education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

MATHEMATICS P1

EXEMPLAR PAPER

MARKS: 100

TIME: 2 hours

This question paper consists of 7 pages.

153 1 E

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions:

1. This question paper consists of SEVEN questions. Answer ALL the questions.
2. Clearly show ALL the calculations, diagrams, graphs, et cetera you have used in determining the answers.
3. An approved calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
4. If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise.
5. Number the answers EXACTLY as the questions are numbered.
6. Diagrams are NOT necessarily drawn to scale.
7. It is in your own interest to write legibly and to present the work neatly.

QUESTION 1

1.1 Simplify:

1.1.1 $(2x-3)(5x^2-2x+1)$ (4)

1.1.2 $\dfrac{3^{x-1}.2^{x+1}}{6^x}$ (4)

1.1.3 $\dfrac{3x+7}{5}-\dfrac{x-2}{3}$ (4)

1.2 Factorise:

1.2.1 $2x^2-5x-3$ (2)

1.2.2 $5xy-3y+10x-6$ (3)

1.3 Show that $(2x-1)^2-(x-3)^2$ can be simplified to $(x+2)(3x-4)$. (4)

[21]

QUESTION 2

2.1 Solve the following equations:

2.1.1 $(x + 1)(x - 2) = 4$ (5)

2.1.2 $2^x = 13$ (answer correct to ONE decimal digit) (3)

2.2 Solve the following inequality. Illustrate your answer graphically.

$-5 < 2x-3 \leq 7$ (5)

2.3 Three rulers and five pencils cost R10. One pen and ten pencils cost R10. Let the cost of a ruler be x rand and the cost of a pencil be y rand.

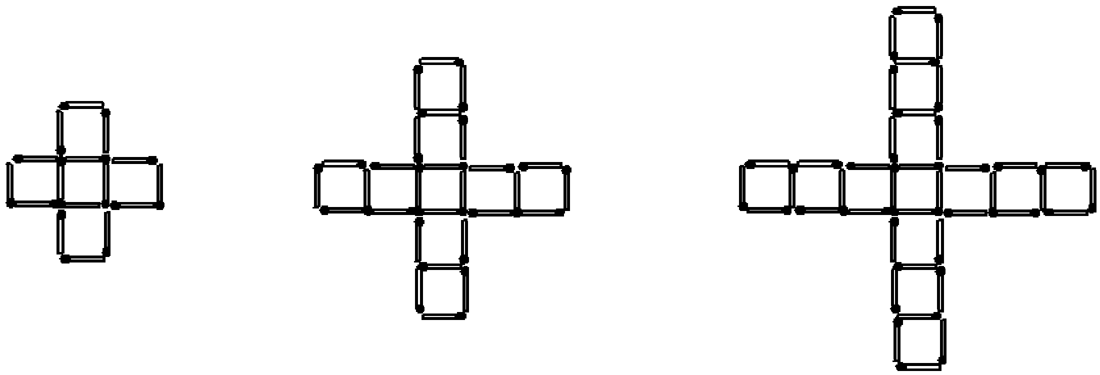
2.3.1 Write down a system of equations, in terms of x and y that reflect the above-mentioned situation. (2)

2.3.2 Solve the system of equations in QUESTION 2.3.1 simultaneously and state the cost of a ruler and the cost of a pencil. (5)

[20]

QUESTION 3

Thandi builds patterns that consist of squares as shown below:



Picture 1 Picture 2 Picture 3

Assume the pattern is continued, answer the following questions:

3.1 How many squares will Picture 5 have? (2)

3.2 Make a conjecture about the number of matches required for any pattern. (2)

3.3 Use a variable to write an algebraic statement to generalise the relationship between the number of squares and the picture number. (2)

[6]

QUESTION 4

4.1 Andrew invested R5 000 at 15% simple interest per annum for 5 years. Cheryl invested R5 000 at 12% compound interest per annum for 5 years. Which person gained more interest on their investment? Substantiate your answer. Show ALL calculations. (8)

4.2 Sipho wants to buy a motor bike for R10 500. He has a deposit of R2 000. He wishes to pay the balance using a hire purchase agreement over 3 years. The interest charged on the loan is 18% per annum. Included in the agreement, is an insurance cost of 2% per annum on the purchase price of the motor bike.

Calculate his monthly instalment. (7)

4.3 The foreign exchange table below indicates the average exchange rate of the South African rand to other currencies.

FOREIGN EXCHANGE TABLE

COUNTRY	CURRENCY	AVERAGE EXCHANGE RATE OF THE RAND
United Kingdom (UK)	Pound (£)	11,85
United States of America (USA)	Dollar ($)	6,30

A company in South Africa exports steel tables to the UK and USA. The total cost to manufacture a table in South Africa is R275, 00 per table.

4.3.1 How much, in dollars ($), will a company in the USA pay for a table? (2)

4.3.2 How much, in pounds (£), will a company in the UK pay for a table? (2)

4.3.3 If the UK could manufactures the same tables at a price of £20 each, will they still buy from South Africa?

Show ALL your calculations to substantiate your answer. (2)

4.3.4 As a result of increasing costs in manufacturing the tables, South Africa wishes to increase the prices by 10%. How much will the USA now pay for a single table in dollars? (2)

[23]

QUESTION 5

Given functions $f(x) = -x^2 + 9$ and $g(x) = 3x + 9$

5.1 Draw f and g on the same system of axes. (6)

5.2 Use your graphs to solve for x if:

5.2.1 $f(x) = g(x)$ (2)

5.2.2 $f(x) > 0$ (2)

5.3 How does the graph of $h(x) = -x^2 - 9$ compare with the graph of $f(x)$? (2)

5.4 Give the equation of the reflection of f in the x–axis. (2)

[14]

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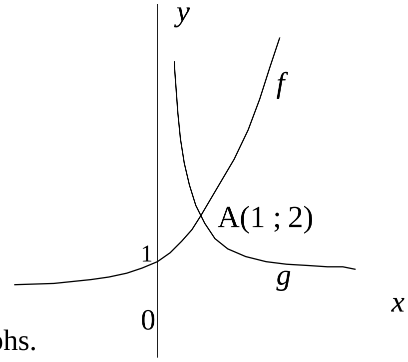
QUESTION 6

6.1 The graph of $f(x) = 2^x$ and $g(x) = \dfrac{k}{x}$ are represented alongside.

The graphs intersect at A.



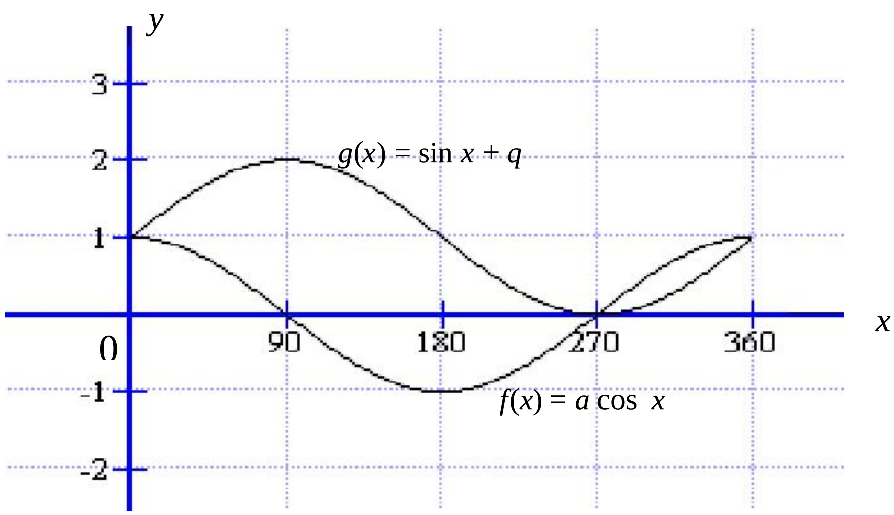
Answer the following questions by using the graphs.

6.1.1 What is the domain of f ? (1)

6.1.2 Give the equation of the asymptote of the graph of $y = 2^x - 2$. (2)

6.1.3 What is the value of k ? (1)

6.2 The diagram below represents the graphs of the functions $f(x) = a\cos x$ and $g(x) = \sin x + q$



6.2.1 What is the value of a? (1)

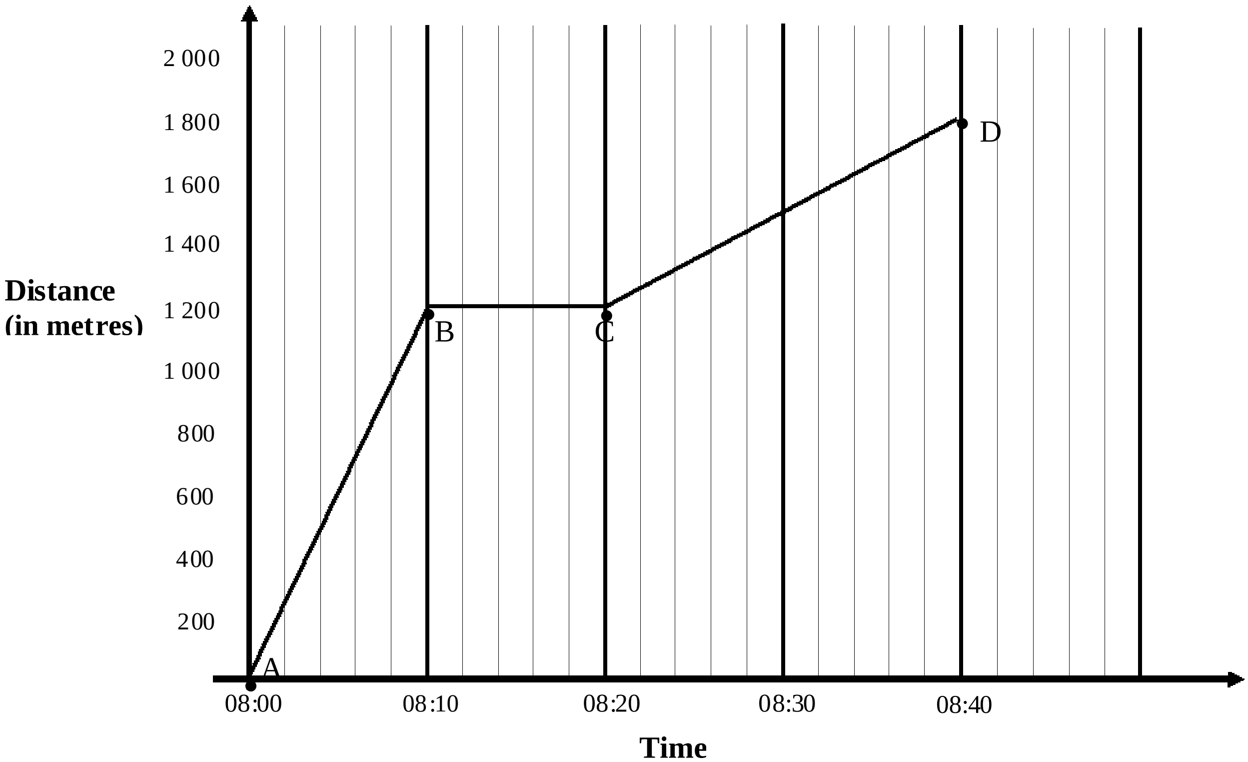
6.2.2 Write down the value of q. (1)

6.2.3 What is the range of g? (2)

6.2.4 For which values of x is $g(x) - f(x) = 2$? (2)

[10]

QUESTION 7



The distance–time graph above represents Rowan's journey from home to school.

7.1 How fast in m/s was Rowan travelling during the first 10 minutes? (2)

7.2 How far was Rowan from home at 08:15? (1)

7.3 Describe in your own words, the stage of Rowan's journey represented by the line BC. (2)

7.4 What was the average speed of the journey from home to school? (2) **[7]**

TOTAL: 100

education

Department:
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REPUBLIC OF SOUTH AFRICA

NASIONALE SENIOR SERTIFIKAAT

GRAAD 10

WISKUNDE V1

MODELVRAESTEL

PUNTE: 100

TYD: 2 uur

Hierdie vraestel bestaan uit 7 bladsye.

153 1 A

INSTRUKSIES EN INLIGTING

Lees die volgende instruksies sorgvuldig deur voordat die vrae beantwoord word:

1. Hierdie vraestel bestaan uit SEWE vrae. Beantwoord AL die vrae.

2. Toon duidelik AL die berekeninge, diagramme, grafieke, ensovoorts wat jy gebruik het om die antwoord te bepaal.

3. 'n Goedgekeurde sakrekenaar (nie-programmeerbar en nie-grafies) mag gebruik word, tensy anders vermeld.

4. Indien nodig, moet antwoorde tot TWEE desimale plekke afgerond word, tensy anders vermeld.

5. Nommer die antwoorde PRESIES soos die vrae genommer is.

6. Diagramme is NIE noodwendig volgens skaal geteken nie.

7. Dit is tot jou eie voordeel om leesbaar te skryf en om die werk netjies aan te bied.

VRAAG 1

1.1 Vereenvoudig:

1.1.1 $(2x-3)(5x^2-2x+1)$ (4)

1.1.2 $\dfrac{3^{x-1}.2^{x+1}}{6^x}$ (4)

1.1.3 $\dfrac{3x+7}{5}-\dfrac{x-2}{3}$ (4)

1.2 Faktoriseer:

1.2.1 $2x^2-5x-3$ (2)

1.2.2 $5xy-3y+10x-6$ (3)

1.3 Toon dat $(2x-1)^2-(x-3)^2$ tot $(x+2)(3x-4)$ vereenvoudig kan word. (4)

[21]

VRAAG 2

2.1 Los die volgende vergelykings op:

2.1.1 $(x+1)(x-2)=4$ (5)

2.1.2 $2^x=13$ (antwoord korrek tot EEN desimale syfer) (3)

2.2 Los die volgende ongelykheid op. Illustreer jou antwoord grafies.

$-5<2x-3\leq 7$ (5)

2.3 Drie liniale en vyf potlode kos R10. Een liniaal en tien potlode kos R10. Laat 'n liniaal x rand kos en 'n potlood y rand kos.

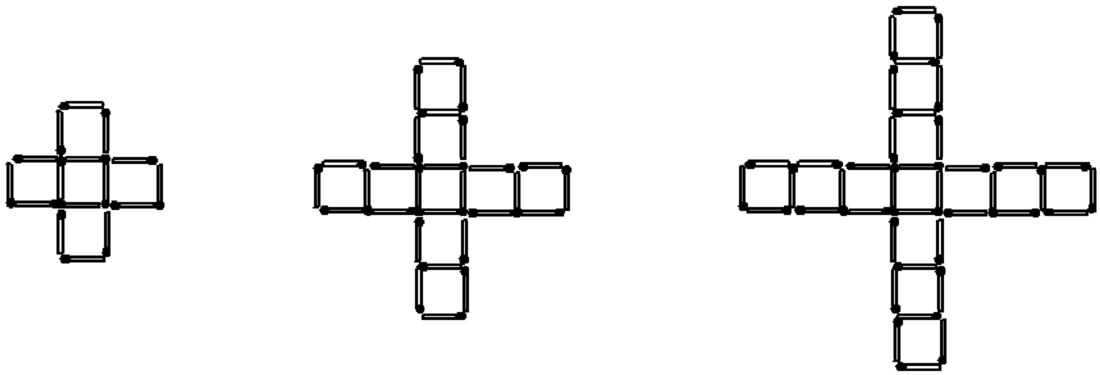
2.3.1 Skryf 'n stelsel vergelykings neer, in terme van x en y, wat bogenoemde situasie reflekteer. (2)

2.3.2 Los die stelsel vergelykings in VRAAG 2.3.1 gelyktydig op en bepaal hoe-veel 'n liniaal kos en hoeveel 'n potlood kos. (5)

[20]

VRAAG 3

Thandi bou patrone wat uit vierkante bestaan met vuurhoutjies soos hieronder:



Patroon 1 Patroon 2 Patroon 3

Veronderstel die patroon word voortgesit, beantwoord die daaropvolgende vrae:

3.1 Hoeveel vierkante sal Patroon 5 hê? (2)

3.2 Maak 'n veronderstelling oor die aantal vierkante wat benodig word vir enige patroon. (2)

3.3 Gebruik 'n veranderlike om 'n algebraïese stelling neer te skryf wat die verwantskap tussen die aantal vierkante en die patroonnommer veralgemeen. (2)

[6]

VRAAG 4

4.1 Andrew belê R5 000 teen 15% eenvoudige rente per jaar vir 5 jaar. Cheryl belê haar R5 000 teen 12% saamgestelde rente per jaar vir 5 jaar. Watter patroon het die meeste rente op hul belegging gemaak? Motiveer jou antwoord. Toon ALLE berekeninge. (8)

4.2 Sipho wil 'n motorfiets vir R10 500 koop. Hy het 'n deposito van R2 000. Hy wil die balans oor 3 jaar afbetaal deur middel van 'n huurkoopooreenkoms. Die rente wat op die ooreenkoms gevra word, is 18% per jaar. Ingesluit in die ooreenkoms, is versekeringskoste van 2% per jaar op die koopprys van die motorfiets.

Bereken sy maandelikse paaiement. (7)

4.3 Die buitelandsewisselkoerstabel hieronder dui die gemiddelde wisselkoers van die Suid-Afrikaanse rand in terme van ander geldeenhede aan:

BUITELANDSEWISSELKOERSTABEL

LAND	GELD-EENHEID	GEMIDDELDE WISSEL-KOERS VAN DIE RAND
Verenigde Koningkryk (VK)	Pond (£)	11,85
Verenigde State van Amerika (VSA)	Dollar ($)	6,30

'n Maatskappy in Suid-Afrika voer staaltafels na die VK en die VSA uit. Die totale koste om 'n tafel in Suid-Afrika te vervaardig is R275,00 per tafel.

4.3.1 Hoeveel, in dollars ($), sal 'n maatskappy in die VSA vir 'n tafel betaal? (2)

4.3.2 Hoeveel, in pond (£), sal 'n maatskappy in die VK vir 'n tafel betaal? (2)

4.3.3 As die VK dieselfde tafel vir £20 elk kan vervaardig, sal hulle nog steeds die tafel van Suid-Afrika koop?

Toon AL jou berekeninge om jou antwoord te staaf. (2)

4.3.4 As gevolg van 'n verhoging in die koste om tafels te bou, wil Suid-Afrika hul prys met 10% verhoog. Hoeveel sal die VSA nou vir 'n enkeltafel in dollars betaal? (2)

[23]

VRAAG 5

Gegee funksies $f(x) = -x^2 + 9$ en $g(x) = 3x + 9$

5.1 Trek die sketsgrafieke van f en g op dieselfde assestelsel. (6)

5.2 Gebruik jou grafieke om vir x op te los as:

5.2.1 $f(x) = g(x)$ (2)

5.2.2 $f(x) > 0$ (2)

5.3 Hoe vergelyk die grafiek van $h(x) = -x^2 - 9$ met die grafiek van $f(x)$? (2)

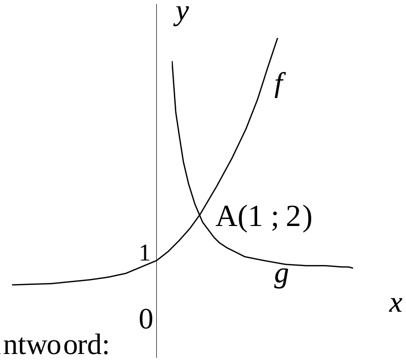
5.4 Gee die vergelyking van die refleksie van f in die x–as. (2)

[14]

VRAAG 6

6.1 Die grafiek van $f(x) = 2^x$ en $g(x) = \frac{k}{x}$ word langsaan getoon.

Die grafieke sny by A.



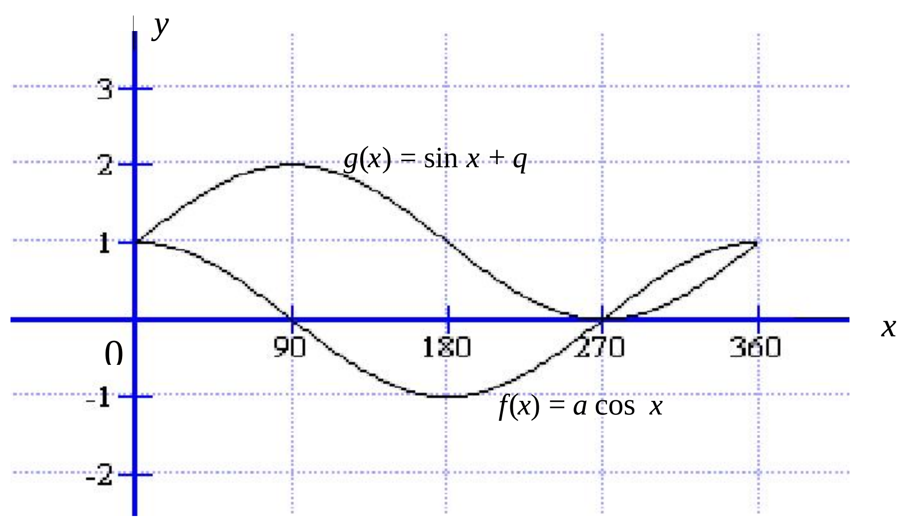
Gebruik die grafieke om die volgende vrae te beantwoord:

6.1.1 Wat is die gebied van f ? (1)

6.1.2 Gee die vergelyking van die asimptoot van die grafiek van $y = 2^x - 2$. (2)

6.1.3 Wat is die waarde van k ? (1)

6.2 Die diagram hieronder toon die grafieke van die funksies $f(x) = a\cos x$ en $g(x) = \sin x + q$



6.2.1 Wat is die waarde van a? (1)

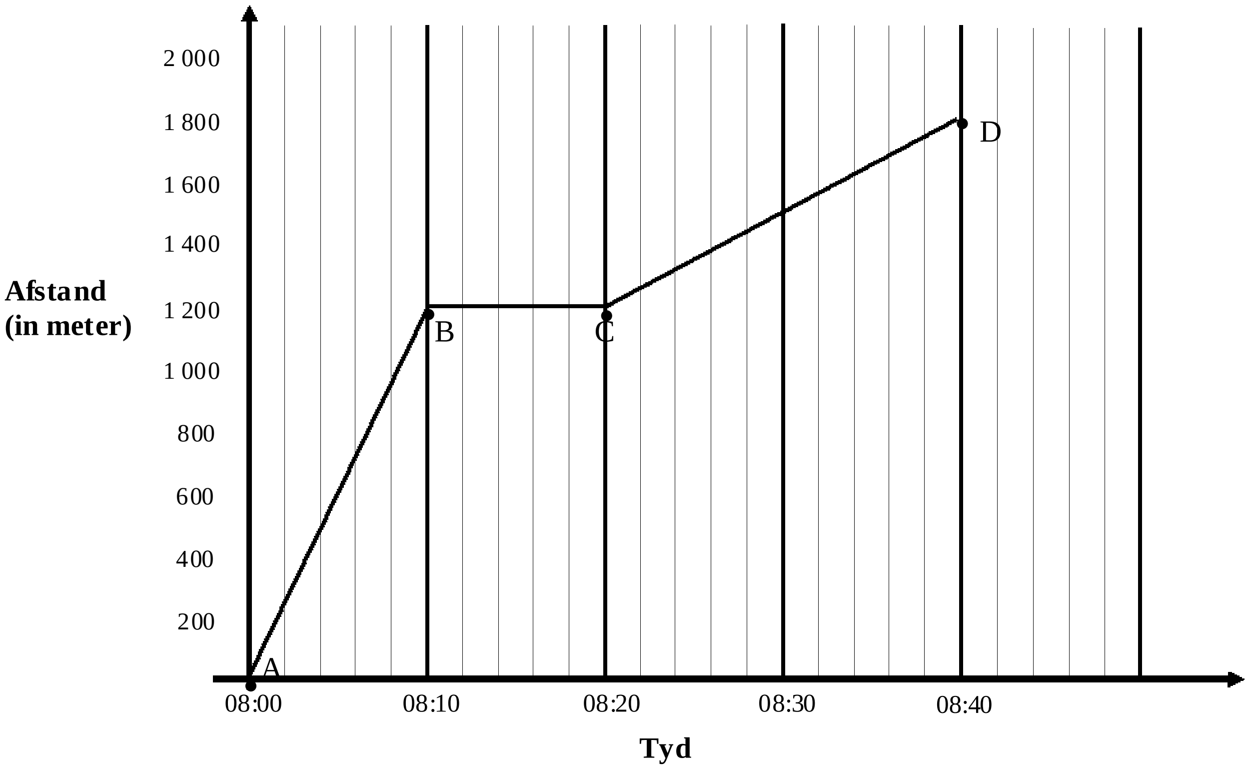
6.2.2 Skryf die waarde van q neer. (1)

6.2.3 Wat is die waardeversameling van g? (2)

6.2.4 Vir watter waardes van x is $g(x) - f(x) = 2$? (2)

[10]

VRAAG 7



Die afstand-tyd-grafiek hierbo stel Rowan se reis vanaf sy huis na die skool voor.

7.1 Hoe vinnig, in m/s, het Rowan gedurende die eerste 10 minute gereis? (2)

7.2 Hoe ver was Rowan van sy huis af om 08:15? (1)

7.3 Beskryf, in jou eie woorde, die stadium van Rowan se reis wat deur die lyn BC verteenwoordig word. (2)

7.4 Wat was die gemiddelde spoed van die reis vanaf sy huis na die skool? (2)
[7]

TOTAAL: 100

Kopiereg voorbehou