basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

MATHEMATICS P1

PAST PAPER QUESTIONS ORGANISED BY TOPIC

November 2020 Edition

CONTENTS

All exam questions in this document have been extracted from Department of Education exam papers.
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PROGRESS TRACKER

Expressions & Exponents	Attempts	DBE Nov 19 Q1		DBE Nov 18 Q1		DBE Nov 17 Q1		DBE Nov 16 Q1		DBE Nov 15 Q1		Exemplar 12 Q1	
		[13]	%	[18]	%	[17]	%	[14]	%	[16]	%	[19]	%
	1st												
	2nd												
	3rd												

Equations & Inequalities	Attempts	DBE Nov 19 Q2		DBE Nov 18 Q2		DBE Nov 17 Q2		DBE Nov 16 Q2		DEB Nov 15 Q2		Exemplar 12 Q2	
		[19]	%	[15]	%	[16]	%	[16]	%	[14]	%	[13]	%
	1st												
	2nd												
	3rd												

Number Patterns	Attempts	DBE Nov 19 Q3.1		DBE Nov 18 Q3		DBE Nov 17 Q3.1		DBE Nov 15 Q3.1	
		[9]	%	[10]	%	[8]	%	[8]	%
	1st								
	2nd								
	3rd								

Number Patterns: Applications	Attempts	DBE Nov 19 Q3.2		DBE Nov 18 Q4		DBE Nov 17 Q3.2		DBE Nov 16 Q3		DBE Nov 15 Q3.2		Exemplar 12 Q3	
		[7]	%	[6]	%	[5]	%	[12]	%	[7]	%	[11]	%
	1st												
	2nd												
	3rd												

Functions	Attempts	DBE Nov 19 Q5		DBE Nov 19 Q6		DBE Nov 18 Q5		DBE Nov 18 Q6		DBE Nov 17 Q5		DBE Nov 17 Q6		DBE Nov 16 Q5		DBE Nov 16 Q6	
		[14]	%	[16]	%	[17]	%	[12]	%	[15]	%	[16]	%	[18]	%	[8]	%
	1st																
	2nd																
	3rd																
	Attempts	DBE Nov 16 Q7		DBE Nov 15 Q4		DBE Nov 15 Q5		DBE Nov 15 Q6		Exemplar 12 Q6		Exemplar 12 Q7					
		[4]	%	[12]	%	[13]	%	[6]	%	[20]	%	[10]	%				
	1st																
	2nd																
	3rd																

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Finance Growth and Decay	Attempts	DBE Nov 19 Q4		DBE Nov 18 Q7		DBE Nov 17 Q4		DBE Nov 16 Q4		DBE Nov 15 Q7		Exemplar 12 Q4	
		[10]	%	[11]	%	[10]	%	[16]	%	[9]	%	[14]	%
	1st												
	2nd												
	3rd												

Probability and Venn Diagrams	Attempts	DBE Nov 19 Q7		DBE Nov 18 Q8		DBE Nov 17 Q7		DBE Nov 16 Q8		DBE Nov 15 Q7		Exemplar 12 Q5	
		[12]	%	[11]	%	[13]	%	[12]	%	[15]	%	[13]	%
	1st												
	2nd												
	3rd												

DBE NOV 19 Q1

QUESTION 1

1.1 Factorise the following expressions fully:

1.1.1 $3y^2 + y$ (1)

1.1.2 $x^2 - 10x - 24$ (2)

1.1.3 $9x^2 - y^2 + 10y - 25$ (3)

1.2 Simplify the following expressions fully:

1.2.1 $\left(4+\frac{1}{x}\right)\left(2-\frac{3}{x}\right)$ (2)

1.2.2 $\frac{5x-5}{5x}$ (2)

1.2.3 $\frac{3^{x+1}+3^x}{27.3^{-1+x}}$ (3)

[13]

DBE NOV 18 Q1

QUESTION 1

1.1 Factorise the following expressions fully:

1.1.1 $4x - x^3$ (2)

1.1.2 $x^2 + 15x - 54$ (2)

1.1.3 $y - xy + x - 1$ (3)

1.2 Simplify the following expressions fully:

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

1.2.2 $\frac{5}{x+3} - \frac{3}{2-x}$ (3)

1.2.3 $\frac{25^{-x}.15^{x+1}}{3^x.5^{-x}}$ (3)

1.3 Determine the value of $(3p+q)^2$ if $9p^2 + q^2 = 12$ and $pq = -3$. (3)

[18]

QUESTION 1

1.1 Given: $q = \sqrt{b^2 - 4ac}$

1.1.1 Determine the value of q if $a = 2$, $b = -1$ and $c = -4$. Leave your answer in simplest surd form. (2)

1.1.2 State whether q is rational or irrational. (1)

1.1.3 Between which TWO consecutive integers does q lie? (1)

1.2 Factorise the following expressions fully:

1.2.1 $t^2(r-s) - r + s$ (3)

1.2.2 $\dfrac{x^3+1}{x^2-x+1}$ (2)

1.3 Simplify the following completely:

1.3.1 $(2y+3)(7y^2-6y-8)$ (2)

1.3.2 $\dfrac{3}{x^2-9} + \dfrac{2}{(x-3)^2}$ (3)

1.3.3 $\dfrac{3^t - 3^{t-2}}{2.3^t - 3^t}$ (3)

[17]

QUESTION 1

1.1 Factorise the following expressions fully:

1.1.1 $x^2 - x$ (1)

1.1.2 $3x^2 + 3px - 2mx - 2mp$ (3)

1.1.3 $2p^2 - 2p - 12$ (3)

1.2 Simplify the following:

1.2.1 $\dfrac{2^{a+1} - 2^{a-1}}{2^a}$ (3)

1.2.2 $\dfrac{x^2-x+1}{x^3+1} \div \dfrac{2x}{2x+2}$ (4)

[14]

QUESTION 1

1.1 Factorise the following expressions fully:

1.1.1 $x^4 - 81$ (2)

1.1.2 $6x^2y - 10xy + 15x - 25$ (3)

1.2 Simplify the following expressions fully:

1.2.1 $\frac{3}{a-4} + \frac{2}{a+3} - \frac{21}{a^2 - a - 12}$ (5)

1.2.2 $\frac{10^{2x+3}.4^{1-x}}{25^{2+x}}$ (4)

1.3 Consider the following numbers: $\sqrt{27}$; $\sqrt[3]{-27}$; $\sqrt{-27}$.

Which ONE of these numbers is:

1.3.1 Irrational (1)

1.3.2 Non-real (1)

[16]

QUESTION 1

1.1 Simplify the following expressions fully:

1.1.1 $(m-2n)(m^2 - 6mn - n^2)$ (3)

1.1.2 $\frac{x^3 + 1}{x^2 - x + 1} - \frac{4x^2 - 3x - 1}{4x + 1}$ (5)

1.2 Factorise the following expressions fully:

1.2.1 $6x^2 - 7x - 20$ (2)

1.2.2 $a^2 + a - 2ab - 2b$ (3)

1.3 Determine, **without the use of a calculator**, between which two consecutive integers $\sqrt{51}$ lies. (2)

1.4 Prove that $0,\dot{2}\dot{4}\dot{5}$ is rational. (4)

[19]

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DBE NOV 19 Q2

QUESTION 2

2.1 Solve for x:

2.1.1 $2x^2 - 10x = 0$ (2)

2.1.2 $px - kx = k - p$ (3)

2.1.3 $2^{\frac{x}{3}} = \frac{1}{128}$ (3)

2.2 Given: $\frac{x+5}{2} > -2$

2.2.1 Solve for x. (2)

2.2.2 If $x \in R$, represent the solution to QUESTION 2.2.1 on a number line. (1)

2.3 Solve simultaneously for x and y if:

$x(x-3) + y(3-x) = 0$ (4)

2.4 During a fundraising event, only R10, R20 and R50 notes were collected. In the final count, there were twice as many R20 notes as there were R50 notes, and 15 more R10 notes than R50 notes.

If R10 150 was collected in total, determine the number of R10, R20 and R50 notes that were collected. (4)

[19]

QUESTION 2

2.1 Solve for x:

2.1.1 $px + qx = a$ (2)

2.1.2 $2x^2 - 5x + 2 = 0$ (3)

2.1.3 $\left(\frac{1}{2}\right)^{3x+1} = 32$ (3)

2.2 Given: $-11 \leq 3m - 8 < 4$

2.2.1 Solve for m. (2)

2.2.2 Hence, write down the number of integers that satisfy the inequality. (1)

2.3 Solve simultaneously for x and y if:

$5x + 4y = 21$ and $2x = 3 - y$ (4)

[15]

QUESTION 2

2.1 Given: $4 - 2x < 16$ where $x \in R$

2.1.1 Solve the inequality. (2)

2.1.2 Hence, represent your answer to QUESTION 2.1.1 on a number line. (1)

2.2 Solve simultaneously for x and y:

$-2x - y = 10$ and $3x - 4y = -4$ (4)

2.3 Solve for x:

2.3.1 $\frac{x(x-5)}{6} - 1 = 0$ (3)

2.3.2 $c = \sqrt{a + 2x}$ (2)

2.4 Tabelo is currently four times as old as his daughter, Linda. Six years from now, Tabelo will be three times as old as Linda.

Calculate Linda's age currently. (4)

[16]

QUESTION 2

2.1 Solve for x:

2.1.1 $x(x-1)=20$ (4)

2.1.2 $\frac{3x-2}{2}=x+1$ (3)

2.2 Given: $-4\leq -\frac{1}{2}m<5$ where $m\in R$

2.2.1 Solve for m. (3)

2.2.2 Write the answer to QUESTION 2.2.1 in interval notation. (1)

2.3 Given: $4x^2-y^2=171$ and $2x-y=9$

2.3.1 Calculate the value of $2x+y$. (2)

2.3.2 Solve simultaneously for x and y. (3)

[16]

QUESTION 2

2.1 Solve for x:

2.1.1 $15x^2-8=14x$ (4)

2.1.2 $5^x=\frac{1}{125}$ (2)

2.2 The following inequality is given: $3(x+7)<\frac{x}{2}+1$

2.2.1 Solve for x in the inequality. (3)

2.2.2 Represent your answer to QUESTION 2.2.1 on a number line. (1)

2.3 Mary gave one third of her money to Nazeem and one fifth of her money to Elwethu. Elwethu received R28 less than Nazeem. How much money did Mary have originally? (4)

[14]

QUESTION 2

2.1 Determine, **without the use of a calculator**, the value of x in each of the following:

2.1.1 $x^2 - 4x = 21$ (3)

2.1.2 $96 = 3x^{\frac{5}{4}}$ (3)

2.1.3 $R = \dfrac{2\sqrt{x}}{3S}$ (2)

2.2 Solve for p and q simultaneously if:

$$6q + 7p = 3$$
$$2q + p = 5$$

(5)
[13]

DBE NOV 19 Q3.1

QUESTION 3

3.1 Given the linear pattern: $2x+1$; $3x+3$; $4x+5$; ...

3.1.1 Write down the next term in the pattern. (1)

3.1.2 Write, in terms of x, the formula for T_n, the general term of the pattern. (3)

3.1.3 If the value of the 13^{th} term of the pattern is 95, calculate the value of x. (2)

3.1.4 If $x = 5$, determine the largest value of n for which $T_n < 158$. (3)

DBE NOV 18 Q3

QUESTION 3

Consider the finite linear pattern: 20 ; 17 ; 14 ; ... ; –103

3.1 Write down the 4^{th} term of the pattern. (1)

3.2 Determine the expression for the n^{th} term. (2)

3.3 Calculate the number of terms in the sequence. (2)

3.4 Which term is the first to have a negative value? (3)

3.5 What is the value of the 19^{th} even-valued term in the sequence? (2)

[10]

DBE NOV 17 Q3.1

QUESTION 3

3.1 Consider the linear sequence: 5 ; 8 ; 11 ; b ; 17 ; ...

3.1.1 Write down the value of b. (2)

3.1.2 Determine the n^{th} term of the sequence. (2)

3.1.3 Calculate the value of the 15^{th} term of the sequence. (2)

3.1.4 Which term in the sequence is equal to 83? (2)

[8]

QUESTION 3

3.1 Given the linear number pattern: 8 ; 3 ; –2 ; …

3.1.1 Write down the NEXT TWO terms of the pattern. (2)

3.1.2 Determine the n^{th} term of the pattern. (2)

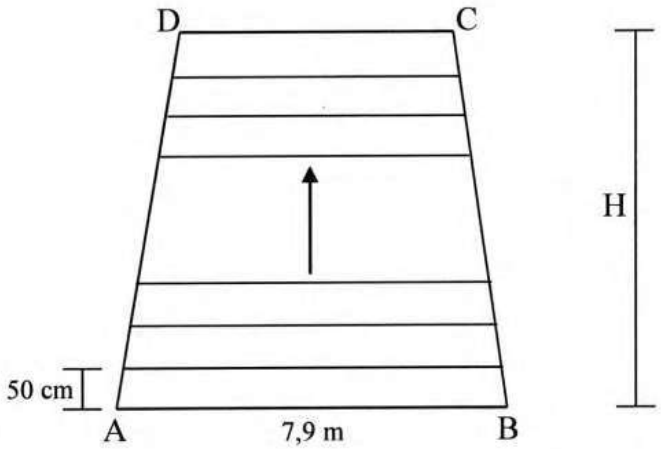
3.1.3 Calculate T_{30}, the thirtieth term of the pattern. (2)

3.1.4 Which term of the pattern is equal to –492? (2)

[8]

DBE NOV 19 Q3.2

3.2 An air-traffic control tower is constructed at an airport. The front view of the tower is shown in the diagram below. AB, the first horizontal support from the bottom, is 7,9 m long and is secured to the ground. Additional horizontal supports are secured parallel to AB and are 50 cm apart. Each additional support above is 10 cm shorter than the one below it. CD is the 45^{th} horizontal support. AD and BC are lateral supports on which the horizontal supports are secured.



3.2.1 Calculate the height (H), in cm, of the tower. (1)

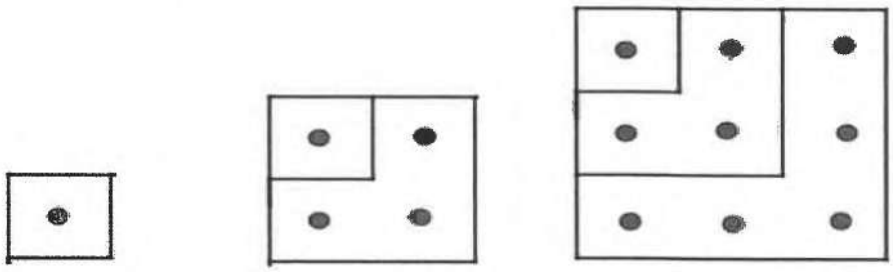
3.2.2 Calculate the length, in metres, of the 45^{th} horizontal support. (3)

3.2.3 Calculate the area, in square metres, enclosed by supports AB, BC, CD and AD. (3)

[16]

QUESTION 4

Samantha is investigating a pattern of dots represented in the diagram below.



Pattern number:	1	2	3
Number of dots:	$1^2 = 1$	$1+3=2^2=4$	$1+3+5=3^2=9$

4.1 Write down:

4.1.1 The number of dots in the 4^{th} pattern (1)

4.1.2 The number of dots in the 13^{th} pattern (1)

4.1.3 A formula for the number of dots in the n^{th} pattern (1)

4.2 Hence, or otherwise, calculate the value of:

$1+3+5+...+43$ (3)

[6]

3.2 Consider the number pattern below created by using the numbers of the sequence 2 ; 6 ; 10 ; 14 ; 18 ; ...

				2				
			6		10			
		14		18		22		
	26		30		34		38	
42		...		...		...		...

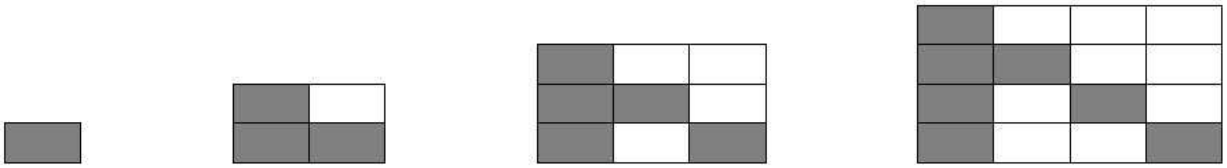
3.2.1 Calculate the sum of the numbers in the 8^{th} row. (3)

3.2.2 Determine the mean of the numbers in the 20^{th} row. (2)

[5]

QUESTION 3

Dark tiles (D) and light tiles (L) are used to create patterns on a floor. The first four patterns are shown below. For the patterns that follow the tiles are arranged in a similar manner.



Pattern 1 **Pattern 2** **Pattern 3** **Pattern 4**

3.1 How many dark tiles were used in pattern 5? (1)

3.2 How many light tiles were used in pattern 6? (1)

3.3 Write down the general term (D_n) for the number of dark floor tiles used in each pattern. (2)

3.4 Write down the general term (L_n) for the number of light floor tiles used in each pattern. (2)

3.5 Which pattern will have exactly 64 light floor tiles? (3)

3.6 Each dark tile is 0,3 m wide and 0,6 m long. Calculate the total area covered by all the dark tiles in the first 100 patterns. (3)

[12]

3.2 The first four terms of PATTERN A and PATTERN B are shown in the table below:

Position of term (n)	**1**	**2**	**3**	**4**
PATTERN A	1	3	5	7
PATTERN B	1	9	25	49

3.2.1 Determine a general formula for the n^{th} term of PATTERN A. (2)

3.2.2 Hence, or otherwise, determine a general formula for the n^{th} term of PATTERN B. (1)

3.2.3 Hence, determine a general formula for the pattern 0 ; –6 ; –20 ; –42 … Simplify your answer as far as possible. (4)

[7]

QUESTION 3

3.1 $3x + 1$; $2x$; $3x - 7$….. are the first three terms of a linear number pattern.

3.1.1 If the value of x is three, write down the FIRST THREE terms. (3)

3.1.2 Determine the formula for T_n, the general term of the sequence. (2)

3.1.3 Which term in the sequence is the first to be less than – 31? (3)

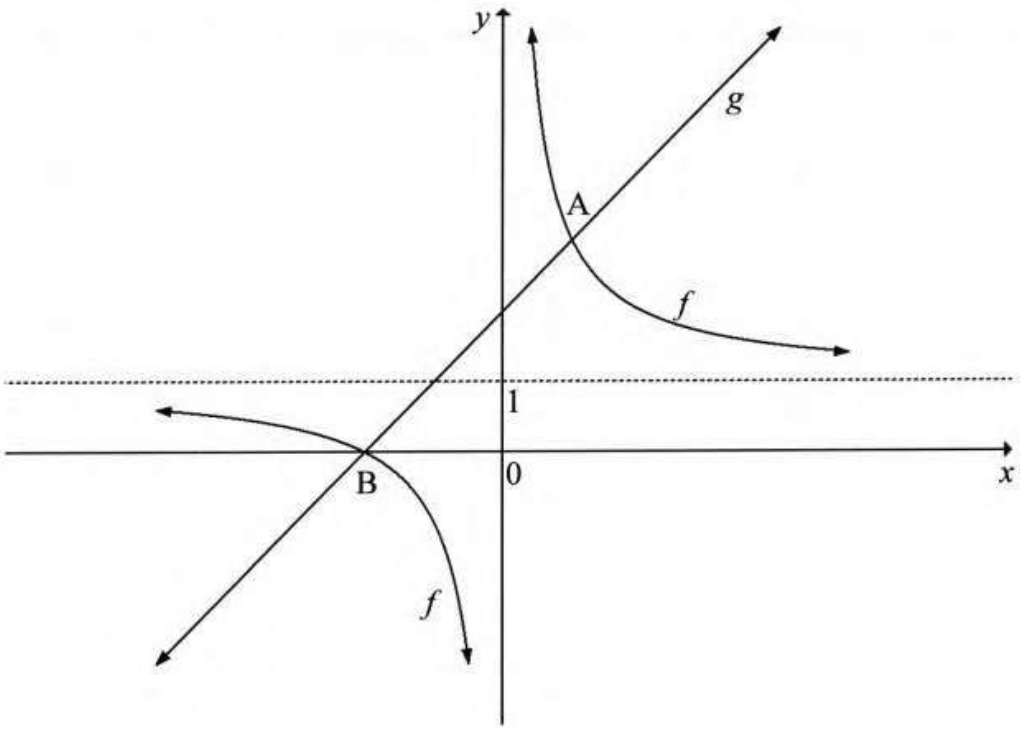
3.2 The multiples of three form the number pattern: 3 ; 6 ; 9 ; 12 ; ...
Determine the 13^{th} number in this pattern that is even. (3)
[11]

DBE NOV 19 Q5

QUESTION 5

Sketched below are the graphs of $f(x)=\frac{k}{x}+q$ and $g(x)=x+2$.

- The equation of the horizontal asymptote of f is $y=1$.
- Graph g cuts the x-axis at B.
- Graphs f and g intersect at A and B.



5.1 Write down the:

5.1.1 Value of q (1)

5.1.2 Domain of f (2)

5.2 Determine the:

5.2.1 Equation of the line of symmetry of f that has a negative gradient (2)

5.2.2 Equation of f (4)

5.2.3 Coordinates of A, a point of intersection of f and g (5)

[14]

QUESTION 6

The graphs defined as $g(x) = ax^2 + q$ and $f(x) = k^x - 4$ both pass through $(-2 ; 0)$ on the x-axis. The y-intercept of g is $(0 ; -5)$.

6.1 Write down the:

6.1.1 Equation of the asymptote of f (1)

6.1.2 Value of q (1)

6.1.3 Coordinates of the other x-intercept of g (1)

6.2 Determine the equation of:

6.2.1 g (2)

6.2.2 f (3)

6.3 Calculate the y-intercept of f. (2)

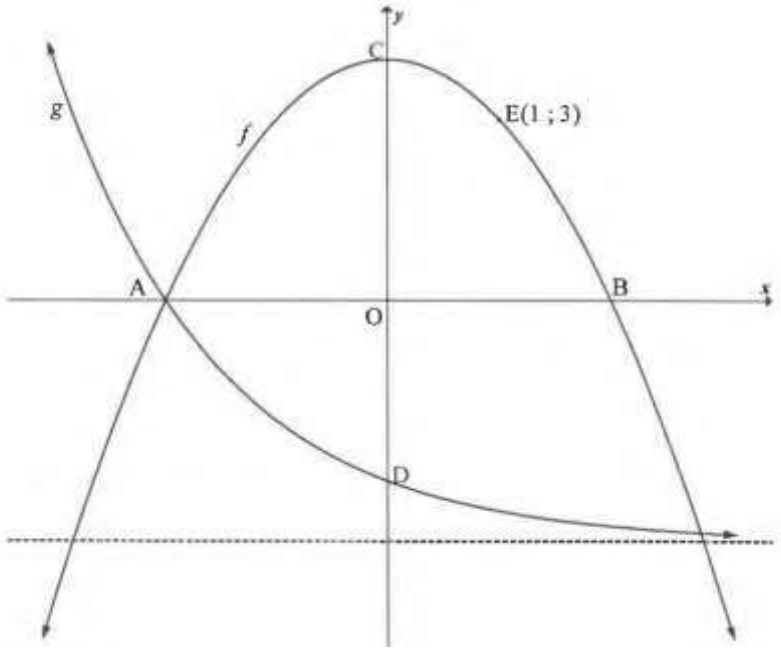
6.4 On the same system of axes, sketch the graphs of g and f. Show ALL the intercepts with the axes and asymptote(s). (6)

[16]

QUESTION 5

Sketched below are the graphs of $f(x) = ax^2 + q$ and $g(x) = \left(\frac{1}{2}\right)^x - 4$.

A and B are the x-intercepts of f. The graphs intersect at A and point E (1 ; 3) lies on f. C is the turning point of f and D is the y-intercept of g.



5.1 Write down the:

5.1.1 Coordinates of D (2)

5.1.2 Range of g (1)

5.2 Calculate the:

5.2.1 Coordinates of A (2)

5.2.2 Values of a and q (4)

5.3 Determine the:

5.3.1 Length of CD (2)

5.3.2 Equation of a straight line through A and D (3)

5.4 For which values of x is:

5.4.1 $f(x) > 0$? (2)

5.4.2 f decreasing? (1)

[17]

QUESTION 6

The equation of the function $g(x)=\frac{a}{x}+q$ passes through the point $(3;2)$ and has a range of $y\in(-\infty;1)\cup(1;\infty)$.

6.1 Determine the:

6.1.1 Equation of g (3)

6.1.2 Equation of h, the axis of symmetry of g which has a positive gradient (2)

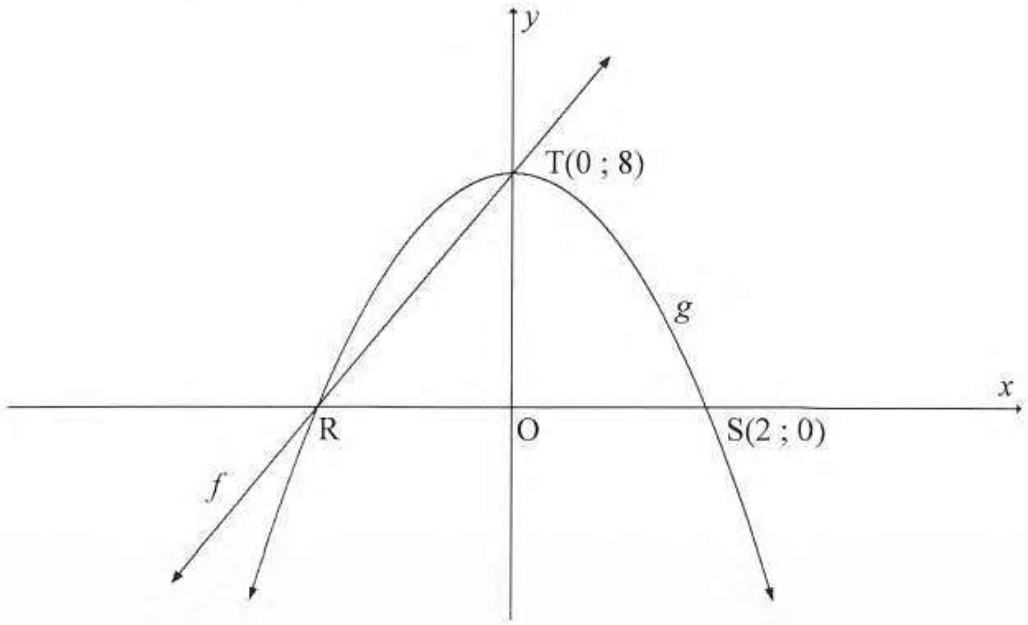
6.2 Sketch the graphs of g and h on the same system of axes. Clearly show ALL the asymptotes and intercepts with axes. (4)

6.3 Write the equations of the asymptotes of f if $f(x)=-g(x)+5$. (3)

[12]

QUESTION 5

The diagram shows the graphs of $g(x) = ax^2 + q$ and $f(x) = mx + c$.
R and S(2 ; 0) are the x-intercepts of g and T(0 ; 8) is the y-intercept of g.
Graph f passes through R and T.



5.1 Write down the range of g. (1)

5.2 Write down the x-coordinate of R. (1)

5.3 Calculate the values of a and q. (3)

5.4 Determine the equation of f. (3)

5.5 Use the graphs to determine the value(s) of x for which:

5.5.1 $f(x) = g(x)$ (2)

5.5.2 $x \cdot g(x) \leq 0$ (3)

5.6 The graph h is obtained when g is reflected along the line $y = 0$.
Write down the equation of h in the form $h(x) = px^2 + k$. (2)
[15]

QUESTION 6

6.1 The function $p(x) = k^x + q$ is described by the following properties:

- $k > 0; k \neq 1$
- x-intercept at (2 ; 0)
- The horizontal asymptote is $y = -9$

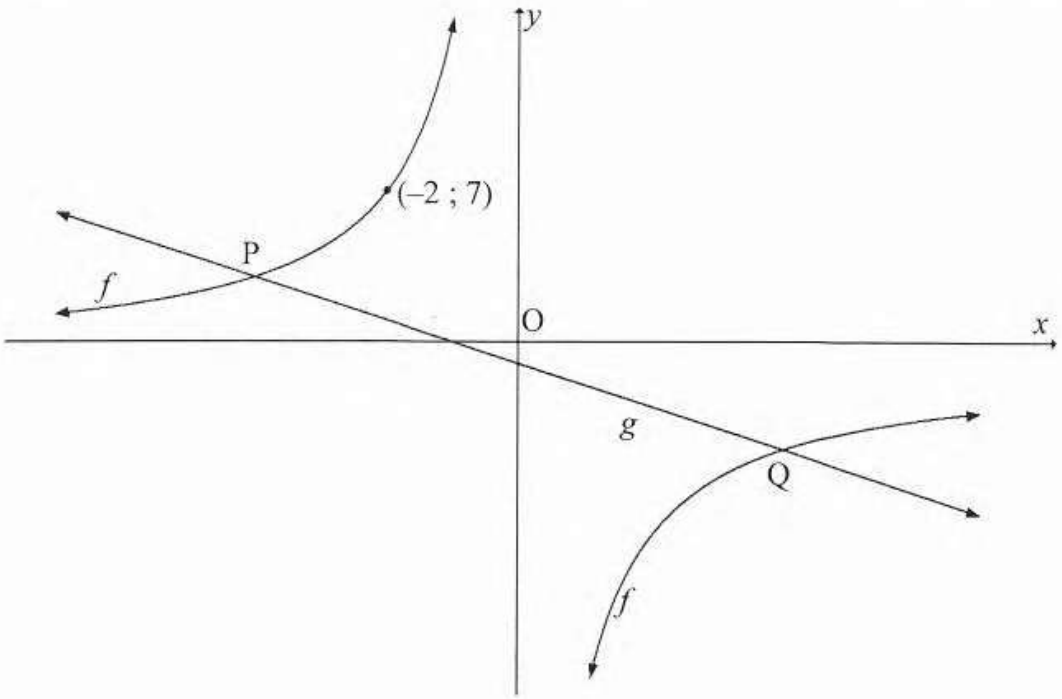
6.1.1 Write down the range of p. (1)

6.1.2 Determine the equation of p. (3)

6.1.3 Sketch the graph of p. Show clearly the intercepts with the axes and the asymptote. (3)

6.2 The sketch below shows the graphs of $f(x) = \frac{k}{x} + w$ and $g(x) = -x - 1$.

The graph g is an axis of symmetry of f. The graphs f and g intersect at P and Q.



6.2.1 Write down the value of w. (1)

6.2.2 The point (–2 ; 7) lies on f. Calculate the value of k. (2)

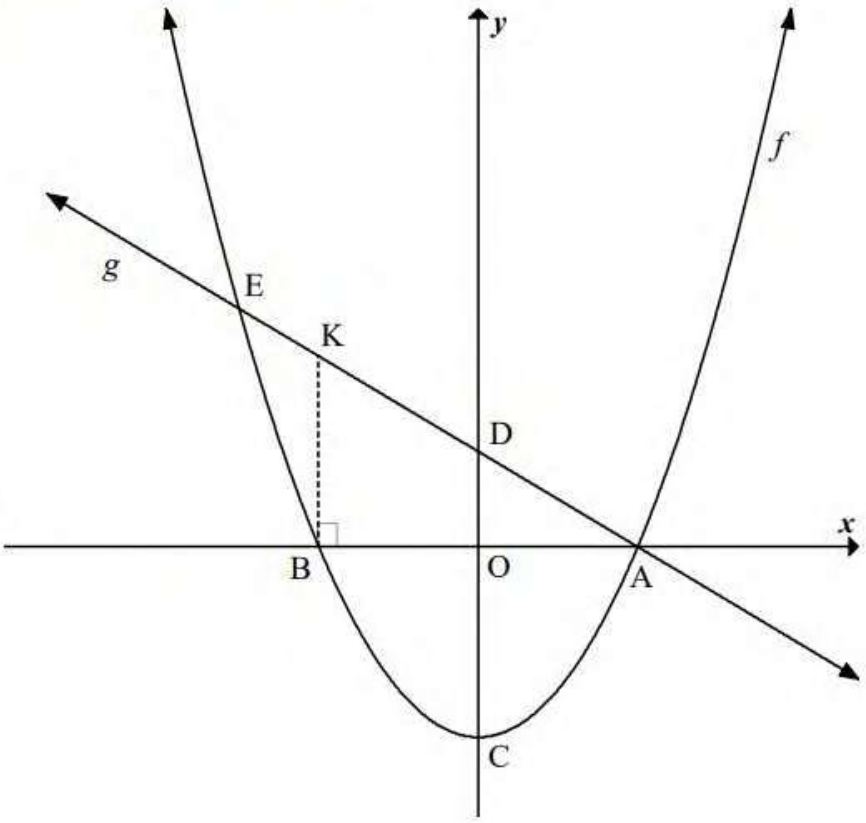
6.2.3 Calculate the x-coordinates of P and Q. (4)

6.2.4 Write down the values of x for which $\frac{-16}{x} > -x$. (2)

[16]

QUESTION 5

The graphs of $f(x)=x^2-4$ and $g(x)=-x+2$ are sketched below. A and B are the x-intercepts of f. C and D are the y-intercepts of f and g respectively. K is a point on g such that BK $\|$ x-axis. f and g intersect at A and E.



5.1 Write down the coordinates of C. (1)

5.2 Write down the coordinates of D. (1)

5.3 Determine the length of CD. (1)

5.4 Calculate the coordinates of B. (3)

5.5 Determine the coordinates of E, a point of intersection of f and g. (4)

5.6 For which values of x will:

5.6.1 $f(x)<g(x)$ (2)

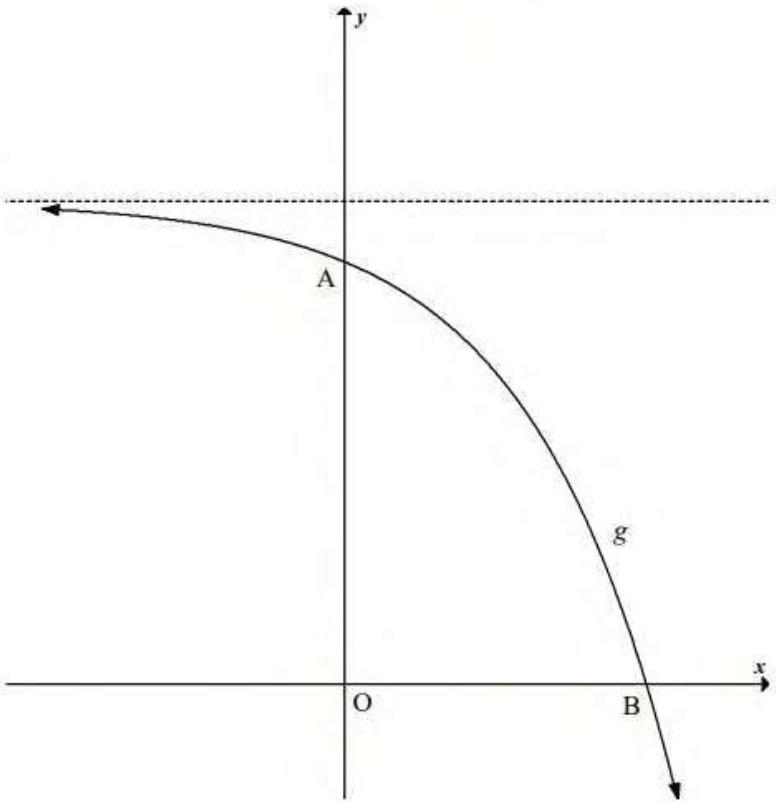
5.6.2 $f(x).g(x)\geq 0$ (2)

5.7 Calculate the length of AK. (4)

[18]

QUESTION 6

The graph of $g(x) = -2^x + 8$ is sketched below. A and B are the y- and x-intercepts respectively of g.



6.1 Write down the range of g. (1)

6.2 Determine the coordinates of B. (3)

6.3 If g is reflected over the x-axis to form a new graph h, determine the equation of h. (2)

6.4 Explain why the x-intercepts of g and h are both at B. (2)
[8]

QUESTION 7

A hyperbola, h, is described with the following characteristics:

- The equation of the vertical asymptote is $x = 0$
- The range of h is $(-\infty ; 3) \cup (3 ; \infty)$
- The x-intercept of h is $(2 ; 0)$

Determine the equation of h. **[4]**

QUESTION 4

$f(x) = -2x^2 + 2$ and $g(x) = 2^x + 1$ are the defining equations of graphs f and g respectively.

4.1 Write down an equation for the asymptote of g. (1)

4.2 Sketch the graphs of f and g on the same set of axes, clearly showing ALL intercepts with the axes, turning points and asymptotes. (6)

4.3 Write down the range of f. (1)

4.4 Determine the maximum value of h if $h(x) = 3^{f(x)}$. (2)

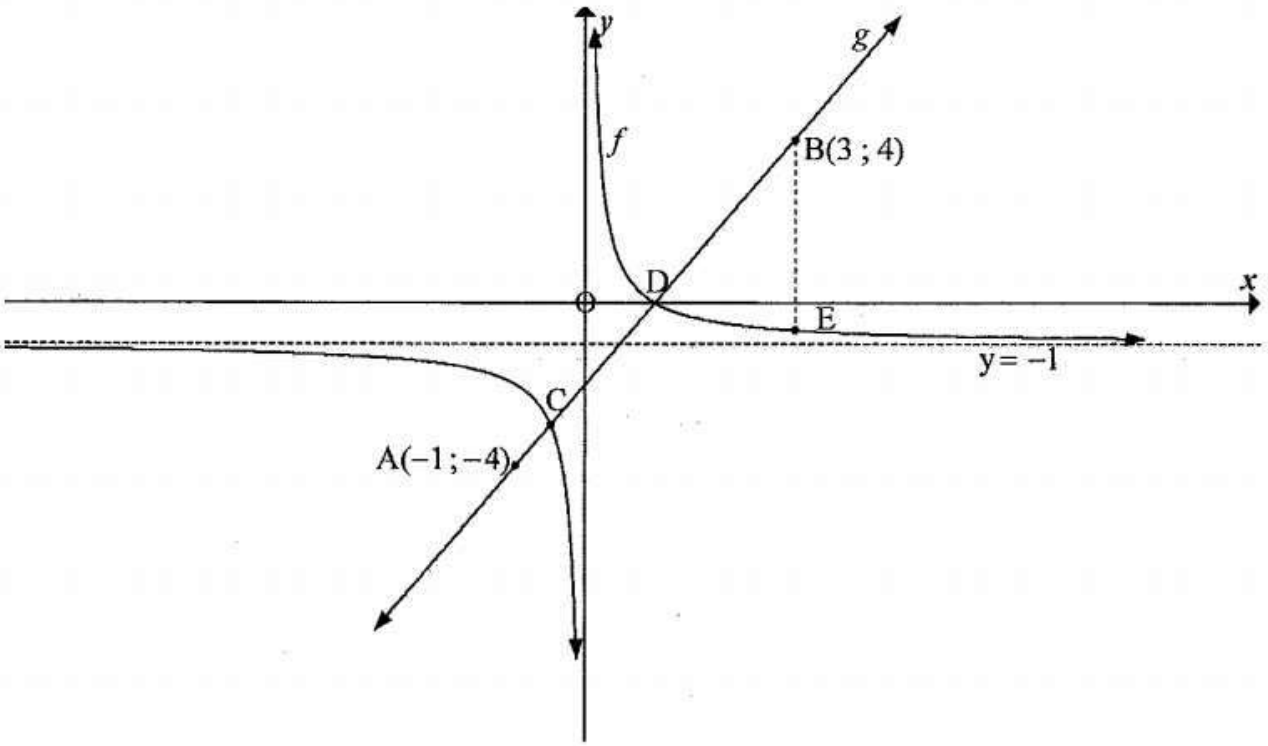
4.5 What transformation does the graph of $y = f(x)$ undergo in order to obtain the graph of $y = 2x^2 - 2$? (2)

[12]

QUESTION 5

The sketch below shows f and g, the graphs of $f(x)=\frac{1}{x}-1$ and $g(x)=ax+q$ respectively.

Points A(–1 ; –4) and B(3 ; 4) lie on the graph g.
The two graphs intersect at points C and D.
Line BE is drawn parallel to the y-axis, with E on f.



5.1 Show that $a=2$ and $q=-2$. (2)

5.2 Determine the values of x for which $f(x)=g(x)$. (4)

5.3 For what values of x is $g(x)\geq f(x)$? (3)

5.4 Calculate the length of BE. (3)

5.5 Write down an equation of h if $h(x)=f(x)+3$. (1)
[13]

QUESTION 6

Given: $f(x) = ax^2 + c$

f passes through the x-axis at $(d-5)$ and $(d-1)$, where $d \in R$.

6.1 Determine the value of d. (2)

6.2 Determine the values of a and c if it is also given that $f(1) = -9$. (4)

[6]

QUESTION 6

Given: $f(x) = \frac{3}{x} + 1$ and $g(x) = -2x - 4$

6.1 Sketch the graphs of f and g on the same set of axes. (4)

6.2 Write down the equations of the asymptotes of f. (2)

6.3 Write down the domain of f. (2)

6.4 Solve for x if $f(x) = g(x)$. (5)

6.5 Determine the values of x for which $-1 \leq g(x) < 3$. (3)

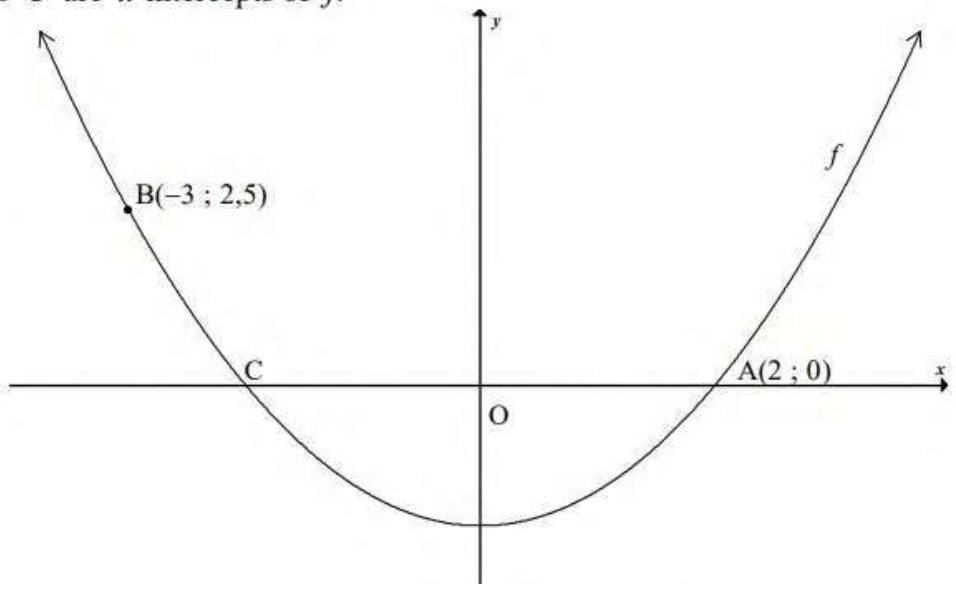
6.6 Determine the y-intercept of k if $k(x) = 2g(x)$. (2)

6.7 Write down the coordinates of the x- and y-intercepts of h if h is the graph of g reflected about the y-axis. (2)

[20]

QUESTION 7

The graph of $f(x) = ax^2 + q$ is sketched below.
Points A(2 ; 0) and B(– 3 ; 2,5) lie on the graph of f.
Points A and C are x-intercepts of f.



7.1 Write down the coordinates of C. (1)

7.2 Determine the equation of f. (3)

7.3 Write down the range of f. (1)

7.4 Write down the range of h, where $h(x) = -f(x) - 2$. (2)

7.5 Determine the equation of an exponential function, $g(x) = b^x + q$, with range $y > -4$ and which passes through the point A. (3)

[10]

DBE NOV 19 Q4

QUESTION 4

4.1 Peter wants to buy a computer costing R7 950, on a hire-purchase agreement. The conditions of the agreement are:

- Peter must pay a deposit of 25% of the purchase price.
- Interest is charged at 15% per annum simple interest on the balance.
- He must also pay a compulsory monthly insurance premium of R70,75.
- The balance is to be settled in monthly instalments.

4.1.1 Calculate the balance after Peter pays the deposit. (2)

4.1.2 If the balance is to be paid off in 24 months, calculate Peter's total monthly instalment. (4)

4.2 The table below shows the cost of one British pound and one US dollar in South African rand.

COUNTRY	UNIT	EXCHANGE RATE
England	Pound (£)	R23,43
USA	Dollar ($)	R14,58

4.2.1 It costs £55 to fill a car with 80 litres of petrol in England. How much will it cost to fill up with the same quantity of petrol if you were paying in South African rand? (1)

4.2.2 An English visitor to the USA notices a car on sale for $5 500. A similar vehicle in England costs £3 500. In which country is the car more expensive? Justify your answer with relevant calculations. (3)

[10]

QUESTION 7

Read the advertisement below.

Buy a Samsung J5 for only R229 per month.

You have 24 months to pay.
No deposit is required.

7.1 Calculate the total amount to be paid over a period of 24 months. (1)

7.2 The monthly instalment, quoted in the advertisement, is calculated on a hire purchase agreement which charges interest of 7,5% p.a. on the cash price of the cellphone. Show that the price of the cellphone is R4 779,13. (2)

7.3 Calculate the total interest paid over a period of 24 months if the cellphone is bought with this hire purchase agreement. (1)

7.4 The cellphone is insured at 11,5% p.a of the cash price. The total insurance is calculated and then split up over 24 months. It is then added to the monthly instalment. Calculate the new monthly instalment if the customer wants to insure the cellphone. (3)

7.5 The cost of the cellphone is subject to inflation and increases to a cash price of R5 100,00 after 2 years. Calculate the annual inflation rate. (4)
[11]

QUESTION 4

4.1 Seven years ago, Mrs Grey decided to invest R18 000 in a bank account that paid simple interest at 4,5% p.a.

4.1.1 Calculate how much interest Mrs Grey has earned over the 7 years. (2)

4.1.2 Mrs Grey wants to buy a television set that costs R27 660,00 now. If the average rate of inflation over the last 5 years was 6,7% p.a., calculate the cost of the television set 5 years ago. (3)

4.1.3 At what rate of simple interest should Mrs Grey have invested her money 7 years ago if she intends buying the television set now using only her original investment of R18 000 and the interest earned over the last 7 years? (3)

4.2 On a certain day the exchange rate between the US dollar and South African rand is \$1 = R12,91. At the same time the exchange rate between the British pound and the South African rand is £1 = R16,52.

Calculate the exchange rate between the British pound and US dollar on that day. (2)
[10]

QUESTION 4

4.1 Mary wants to buy a fridge that costs R15 550. She has to pay a deposit of 15% of the cost and the balance by means of a hire-purchase agreement. The rate of interest on the loan is 16,25% p.a. simple interest. The repayment period of the loan is 54 months. In addition to the hire-purchase agreement, an annual insurance premium of 1,5% of the total cost of the fridge should be added. The annual insurance premium should be paid in monthly instalments.

4.1.1 Calculate the value of the loan that Mary will take. (2)

4.1.2 Calculate the total amount that must be repaid on the hire-purchase agreement. (3)

4.1.3 Calculate the monthly repayment, which includes the monthly insurance premium. (3)

4.2 The table below shows the rand equivalent of one British pound and one US dollar.

COUNTRY	CURRENCY	RATE OF EXCHANGE OF THE RAND
Britain (United Kingdom)	Pound (£)	21,41
United States of America	Dollar ($)	13,45

A South African nurse works in the United States of America.

4.2.1 The nurse saves the equivalent of R4 800 per month. Calculate the amount, in US (American) dollars, that she saves per month. (2)

4.2.2 She ordered a book from the United Kingdom (Britain) and paid $85 for it. Calculate the price of the book in pounds (£). (3)

4.3 A sum of money doubles in 5 years when the interest is compounded annually. Calculate the rate of interest. (3)

[16]

QUESTION 7

Zach likes to travel. He has saved R5 000 as spending money for his vacation in Australia at the end of 2015.

7.1 Zach looks up the exchange rate on the Internet. Using the information in the table below, calculate how many Australian dollars Zach can buy for R5 000.

SOUTH AFRICAN RAND RATES TABLE

FOREIGN CURRENCY	EQUIVALENT VALUE OF R1	RAND EQUIVALENT OF 1 UNIT OF CURRENCY
US dollar	0,083130	12,029313
Euro	0,074048	13,504730
British pound	0,053877	18,560961
Australian dollar	0,105058	9,518569

(2)

7.2 Zach plans to make another trip to Australia at the end of 2018.

7.2.1 Assume that the average annual rate of inflation in South Africa will be 6,1% over the next 3 years. In 2018, what amount of money will be equivalent to the value of R5 000 now? (3)

7.2.2 Zach plans to invest equal amounts into a savings account on 1 December 2016 and on 1 December 2017 to have accumulated an amount of R5 980 by 1 December 2018. If this account earns interest at 9% p.a. compounded annually, how much money should Zach deposit into the account on each occasion? (4)

[9]

QUESTION 4

4.1 Thando has R4 500 in his savings account. The bank pays him a compound interest rate of 4,25% p.a. Calculate the amount Thando will receive if he decides to withdraw the money after 30 months. (3)

4.2 The following advertisement appeared with regard to buying a bicycle on a hire-purchase agreement loan:

Purchase price	*R5 999*
Required deposit	*R600*
Loan term	*Only 18 months, at 8% p.a. simple interest*

4.2.1 Calculate the monthly amount that a person has to budget for in order to pay for the bicycle. (6)

4.2.2 How much interest does one have to pay over the full term of the loan? (1)

4.3 The following information is given:

1 ounce = 28,35 g
$1 = R8,79

Calculate the rand value of a 1 kg gold bar, if 1 ounce of gold is worth $978, 34. (4)
[14]

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QUESTION 7

7.1 For two events A and B, it is given that
$P(A) = 0,30$; $P(B) = 0,65$ and $P(A \text{ or } B) = 0,74$.

7.1.1 Calculate $P(A \text{ and } B)$. (2)

7.1.2 Hence, represent the above information in a Venn diagram. (4)

7.1.3 Are the events A and B mutually exclusive? Give a reason. (2)

7.2 A circular spinner is divided into 12 equal sectors. Each sector is numbered from 1 to 12. When spun, the spinner has an equal chance of stopping at any of the numbers 1 to 12.

7.2.1 For any random spin, what is the probability that the spinner will stop at a square number? (1)

7.2.2 The number that the spinner stopped at after the first spin was recorded. The number that the spinner stopped at after the second spin was also recorded. Calculate the probability that the sum of the two numbers at which the spinner stopped is greater than 2. (3)

[12]

QUESTION 8

8.1 In a random physical sciences experiment, A and B are two different events. It was found that:

$$P(A)=\frac{2}{5},\ P(B')=\frac{3}{8} \text{ and } P(A \text{ or } B)=\frac{5}{7}$$

8.1.1 Calculate:

(a) P(B) (2)

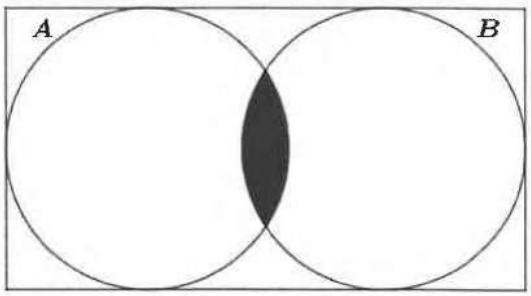
(b) P(A and B) (3)

8.1.2 Hence, determine whether events A and B are mutually exclusive. Motivate your answer. (2)

8.2 The Venn diagrams below represent different scenarios of events A and B.

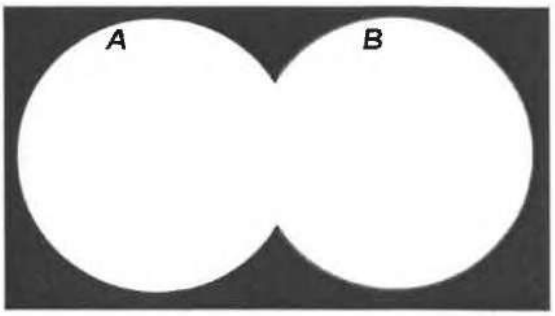
Write down the probability of the shaded region for EACH of the diagrams below.

8.2.1



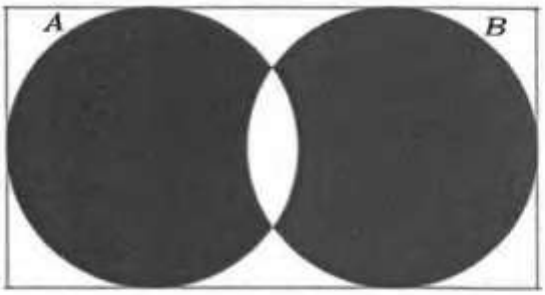
(1)

8.2.2



(1)

8.2.3



(1)

8.3 Which diagram(s) in QUESTIONS 8.2.1, 8.2.2 or 8.2.3 represent mutually exclusive events? (1)

[11]

QUESTION 7

7.1 Two events, A and B, are complementary and make up the entire sample space. Also, $P(A') = 0,35$.

7.1.1 Complete the statement: $P(A) + P(B) = ...$ (1)

7.1.2 Write down the value of $P(A \text{ and } B)$. (1)

7.1.3 Write down the value of $P(B)$. (1)

7.2 A survey was conducted among 150 learners in Grade 10 at a certain school to establish how many of them owned the following devices: smartphone (S) or tablet (T).

The results were as follows:

- 8 learners did not own either a smartphone or a tablet.
- 20 learners owned both a smartphone and a tablet.
- 48 learners owned a tablet.
- x learners owned a smartphone.

7.2.1 Represent the information above in a Venn diagram. (4)

7.2.2 How many learners owned only a smartphone? (3)

7.2.3 Calculate the probability that a learner selected at random from this group:

(a) Owned only a smartphone (1)

(b) Owned at most one type of device (2)

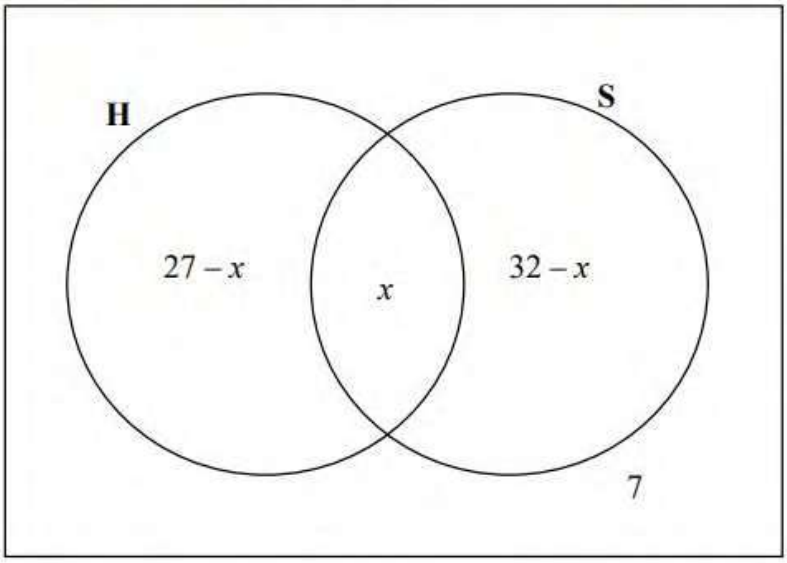
[13]

QUESTION 8

8.1 In a certain class of 42 boys:

- 27 play hockey (H)
- 32 play soccer (S)
- 7 do not play hockey or soccer
- An unknown number (x) play both hockey and soccer

The information is represented in the Venn diagram below.



8.1.1 Calculate the value of x. (2)

8.1.2 If a boy from the class is chosen at random, calculate the probability that he:

(a) Does not play hockey or soccer (1)

(b) Plays only soccer (2)

8.2 A bag contains 3 blue balls and x yellow balls.

8.2.1 Write down the total number of balls in the bag. (1)

8.2.2 If a ball is drawn from the bag, write down the probability that it is blue. (2)

8.3 8.3.1 Complete the following statement:

If A and B are two mutually exclusive events, then
P (A and B) = … (1)

8.3.2 Given that A and B are mutually exclusive events. The probability that event A occurs is 0,55. The probability that event B does not occur is 0,7.

Calculate P (A or B). (3)
[12]

QUESTION 8

8.1 At a certain school there are 64 boys in Grade 10. Their sport preferences are indicated below:

- 24 boys play soccer
- 28 boys play rugby
- 10 boys play both soccer and rugby
- 22 boys do not play soccer or rugby

8.1.1 Represent the information above in a Venn diagram. (5)

8.1.2 Calculate the probability that a Grade 10 boy at the school, selected at random, plays:

(a) Soccer and rugby (1)

(b) Soccer or rugby (1)

8.1.3 Are the events a Grade 10 boy plays soccer at the school and a Grade 10 boy plays rugby at the school, mutually exclusive? Justify your answer. (2)

8.2 One morning Samuel conducted a survey in his residential area to establish how many passengers, excluding the driver, travel in a car. The results are shown in the table below:

Number of passengers, excluding the driver	0	1	2	3	4
Number of cars	7	11	6	5	1

Calculate the probability that, excluding the driver, there are more than two passengers in a car. (3)

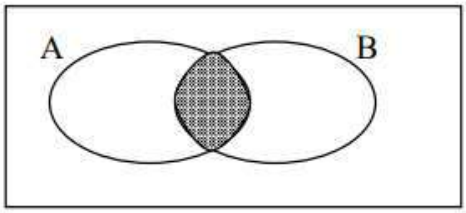
8.3 If you throw two dice at the same time, the probability that a six will be shown on one of the dice is $\frac{10}{36}$ and the probability that a six will be shown on both the dice, is $\frac{1}{36}$. What is the probability that a six will NOT show on either of the dice when you throw two dice at the same time? (3)

[15]

QUESTION 5

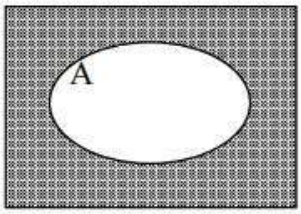
5.1 What expression BEST represents the shaded area of the following Venn diagrams?

5.1.1



(1)

5.1.2



(1)

5.2 State which of the following sets of events is mutually exclusive:

A Event 1: The learners in Grade 10 in the swimming team
Event 2: The learners in Grade 10 in the debating team

B Event 1: The learners in Grade 8
Event 2: The learners in Grade 12

C Event 1: The learners who take Mathematics in Grade 10
Event 2: The learners who take Physical Sciences in Grade 10 (1)

5.3 In a class of 40 learners the following information is TRUE:

- 7 learners are left-handed
- 18 learners play soccer
- 4 learners play soccer and are left-handed
- All 40 learners are either right-handed or left-handed

Let L be the set of all left-handed people and S be the set of all learners who play soccer.

5.3.1 How many learners in the class are right-handed and do NOT play soccer? (1)

5.3.2 Draw a Venn diagram to represent the above information. (4)

5.3.3 Determine the probability that a learner is:

(a) Left-handed or plays soccer (3)

(b) Right-handed and plays soccer (2)

[13]