education

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PROVINSIALE ASSESSERINGSTAAK

GRAAD 12

ONDERSOEK: MEMO

15 – 19 MAART 2021

PUNTE: 100

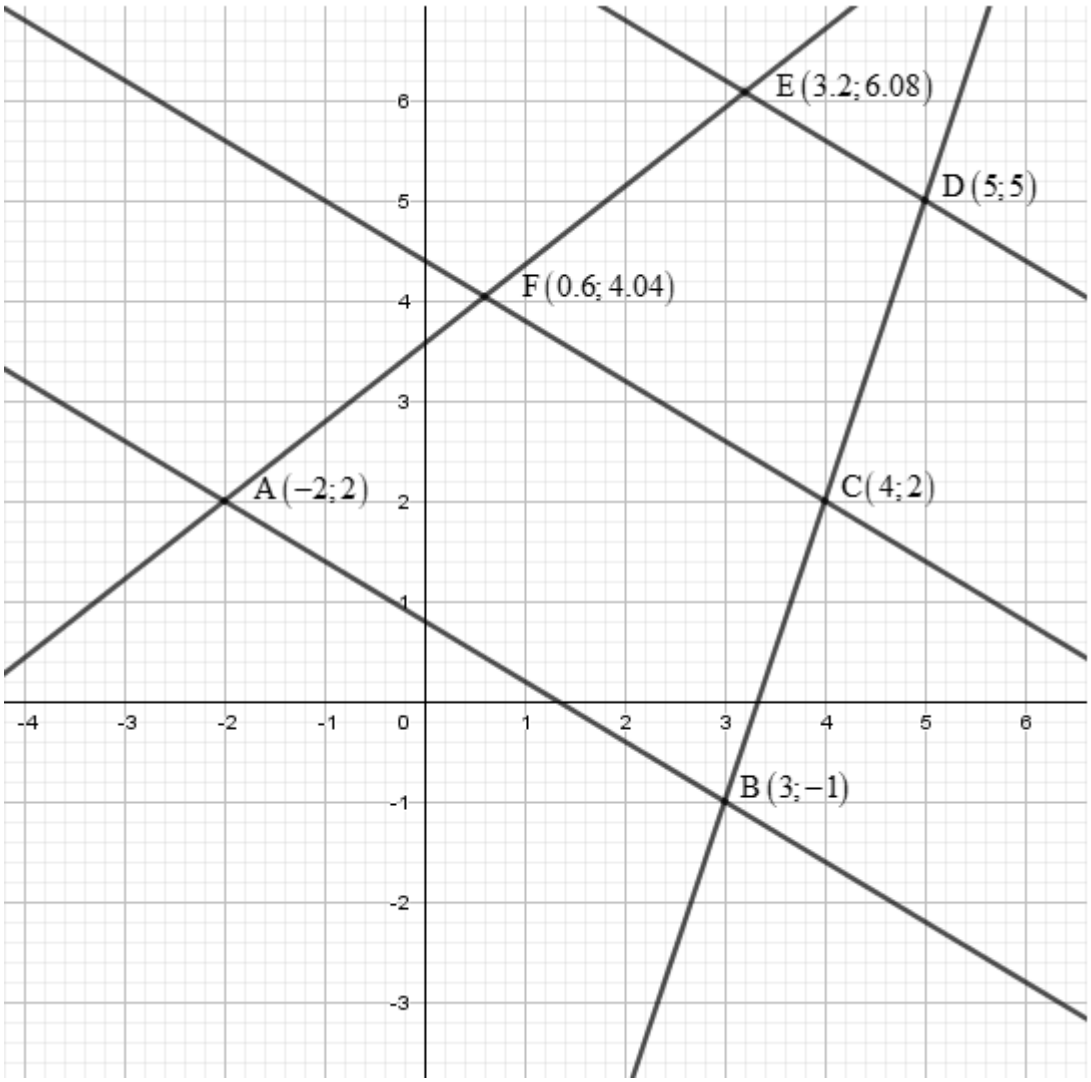
Hierdie merkriglyne bestaan uit 16 bladsye.

ONDERSOEK HOE 'N LYN WAT TWEE SYE VAN 'N DRIEHOEK SNY, DIE SYE VERDEEL.

VRAAG 1

1.1	Verhouding: Vergelyking van twee hoeveelhede deur deling	✓ twee hoeveelhede ✓ deling	(2)

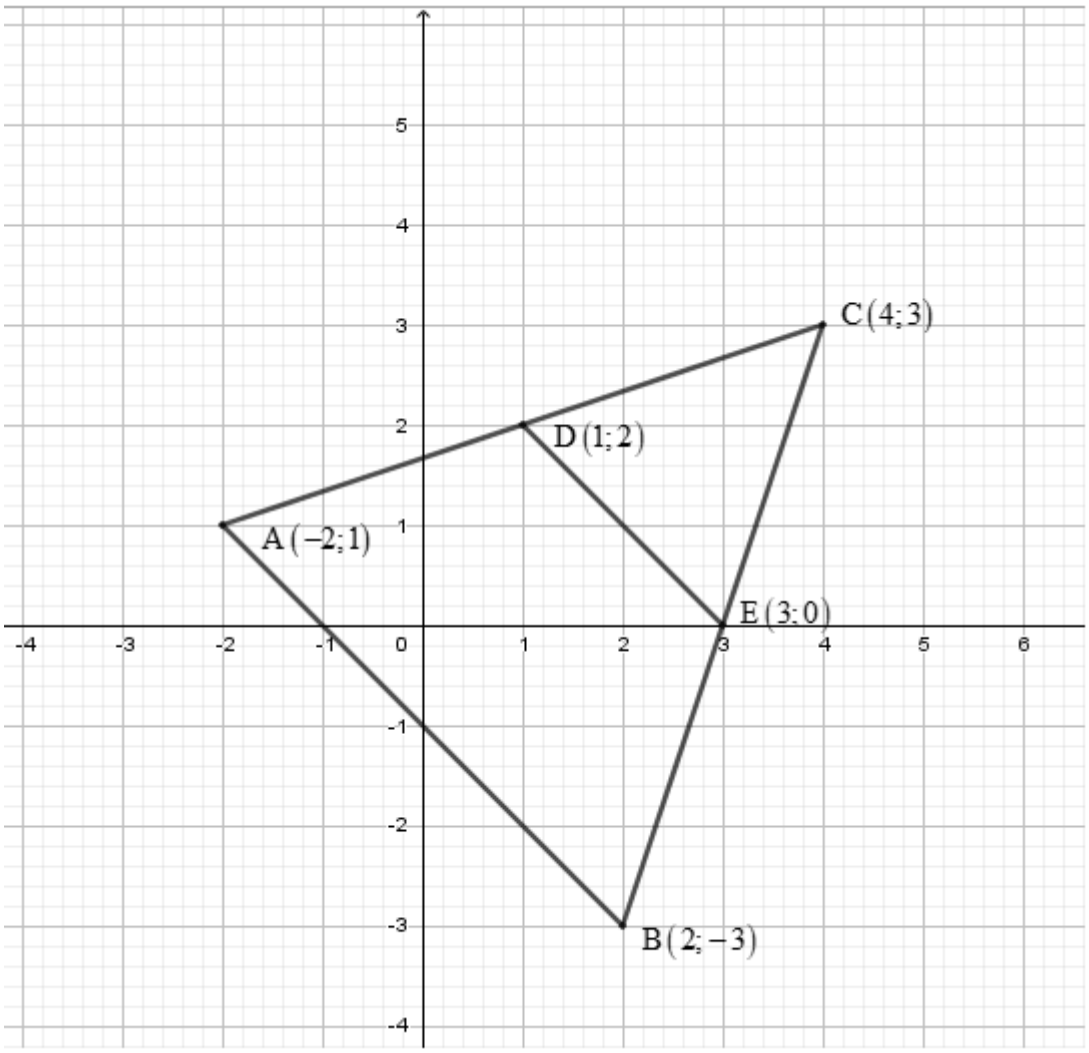
1.2



1.2.1 (a)	$m_{AB} = \frac{-1-2}{3+2}$ $= -\frac{3}{5}$	✓ substitusie ✓ $-\frac{3}{5}$ or $-0,6$	(2)
(b)	$m_{CF} = \frac{2-4,04}{4-0,6}$ $= -\frac{3}{5}$	✓ $-\frac{3}{5}$ or $-0,6$	(1)
(c)	$m_{DE} = \frac{5-6,08}{5-3,2}$ $= -\frac{3}{5}$	✓ $-\frac{3}{5}$ or $-0,6$	(1)
1.2.2	$m_{AB} = m_{CF} = m_{DE}$	✓ antwoord	(1)
1.2.3	AB || CF || DE	✓ antwoord	(1)
1.2.4 (a)	$BC = \sqrt{(4-3)^2 + (2+1)^2}$ $= \sqrt{10}$	✓ substitusie ✓ $\sqrt{10}$	(2)
(b)	$CD = \sqrt{(5-4)^2 + (5-2)^2}$ $= \sqrt{10}$	✓ $\sqrt{10}$	(1)
(c)	$BD = \sqrt{(5-3)^2 + (5+1)^2}$ $= 2\sqrt{10}$ OF $BD = BC + CD$ $= \sqrt{10} + \sqrt{10}$ $= 2\sqrt{10}$	✓ $2\sqrt{10}$ ✓ $2\sqrt{10}$	(1)
(d)	$EF = \sqrt{(3,2-0,6)^2 + (6,08-4,04)^2}$ $= 3,31$	✓ $3,31$	(1)
(e)	$AF = \sqrt{(0,6+2)^2 + (4,04-2)^2}$ $= 3,31$	✓ $3,31$	(1)

(f)	$AE = AF + FE = 6,62$	✓ $6,62$	(1)
1.2.5	Verhouding: Twee verhoudings wat gelyk is aan mekaar OF 'n Vergelyking wat toon dat dat twee verhoudings gelyk is	✓ twee verhoudings ✓ gelyk ✓ vergelyking ✓ twee verhoudings	(2)
1.2.6 (a)	$\frac{BC}{CD} = \frac{\sqrt{10}}{\sqrt{10}} = 1$ $\frac{AF}{EF} = \frac{3,31}{3,31} = 1$ $\frac{BC}{CD} = \frac{AF}{EF}$	✓ 1 ✓ 1 ✓ verhouding	(3)
(b)	$\frac{BC}{BD} = \frac{\sqrt{10}}{2\sqrt{10}} = \frac{1}{2}$ $\frac{AF}{AE} = \frac{3,31}{6,62} = \frac{1}{2}$ $\frac{BC}{BD} = \frac{AF}{AE}$	✓ $\frac{1}{2}$ ✓ $\frac{1}{2}$ ✓ verhouding	(3)
(c)	$\frac{CD}{DB} = \frac{\sqrt{10}}{2\sqrt{10}} = \frac{1}{2}$ $\frac{EF}{AE} = \frac{3,31}{6,62} = \frac{1}{2}$ $\frac{CD}{DB} = \frac{EF}{AE}$	✓ $\frac{1}{2}$ ✓ $\frac{1}{2}$ ✓ verhouding	(3)
1.2.7	Indien drie <u>parallelle</u> lyne twee transversal sny, dan verdeel die lyne in <u>diesefde verhouding</u> / <u>eweredig</u>	✓ parallel ✓ dieselfde verhouding / eweredig	(2)
			[28]

VRAAG 2

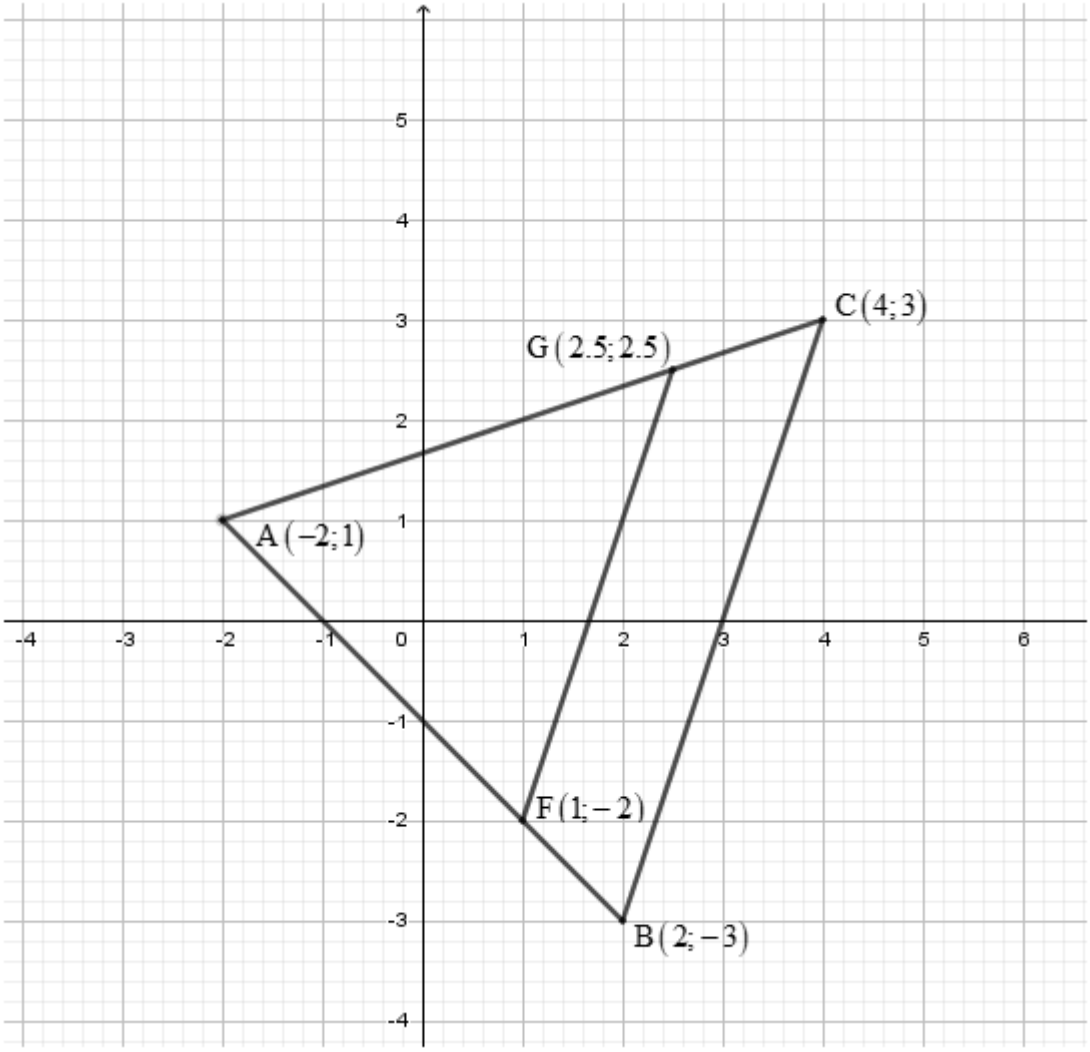


2.1.1	$m_{AB}=\frac{-3-1}{2+2}=-1$	✓ -1	(1)
2.1.2	$m_{DE}=\frac{0-2}{3-1}=-1$	✓ -1	(1)
2.2	$m_{AB}=m_{DE}$	✓ antwoord	(1)
2.3	AB || DE	✓ antwoord	(1)
2.4.1	$BE=\sqrt{(3-2)^2+(0+3)^2}$ $=\sqrt{10}$	✓ $\sqrt{10}$	(1)

2.4.2	$CE = \sqrt{(4-3)^2 + (3-0)^2}$ $= \sqrt{10}$	✓ $\sqrt{10}$	(1)
2.4.3	$BC = 2\sqrt{10}$	✓ $2\sqrt{10}$	(1)
2.4.4	$AD = \sqrt{(1+2)^2 + (2-1)^2}$ $= \sqrt{10}$	✓ $\sqrt{10}$	(1)
2.4.5	$CD = \sqrt{(4-1)^2 + (3-2)^2}$ $= \sqrt{10}$	✓ $\sqrt{10}$	(1)
2.4.6	$AC = 2\sqrt{10}$	✓ $2\sqrt{10}$	(1)
2.5.1	$\frac{BE}{EC} = \frac{\sqrt{10}}{\sqrt{10}} = 1$ $\frac{AD}{DC} = \frac{\sqrt{10}}{\sqrt{10}} = 1$ $\frac{BE}{EC} = \frac{AD}{DC}$	✓ 1 ✓ 1 ✓ verhouding	(3)
2.5.2	$\frac{BE}{BC} = \frac{\sqrt{10}}{2\sqrt{10}} = \frac{1}{2}$ $\frac{AD}{AC} = \frac{\sqrt{10}}{2\sqrt{10}} = \frac{1}{2}$ $\frac{BE}{BC} = \frac{AD}{AC}$	✓ $\frac{1}{2}$ ✓ $\frac{1}{2}$ ✓ verhouding	(3)

2.5.3	$\frac{CE}{BC}=\frac{\sqrt{10}}{2\sqrt{10}}=\frac{1}{2}$ $\frac{CD}{AC}=\frac{\sqrt{10}}{2\sqrt{10}}=\frac{1}{2}$ $\frac{CE}{BC}=\frac{CD}{AC}$	✓ $\frac{1}{2}$ ✓ $\frac{1}{2}$ ✓ verhouding	(3)
			[19]

VRAAG 3



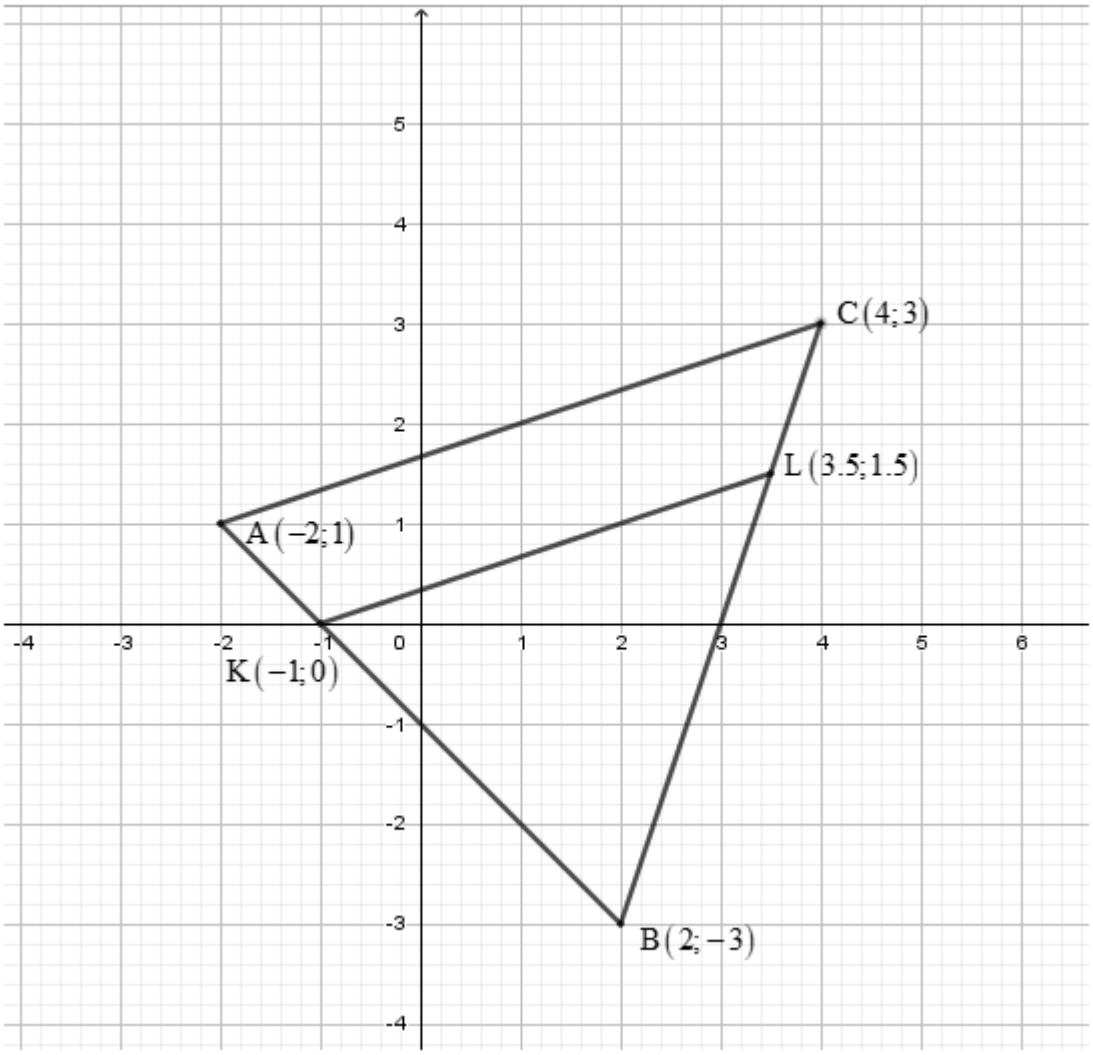
3.1.1	$m_{BC} = \frac{3+3}{4-2} = 3$	✓ 3	(1)
3.1.2	$m_{FG} = \frac{2,5+2}{2,5-1} = 3$	✓ 3	(1)
3.2	$m_{BC} = m_{FG}$	✓ antwoord	(1)
3.3	BC FG	✓ antwoord	(1)
3.4.1	$AF = \sqrt{(1+2)^2 + (-2-1)^2}$ $= 3\sqrt{2}$	✓ $3\sqrt{2}$	(1)

3.4.2	$\text{FB} = \sqrt{(2-1)^2 + (-3+2)^2}$ $= \sqrt{2}$	✓ $\sqrt{2}$	(1)
3.4.3	$\text{AB} = 3\sqrt{2} + \sqrt{2}$ $= 4\sqrt{2}$	✓ $4\sqrt{2}$	(1)
3.4.4	$\text{AG} = \sqrt{(2,5+2)^2 + (2,5-1)^2}$ $= \frac{3\sqrt{10}}{2}$	✓ $\frac{3\sqrt{10}}{2}$	(1)
3.4.5	$\text{CG} = \sqrt{(3-2,5)^2 + (4-2,5)^2}$ $= \frac{\sqrt{10}}{2}$	✓ $\frac{\sqrt{10}}{2}$	(1)
3.5.1	$\frac{\text{FB}}{\text{AF}} = \frac{\sqrt{2}}{3\sqrt{2}} = \frac{1}{3}$ $\frac{\text{GC}}{\text{AG}} = \frac{\frac{\sqrt{10}}{2}}{\frac{3\sqrt{10}}{2}} = \frac{\sqrt{10}}{2} \times \frac{2}{3\sqrt{10}} = \frac{1}{3}$ $\frac{\text{FB}}{\text{AF}} = \frac{\text{GC}}{\text{AG}}$	✓ $\frac{1}{3}$ ✓ $\frac{1}{3}$ ✓ verhouding	(3)
3.5.2	$\frac{\text{FB}}{\text{AB}} = \frac{\sqrt{2}}{4\sqrt{2}} = \frac{1}{4}$ $\frac{\text{CG}}{\text{AC}} = \frac{\frac{\sqrt{10}}{2}}{2\sqrt{10}} = \frac{\sqrt{10}}{2} \times \frac{1}{2\sqrt{10}} = \frac{1}{4}$ $\frac{\text{FB}}{\text{AB}} = \frac{\text{CG}}{\text{AC}}$	✓ $\frac{1}{4}$ ✓ $\frac{1}{4}$ ✓ verhouding	(3)

3.5.3	$\frac{AF}{AB}=\frac{3\sqrt{2}}{4\sqrt{2}}=\frac{3}{4}$ $\frac{AG}{AC}=\frac{\frac{3\sqrt{10}}{2}}{2\sqrt{10}}=\frac{3\sqrt{10}}{2}\times\frac{1}{2\sqrt{10}}=\frac{3}{4}$ $\frac{AF}{AB}=\frac{AG}{AC}$	✓ $\frac{3}{4}$ ✓ $\frac{3}{4}$ ✓ verhouding	(3)
			[18]

VRAAG 4

In die skets hieronder is die koördinate van die hoekpunte van ΔABC, $A(-2;1)$, $B(2;-3)$ en $C(4;3)$. $K(-1;0)$ lê op AB en $L(3.5;1.5)$ op BC.



4.1.1	$m_{AC} = \frac{3-1}{4+2} = \frac{1}{3}$	✓ $\frac{1}{3}$	(1)
4.1.2	$m_{KL} = \frac{1,5-0}{3,5+1} = \frac{1}{3}$	✓ $\frac{1}{3}$	(1)
4.2	$m_{AC} = m_{KL}$	✓ antwoord	(1)
4.3	AC KL	✓ antwoord	(1)

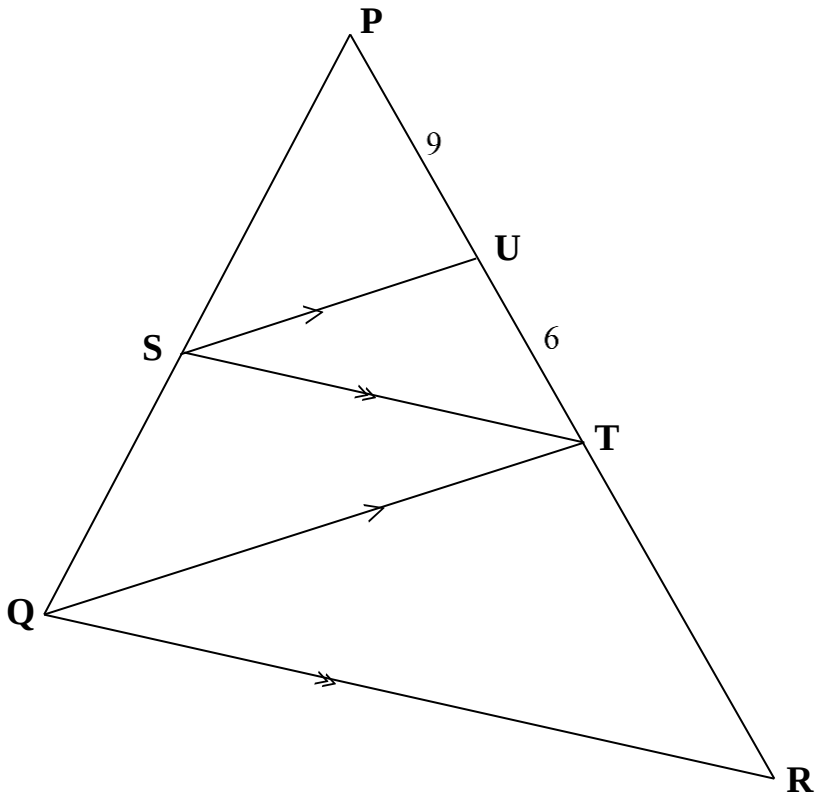
4.4.1	$AK = \sqrt{(-1+2)^2 + (0-1)^2}$ $= \sqrt{2}$	✓ $\sqrt{2}$	(1)
4.4.2	$KB = \sqrt{(2+1)^2 + (-3-0)^2}$ $= 3\sqrt{2}$	✓ $3\sqrt{2}$	(1)
4.4.3	$CL = \sqrt{(4-3)^2 + (3-1,5)^2}$ $= \frac{\sqrt{10}}{2}$	✓ $\frac{\sqrt{10}}{2}$	(1)
4.4.4	$LB = \sqrt{(3,5-2)^2 + (1,5+3)^2}$ $= \frac{3\sqrt{10}}{2}$	✓ $\frac{3\sqrt{10}}{2}$	(1)
4.5.1	$\frac{AK}{KB} = \frac{\sqrt{2}}{3\sqrt{2}} = \frac{1}{3}$ $\frac{CL}{LB} = \frac{\frac{\sqrt{10}}{2}}{\frac{3\sqrt{10}}{2}} = \frac{\sqrt{10}}{2} \times \frac{2}{3\sqrt{10}} = \frac{1}{3}$ $\frac{AK}{KB} = \frac{CL}{LB}$	✓ $\frac{1}{3}$ ✓ $\frac{1}{3}$ ✓ verhouding	(3)
4.5.2	$\frac{AK}{AB} = \frac{\sqrt{2}}{4\sqrt{2}} = \frac{1}{4}$ $\frac{CL}{BC} = \frac{\frac{\sqrt{10}}{2}}{2\sqrt{10}} = \frac{\sqrt{10}}{2} \times \frac{1}{2\sqrt{10}} = \frac{1}{4}$ $\frac{AK}{AB} = \frac{CL}{BC}$	✓ $\frac{1}{4}$ ✓ $\frac{1}{4}$ ✓ verhouding	(3)

4.5.3	$\frac{KB}{AB}=\frac{3\sqrt{2}}{4\sqrt{2}}=\frac{3}{4}$ $\frac{LB}{BC}=\frac{\frac{3\sqrt{10}}{2}}{2\sqrt{10}}=\frac{3\sqrt{10}}{2}\times\frac{1}{2\sqrt{10}}=\frac{3}{4}$ $\frac{KB}{AB}=\frac{LB}{BC}$	✓ $\frac{3}{4}$ ✓ $\frac{3}{4}$ ✓ verhouding	(3)
			[17]

VRAAG 5

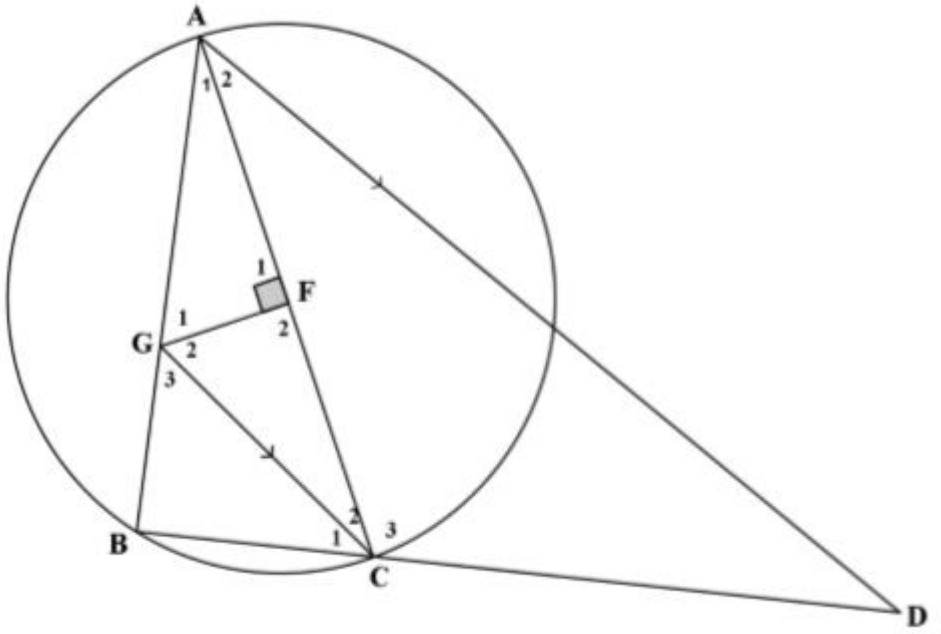
5.1	Indien ‘n lyn wat ‘n driehoek sny <u>parallel</u> is aan een sy van die driehoek, dan verdeel die lyn die ander twee sye van die driehoek <u>in dieselfde verhouding</u> / <u>eweredig</u>	✓ parallel ✓ in dieselfde verhouding / eweredig	(2)

5.2



5.2.1	$\frac{PS}{SQ}=\frac{PU}{UT}$ $\frac{PS}{SQ}=\frac{9}{6}=\frac{3}{2}$	[eweredigheidstelling; SU ‖ QT] OF [lyn ‖ een sy van Δ]	✓ S/ R ✓ antwoord	(2)
5.2.2	$\frac{TR}{PT}=\frac{SQ}{PS}$ $\frac{TR}{15}=\frac{2}{3}$ $TR=\frac{2}{3}\times 15=10$ cm	[eweredigheidstelling; ST // QR] OR [lyn ‖ een sy van Δ]	✓ S/ R ✓ antwoord	(2)
				[6]

VRAAG 6



6.1	$\angle C_1 = \angle D$	[ooeenk. $\angle s$; AD // GC]	✓ S/ R	(3)
	$\angle C_2 = \angle A_2$	[verw $\angle s$; AD // GC]	✓ S/ R	
	AC = CD	[sye teenoor gelyke $\angle s$]	✓ R	
6.2	$\frac{BC}{CD} = \frac{BG}{GA}$	[eweredigheidstelling; AD // GC]	✓ S/ R	(2)
	$\frac{BC}{AC} = \frac{BG}{GA}$	[AC = CD; bewys]	✓ S/ R	
6.3	$\angle B = 90°$	[$\angle$ ½ ⊙]	✓ S/ R	(3)
	$\angle F_2 = 90°$	[GF ⊥ AC]	✓ S/ R	
	GBCF is 'n koordevierhoek	[omgekeerd teenoorst $\angle$ e koordevierhoek]	✓ R	

6.4.1	$AC = 2 \times 10 = 20$ $AB^2 + 12^2 = 20^2$ $AB = 16\,\text{units}$	[deursnee = 2 x radius] [Pyth.]	 ✓ S ✓ antwoord	(2)
6.4.2	$\frac{GA}{AB} = \frac{CD}{BD}$ $\frac{GA}{16} = \frac{20}{32}$ $GA = 10$	[eweredigheidstelling; AD // GC]	✓ S/ R ✓ antwoord	(2)
				[12]
	TOTAAL:			**[100]**