2. \sin 45^\circ = \frac{o}{h} \\ = \frac{1}{\sqrt{2}} \checkmark$$

9.1.

$$2.3. \cos 0^\circ = \frac{x}{r} \\ = \frac{1}{1} \checkmark \\ = 1$$

9.2.

$$\cos \theta = -\frac{4}{5} \\ = \frac{-4}{5} \frac{x}{r}$$

•  $\cos - \therefore$  Q II III•  $\sin - \therefore$  Q III IV $\therefore$  Q III

$$x = -4, r = 5, y = -3 \text{ both}$$

$$\therefore \tan \theta = \frac{y}{x} \\ = \frac{-3}{-4} \\ = \frac{3}{4} \checkmark$$

3

PolyMathic

Vraestel 9 en  
Vraestel 10

Algebra en  
Meetkunde &  
Trig

PolyMathic



**Totaal: 150**

**Algebra: Vraag 1 tot Vraag 6**

**Meetkunde en Trig: Vraag 7 tot Vraag 12**

Instruksies:

- Toon alle stappe
- 'n Sakrekenaar mag gebruik word
- Rond antwoorde af tot 2 desimale plekke tensy anders vermeld word

**Vraag1 - [6]**

1.1 Watter van die volgende getalle is irrasionaal?

$$A = 1.3833\ 8333\ 83333\ 8\ \dots$$

$$B = \sqrt{3}$$

$$C = \frac{22}{7}$$

$$D = \frac{\pi}{2}$$

1.2 Tussen watter twee opeenvolgende heelgetalle lê die volgende getal (bepaal sonder die gebruik van 'n sakrekenaar).

$$\sqrt{210}$$

1.3 Skryf  $1,\dot{3}$  as 'n gewone breuk (in die vorm  $\frac{a}{b}$  waar a en b heelgetalle is).

**Vraag 2 - [10]**

Vereenvoudig die volgende:

2.1  $3ab(2b^2 - 4a^2)$  (2)

2.2  $(3x - 1)(2x + 3)$  (1)

2.3  $-4(x - 1)^2$  (2)

2.4  $(2x - 3y)(-x^2 + 3xy + 2y^2)$  (2)

2.5  $2(3a + 4b) - 5(4a - 2b) - (-b)$  (3)

**Vraag 3** - **[20]**

Faktoriseer die volgende:

3.1.1  $3x^2y + 9xy^3$  (2)

3.1.2  $4x^2 - 1$  (2)

3.1.3  $5x^2 - 125y^2$  (3)

3.1.4  $a^3 + 27$  (2)

3.1.5  $4(3a - 2b) + 8x(2b - 3a)$  (3)

3.1.6  $a^3 + 4a^2 - 5a - 20$  (2)

3.1.7  $x^2 - 7x - 18$  (2)

3.1.8  $6x^2 + 7x - 5$  (2)

3.2 Vind al die Natuurlike getalle vir "m" waarvoor:  $x^2 + mx + 30$  gefaktoriseer kan word. (2)

**Vraag 4 - [18]**

Vereenvoudig die volgende en los jou antwoorde in positiewe eksponente.

4.1  $2(3x^2y^2z^0)^3$  (2)

4.2  $\frac{(2a^3b^2)^4}{8a^{-3}b^2}$  (3)

4.3  $\frac{3 \cdot 5^x - 3}{5^x - 1}$  (3)

4.4  $\frac{-3y+6}{2-y} - \frac{2y^2-2y}{y-1}$  (3)

4.5  $\frac{b^2-4b}{b^2-16} \times \frac{4b+16}{b^2+2b+1}$  (4)

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

**Vraag 5** - **[21]**

5.1 Los op vir "x".

5.1.1  $2(3x - 2) = 4$  (2)

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

5.1.3  $8y^3 - 64 = 0$  (2)

5.1.4  $2x^2 + 5x - 3 = 0$  (2)

5.1.5  $5 \cdot 3^{2x} = 45$  (2)

5.1.6  $-3(x - 1) + 2(x + 3) \leq 7x - 49$  (3)

5.2 Los die volgende 2 vergelykings gelyktydig op: (4)

$$2x + y = 8$$

$$4y = 3x - 3$$

5.3 Skryf die volgende vergelyking oor, in die vorm  $a = \dots$

$$v^2 = u^2 - 2as \quad (3)$$

**Vraag 6 - [19]**

6.1 Bepaal die  $n^{\text{de}}$  term vir elkeen van die volgende liniêre patrone:

6.1.1 3; 10; 17; 24; ... (2)

6.1.2 3; 1; -1; .... (2)

6.2 Bepaal die  $n^{\text{de}}$  term van die volgende kwadratiese patroon:

1; 3; 7; 13; 21; .... (3)

6.3 Vir die volgende liniêre patroon:  $3a + 2b; 5a + b; 7a; 9a - b; \dots$

6.3.1 Skryf die volgende 3 terme neer. (2)

6.3.2 Bepaal die gemene verskil kragtens "a" en "b". (2)

6.4 Watter term in die getal patroon 1; 4; 7; ... is gelyk aan 61? (3)

6.5 Kyk na die volgende rangskikking van vuurhoutjies:



Patroon 1



Patroon 2



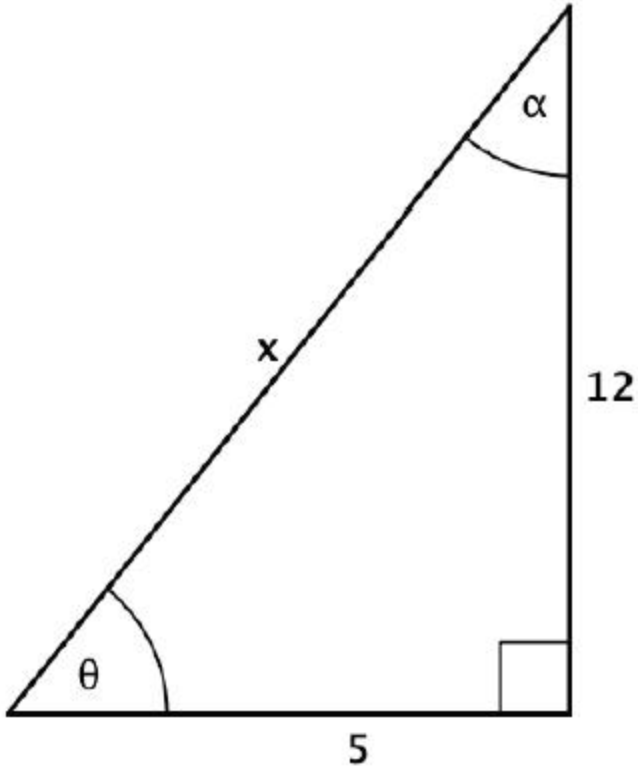
Patroon 3

6.5.1 Bepaal die hoeveel vuurhoutjies in die  $n^{\text{de}}$  rangskikking? (3)

6.5.2 Hoeveel vuurhoutjies sal daar in die 27ste patroon wees? (2)

**Vraag 7 - [8]**

Kyk na die driehoek hieronder:



7.1 Gebruik Pythagoras om die waarde van “x” te bepaal. (1)

7.2 Bepaal die waardes van die volgende:

---

7.2.1  $\tan \theta$  (1)

7.2.2  $\operatorname{cosec} \alpha$  (1)

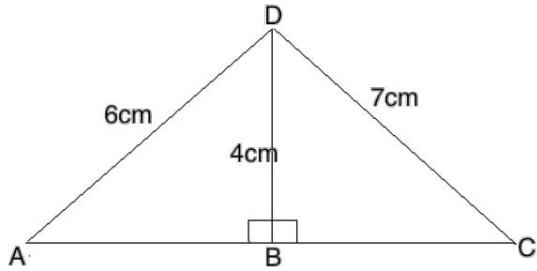
7.2.3  $\sec \theta$  (1)

7.2.4  $\sin \alpha$  (1)

7.3 Bepaal die grote van hoeke  $\alpha$  en  $\theta$ . (3)

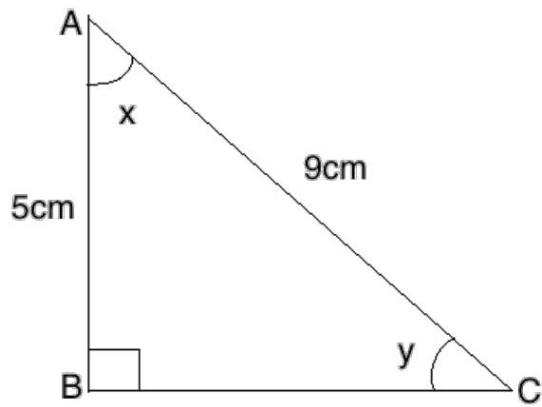
**Vraag 8 - [13]**

8.1 Bepaal die lengte van AC.



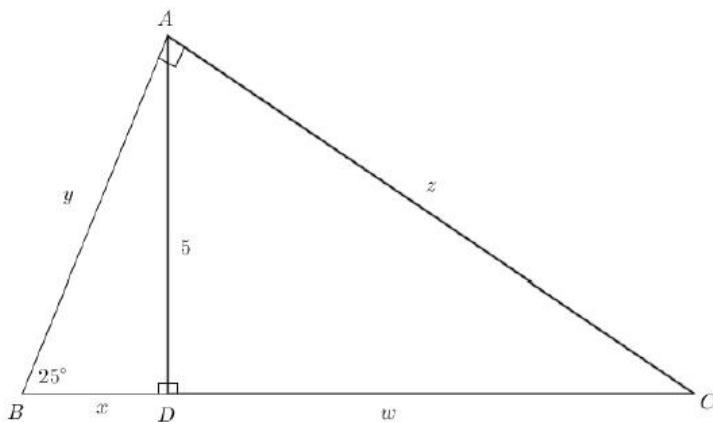
(4)

8.2 Bepaal die grootte van hoeke  $x$  en  $y$ .



(4)

8.3 Bepaal  $x$ ,  $y$ ,  $w$  en  $z$





**Vraag 9 - [10]**

9.1 Gebruik jou sakrekenaar om die volgende uit te werk:

9.1.1  $2 \cos 36 + \sin 54$  (1)

9.1.2  $2 \cot 81$  (2)

9.1.3  $2 \sec^2 25$  (2)

9.2 As  $A = 30^\circ$  en  $B = 45^\circ$ , bepaal die volgende sonder die gebruik van 'n sakrekenaar.

9.2.1  $\tan A + \cot B$  (2)

9.2.2  $\cos 2A$  (1)

9.2.3  $\sin^2 B + \cos^2 A$  (2)

**Vraag 10 - [5]**

Bepaal die volgende sonder die gebruik van 'n sakrekenaar, toon alle stappe!

10.1  $\sin 135 + \cos 45$  (2)

10.2  $\cos 225 + \operatorname{cosec} 315$  (3)

**Vraag 11 - [10]**

Gebruik jou sakrekenaar om die waardes vir  $x$ ,  $A$  en  $\theta$  in elk van die volgende te bepaal. Rond jou antwoorde af tot 1 desimale plek.

11.1  $\sin \theta = 0,3$  (1)

11.2  $\sin x - 0,53 = -1$  (2)

11.3  $\tan(A - 12^\circ) = 3$  (2)

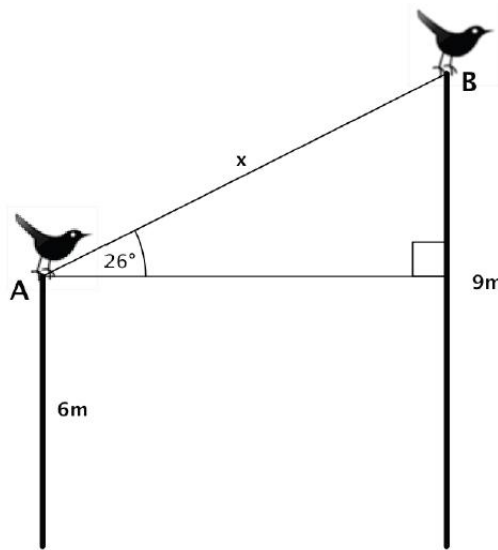
11.4  $2 \sin 3\theta + 2 = 3$  (3)

11.5  $\sin \frac{\theta}{3} = \cos 70^\circ$  (2)

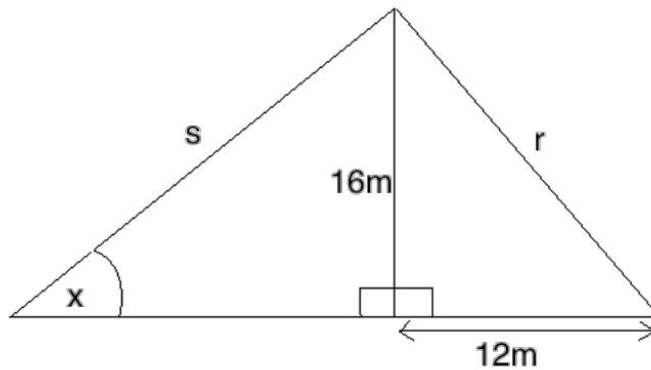
**Vraag 12 - [9]**

12.1 Twee voëls sit op twee verskillende telefoonpale (A en B).

Telefoonpaal A is 6m hoog terwyl telefoonpaal B 9m hoog is. As die hoogtehoek vanaf A na B  $26^\circ$  is, hoe vêr is die twee pale van mekaar af? (4)



12.2 In die diagram hieronder is 'n vlagpaal wat op gelyke grond staan. Twee kables r en s is vasgemaak aan die paal by 'n hoogte van 16m. Die lengte van kabel s en r saam is 50m. As kabel r 12m vanaf die voet van die vlagpaal vasgemaak is – wat is die hoek (x) wat kabel s met die grond maak? (5)



(5)

# Graad 10 Wiskunde - Memorandum

Junie eksamen

Totaal:150

1.1 A, B, D ✓✓ ⊖ Per fout (2)

1.2  $\sqrt{196} < \sqrt{210} < \sqrt{225}$  ✓

∴  $14 < \sqrt{210} < 15$  ✓ (2)

1.3 laat:  $x = 1,3$   
∴  $10x = 13,3$  ✓

∴  $9x = 12$

∴  $x = \frac{12}{9}$  of  $\frac{4}{3}$  ✓ (2)

2.1  $3ab(2b^2 - 4a^2)$   
 $= 6ab^3 - 12a^3b$  (2)

2.2  $(3x-1)(2x+3)$   
 $= 6x^2 + 9x - 2x - 3$   
 $= 6x^2 + 7x - 3$  ✓ (1)

2.3  $-4(x-1)^2$   
 $= -4(x^2 - 2x + 1)$   
 $= -4x^2 + 8x - 4$  ✓✓ (2)

2.4  $(2x-3y)(-x^2+3xy+2y^2)$   
 $= -2x^3 + 6x^2y + 4xy^2 + 3x^2y - 9xy^2 - 6y^3$   
 $= -2x^3 + 9x^2y - 5xy^2 - 6y^3$  ✓ (2)

2.5  $2(3a+4b) - 5(4a-2b) - (-b)$   
 $= 6a + 8b - 20a + 10b + b$   
 $= -14a + 19b$  ✓ (3)

$$3.1.1 \quad 3x^2y + 9xy^3 \\ = \underbrace{3xy}_{\checkmark} (\underbrace{x + 3y^2}_{\checkmark}) \quad (2)$$

$$3.1.2 \quad 4x^2 - 1 \\ = (\underbrace{2x+1}_{\checkmark}) (\underbrace{2x-1}_{\checkmark}) \quad (2)$$

$$3.1.3 \quad 5x^2 - 125y^2 \\ = 5(x^2 - 25y^2) \\ = \underbrace{5}_{\checkmark} (\underbrace{x+5y}_{\checkmark}) (\underbrace{x-5y}_{\checkmark}) \quad (3)$$

$$3.1.4 \quad a^3 + 27 \\ = (\underbrace{a+3}_{\checkmark}) (\underbrace{a^2 - 3a + 9}_{\checkmark}) \quad (2)$$

$$3.1.5 \quad 4(3a-2b) + 8x(2b-3a) \\ = 4(3a-2b) - 8x(3a-2b) \\ = (4-8x)(3a-2b) \checkmark \\ = 4(1-2x)(3a-2b) \checkmark \quad (3)$$

$$3.1.6 \quad a^3 + 4a^2 - 5a - 20 \\ = a^2(a+4) - 5(a+4) \checkmark \\ = (a+4)(a^2-5) \checkmark \quad (2)$$

$$3.1.7 \quad x^2 - 7x - 18 \\ = (\underbrace{x-9}_{\checkmark}) (\underbrace{x+2}_{\checkmark}) \quad (2)$$

$$3.1.8 \quad 6x^2 + 7x - 5 \\ (\underbrace{3x+5}_{\checkmark}) (\underbrace{2x-1}_{\checkmark}) \quad (2)$$

$$3.2 \quad F(30) = 1, 2, 3, 5, 6, 10, 15, 30$$

$$m = 31, 29, 17, 13, 7, 11, 1 \quad \checkmark \quad (2)$$

$$4.1 \quad 2(3x^2y^2z^0)^3$$

$$= 2(27x^6y^6z^0)$$

$$= 54x^6y^6 \quad \checkmark \quad (2)$$

$$4.2 \quad \frac{(2a^3b^2)^4}{8a^{-3}b^2} = \frac{16a^{12}b^8 \checkmark}{8a^{-3}b^2} = 2a^{15}b^6 \checkmark \quad (3)$$

$$4.3 \quad \frac{3 \cdot 5^x - 3}{5^x - 1}$$

$$= \frac{3 \cdot (5^x - 1) \checkmark}{(5^x - 1) \checkmark}$$

$$= 3 \quad \checkmark$$

(3)

$$4.4 \quad \frac{-3y+6}{2-y} - \frac{2y^2-2y}{y-1}$$

$$= \frac{-3(y-2) \checkmark}{-1(y-2)} - \frac{2y(y-1) \checkmark}{(y-1)}$$

$$= 3 - 2y \quad \checkmark$$

(3)

$$4.5 \quad \frac{b^2-4b}{b^2-16} \times \frac{4b+16}{b^2+2b+1}$$

$$= \frac{b(b-4)}{(b+4)(b-4)} \times \frac{4(b+4)}{(b+1)(b+1)} \quad \checkmark$$

$$= \frac{4b \checkmark}{(b+1)^2 \checkmark}$$

(4)

$$\begin{aligned}
 (4.6) \quad & \frac{3}{x-1} + \frac{2}{x+1} \\
 &= \frac{3(x+1) + 2(x-1)}{(x-1)(x+1)} \checkmark \\
 &= \frac{5x-1}{(x-1)(x+1)} \checkmark \quad (3)
 \end{aligned}$$

$$\begin{aligned}
 5.1.1 \quad & 2(3x-2) = 4 \\
 \therefore & 6x - 4 = 4 \\
 \therefore & 6x = 8 \\
 \therefore & x = \frac{8}{6} \checkmark \quad x = \frac{4}{3} \quad (2)
 \end{aligned}$$

$$\begin{aligned}
 5.1.2 \quad & \frac{x-1}{3} + \frac{2x+1}{4} = 5 \\
 \therefore & 4(x-1) + 3(2x+1) = 12(5) \\
 \therefore & 4x - 4 + 6x + 3 = 60 \\
 \therefore & 10x - 1 = 60 \\
 \therefore & 10x = 61 \checkmark \\
 \therefore & x = \frac{61}{10} \quad (3)
 \end{aligned}$$

$$\begin{aligned}
 5.1.3 \quad & 8y^3 - 64 = 0 \\
 \therefore & 8y^3 = 64 \checkmark \\
 \therefore & y^3 = 8 \\
 \therefore & y = \sqrt[3]{8} \\
 \therefore & y = 2 \checkmark \quad (2)
 \end{aligned}$$

$$\begin{aligned}
 5.1.4 \quad & 2x^2 + 5x - 3 = 0 \\
 & (2x-1)(x+3) = 0 \\
 & 2x-1=0 \text{ of } x+3=0 \\
 & x = \frac{1}{2} \checkmark \text{ of } x = -3 \checkmark \quad (2)
 \end{aligned}$$

5.1.5

$$5.3^{2x} = 45$$

$$3^{2x} = 9 \quad \checkmark$$

$$3^{2x} = 3^2$$

$$2x = 2$$

$$\therefore x = 1 \quad \checkmark \quad (2)$$

5.1.6

$$-3(x-1) + 2(x+3) \leq 7x-49$$

$$-3x+3+2x+6 \leq 7x-49$$

$$\checkmark$$

$$-x+9 \leq 7x-49$$

$$-8x \leq -58$$

$$8x \geq 58 \quad \checkmark$$

$$x \geq \frac{58}{8}$$

$$x \geq 7, \frac{27}{4} \quad \checkmark \quad (3)$$

5.2

$$2x+y=8$$

$$4y=3x-3 \quad \text{---} \textcircled{2}$$

$$y=8-2x \quad \text{---} \textcircled{1}$$

Vervang 1 in 2:

$$4(8-2x) = 3x-3$$

$$32-8x = 3x-3$$

$$35 = 11x$$

$$\frac{35}{11} = x \quad \checkmark$$

$$\therefore y = 8 - 2\left(\frac{35}{11}\right) \quad \checkmark$$

$$\therefore y = \frac{18}{11} \quad \checkmark$$

(4)

5.3

$$v^2 = u^2 - 2as$$

$$\therefore v^2 - u^2 = -2as$$

$$\therefore \frac{v^2 - u^2}{-2s} = -a$$

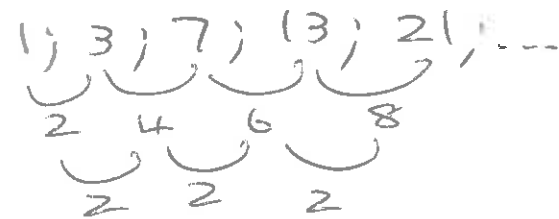
$$\frac{(v+u)(v-u)}{-2s} = -a \quad \checkmark$$

(3)



6.1.1  $3; 10; 17; \dots$   
 $T_n = 7n - 4$  ✓✓ (2)

6.1.2  $3; 1; -1; \dots$   
 $T_n = -2n + 5$  ✓✓ (2)

6.2  $1; 3; 7; 13; 21; \dots$   


$2a = 2 \Rightarrow a = 1$

$3a + b = 2$   
 $3(1) + b = 2$   
 $3 + b = 2$   
 $b = 2 - 3$   
 $b = -1$

$a + b + c = 1$   
 $1 + (-1) + c = 1$   
 $c = 1$

$\therefore T_n = \underbrace{1n^2}_{\checkmark} - \underbrace{1n}_{\checkmark} + \underbrace{1}_{\checkmark}$  (3)

6.3.1  $11a - 2b; 13a - 3b; 15a - 4b$  ✓✓ (2)

6.3.2  $d = T_2 - T_1$   
 $d = 5a + b - (3a + 2b)$   
 $d = \underbrace{2a}_{\checkmark} - \underbrace{b}_{\checkmark}$  (2)

6.4 1; 4; 7; ...

$$T_n = 3n - 2 \quad \checkmark$$

$$\therefore 3n - 2 = 61 \quad \checkmark$$

$$\therefore 3n = 63$$

$$n = 21 \quad \checkmark$$

(3)

OF:

1; 4; 7; 10; 13; 16; 19; 22; 25; 28; 31; 34; 37; 40;  
43; 46; 49; 52; 55; 58; 61

↑  
21<sup>st</sup> term

✓✓✓

6.5.1

Patroon 1: 8

Patroon 2: 11

Patroon 3: 14

8, 11, 14, ...

$$T_n = 3n + 5 \quad \checkmark \checkmark$$

(3)

6.5.2

$$T_{27} = 3(27) + 5 \quad \checkmark \text{ CA}$$

$$T_{27} = 86 \quad \checkmark \text{ CA}$$

(2)

7.1

$$x^2 = 5^2 + 12^2 \quad (\text{Pythag})$$

$$x^2 = 25 + 144$$

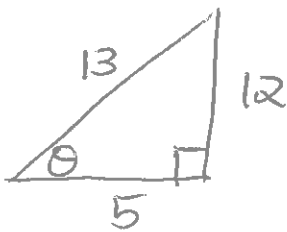
$$x^2 = 169$$

$$x = \sqrt{169}$$

$$x = 13 \quad \checkmark$$

(1)

7.2



$$7.2.1 \quad \tan \theta = \frac{12}{5} \quad \checkmark \quad (1)$$

$$7.2.2 \quad \operatorname{cosec} \alpha = \frac{13}{5} \quad \checkmark \quad (1)$$

$$7.2.3 \quad \sec \theta = \frac{13}{5} \quad \checkmark \quad (1)$$

$$7.2.4 \quad \sin \alpha = \frac{5}{13} \quad \checkmark \quad (1)$$

$$7.3 \quad \tan \theta = \frac{12}{5}$$

$$\therefore \theta = \tan^{-1}\left(\frac{12}{5}\right)$$

$$\theta = 67,38^\circ \quad \checkmark$$

$$\sin \alpha = \frac{5}{13}$$

$$\alpha = \sin^{-1}\left(\frac{5}{13}\right)$$

$$\alpha = 22,61^\circ \quad \checkmark$$

(3)

8.1

$$AB^2 + 4^2 = 6^2$$

$$\therefore AB^2 + 16 = 36$$

$$\therefore AB^2 = 20$$

$$\therefore AB = \sqrt{20}$$

$$BC^2 + 4^2 = 7^2$$

$$BC^2 + 16 = 49$$

$$BC^2 = 33$$

$$BC = \sqrt{33} \quad \checkmark$$

$$AC = AB + BC$$

$$AC = \sqrt{20} + \sqrt{33} \quad \checkmark$$

$$AC = 10,21 \text{ cm} \quad \checkmark$$

$$8.2 \quad \cos x = \frac{5}{9}$$

$$x = \cos^{-1}\left(\frac{5}{9}\right) \checkmark$$

$$x = \frac{33,75^\circ}{56,25^\circ} \checkmark$$

$$\sin y = \frac{5}{9}$$

$$y = \sin^{-1}\left(\frac{5}{9}\right) \checkmark$$

$$y = 33,75^\circ \checkmark$$

(4)

$$8.3 \quad \underline{x}: \tan 25 = \frac{5}{x}$$

$$\therefore x = \frac{5}{\tan 25}$$

$$\therefore x = 10,7225 \checkmark$$

$$\underline{y}: \quad x^2 + 5^2 = y^2$$
$$(10,7225)^2 + 5^2 = y^2$$
$$139,97 = y^2$$
$$y = 11,83 \checkmark$$

Of:

$$\sin 25 = \frac{5}{y}$$

$$y = \frac{5}{\sin 25}$$

$$y = 11,83$$

$$\hat{C} = 65^\circ \quad (\text{binnehoek van } \triangle ABC) \checkmark$$

$$\underline{w}: \quad \tan 65 = \frac{5}{w}$$

$$w = \frac{5}{\tan 65}$$

$$w = 2,33 \checkmark$$

$$\underline{z}: \quad \sin 65 = \frac{5}{z}$$

$$z = \frac{5}{\sin 65}$$

$$z = 5,52 \checkmark$$

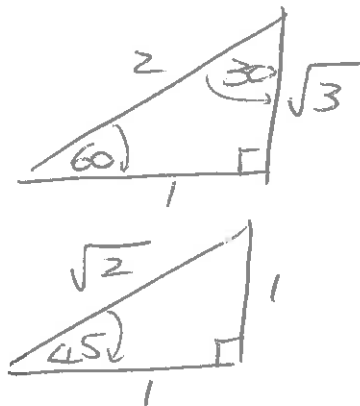
(5)

$$9.1.1 \quad 2 \cos 36 + \sin 54 \\ = 2,427 \quad \checkmark \quad (1)$$

$$9.1.2 \quad 2 \cot 81 \\ = 2 \cdot \frac{1}{\tan 81} \quad \checkmark \\ = 0,3167 \quad \checkmark \quad (2)$$

$$9.1.3 \quad 2 \sec^2 25 \\ = 2 \cdot \frac{1}{\cos^2 25} \quad \checkmark \\ = 2 \cdot \left( \frac{1}{\cos 25} \right)^2 \\ = 2,435 \quad \checkmark \quad (2)$$

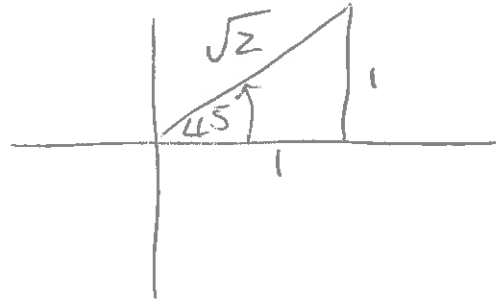
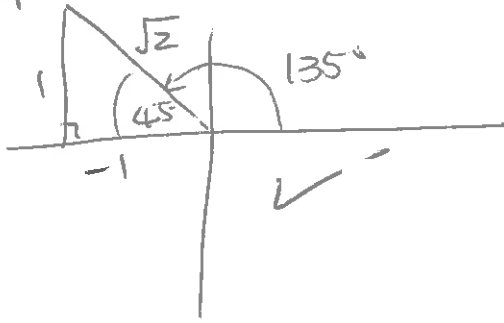
$$9.2.1 \quad \tan A + \cot B \\ = \tan 30 + \cot 45 \\ = \frac{1}{\sqrt{3}} + \frac{1}{1} \quad \checkmark \\ = \frac{1 + \sqrt{3}}{\sqrt{3}}$$



$$9.2.2 \quad \cos 2A \\ = \cos 2(30) \\ = \cos 60 \\ = \frac{1}{2} \quad \checkmark$$

$$9.2.3 \quad \sin^2 B + \cos^2 A \\ \sin^2 30 + \cos^2 45 \\ (\sin 30)^2 + (\cos 45)^2 \\ \left( \frac{1}{2} \right)^2 + \left( \frac{1}{\sqrt{2}} \right)^2 \\ = \frac{1}{4} + \frac{1}{2} \quad \checkmark \\ = \frac{3}{4}$$

10.1  $\sin 135^\circ + \cos 45^\circ$



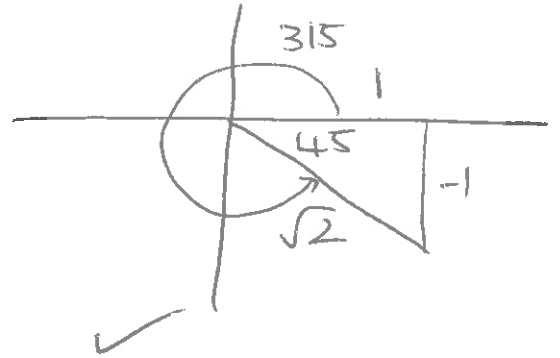
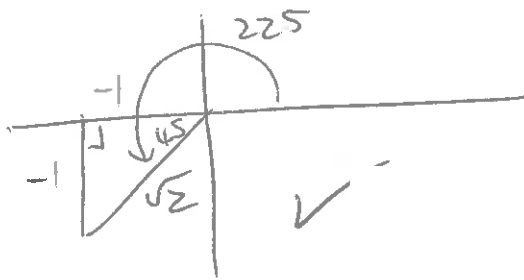
$$= \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}$$

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



(Of:  $\frac{1}{\sqrt{2}}$ )

10.2  $\cos 225^\circ + \operatorname{cosec} 315^\circ$



$$= \frac{-1}{\sqrt{2}} + \frac{\sqrt{2}}{-1}$$

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

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

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



(Of:  $\frac{-3\sqrt{2}}{2}$ )

$$11.1 \quad \sin \theta = 0,3$$

$$\theta = \sin^{-1}(0,3)$$

$$\theta = 17,457^\circ \quad \checkmark \quad (1)$$

$$11.2 \quad \sin x - 0,53 = -1$$

$$\sin x = -1 + 0,53$$

$$\sin x = -0,47 \quad \checkmark$$

$$x = \sin^{-1}(-0,47)$$

$$x = -28,03^\circ \quad \checkmark \quad (2)$$

$$11.3 \quad \tan(A-12) = 3$$

$$A-12 = \tan^{-1}(3) \quad \checkmark$$

$$A = \tan^{-1}(3) + 12$$

$$A = 83,565^\circ \quad \checkmark \quad (2)$$

$$11.4 \quad 2\sin 3\theta + 2 = 3$$

$$2\sin 3\theta = 3 - 2$$

$$2\sin 3\theta = 1$$

$$\sin 3\theta = \frac{1}{2} \quad \checkmark$$

$$3\theta = \sin^{-1}\left(\frac{1}{2}\right) \quad \checkmark$$

$$\theta = \frac{\sin^{-1}\left(\frac{1}{2}\right)}{3}$$

$$\theta = \frac{30}{3}$$

$$\theta = 10^\circ \quad \checkmark \quad (3)$$

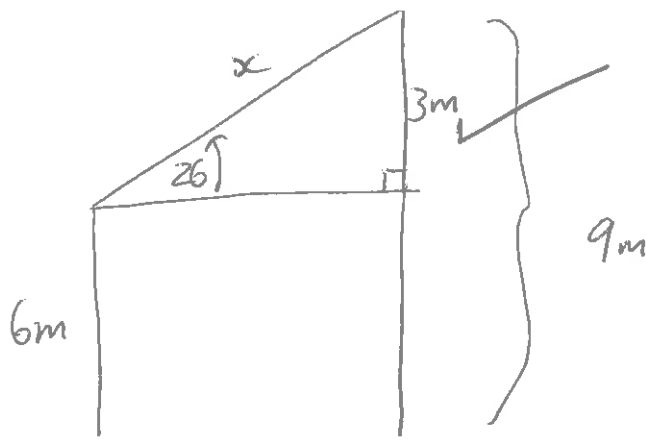
$$11.5 \quad \sin\left(\frac{\theta}{3}\right) = \cos 70$$

$$\frac{\theta}{3} = \sin^{-1}(\cos 70) \quad \checkmark$$

$$\theta = 3 \times \sin^{-1}(\cos 70)$$

$$\theta = 60^\circ \quad \checkmark \quad (2)$$

12.1

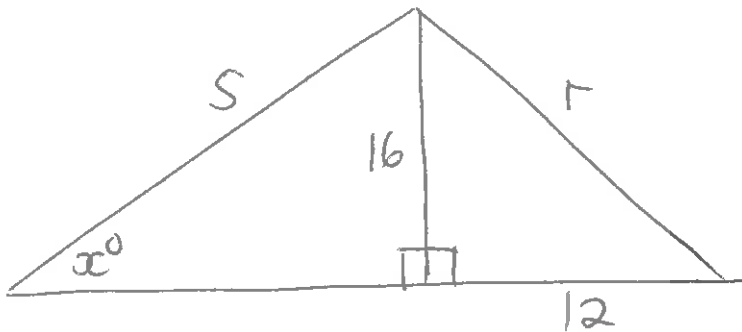


$$\sin 26 = \frac{3}{x} \quad \checkmark$$

$$x = \frac{3}{\sin 26} \quad \checkmark$$

$$x = 6,843 \text{ m} \quad \checkmark \quad (4)$$

12.2



$$s + r = 50$$

$$\left( \begin{array}{l} r = 50 - s \\ \text{or} \\ s = 50 - r \end{array} \right)$$

$$r^2 = 16^2 + 12^2 \quad \checkmark$$

$$r^2 = 256 + 144$$

$$r^2 = 400$$

$$r = \sqrt{400}$$

$$r = 20 \quad \checkmark$$

$$s + r = 50 \quad \text{Gegee}$$

$$\therefore s = 50 - r = 50 - 20 = 30 \quad \checkmark$$

$$\sin \alpha = \frac{16}{30} \quad \checkmark$$

$$\alpha = \sin^{-1} \left( \frac{16}{30} \right)$$

$$\alpha = 32,23^\circ \quad \checkmark$$