GRADE 10 CAPS MATHEMATICS

QUESTIONS PER TOPIC

PAPER 1 & 2

LEARNER REVISION DOCUMENT

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ALGEBRA

FS March 2022

QUESTION 1

1.1 Show that 0,75 is rational number. (1)

1.2 Round 34,4678 off to two decimals (1)

1.3 Consider the following numbers: $\sqrt{25}$; $\sqrt{-7}$; π

Which of the following numbers is:

1.3.1 Irrational (1)

1.3.2 Rational (1)

1.3.3 Non-real (1)

1.4 Determine two positive integers between which $\sqrt{33}$ lies. (2)

1.5 Simplify completely

1.5.1 $3x(2x - 4xy)$ (2)

1.5.2 $(x - 3)^2$ (2)

1.5.3 $(2r - p)(3r^2 - 4rp + p^2)$ (3)

[14]

QUESTION 2

2.1 Factorise completely

2.1.1 $2x^2 - 8$ (2)

2.1.2 $x^2 - 4x + 3$ (2)

2.1.3 $2px + 3qx - 2py - 3qy$ (3)

2.2 Simplify

$$\frac{27x^3 - 8}{27x^2 + 18x + 12}$$ (4)

2.3 Solve for x

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2.3.1 $(2x+1)(x-3)=0$ (2)

2.3.2 $3^x=1$ (2)

2.3.3 $-4\leq 3x-1\leq 5$ (represent your answer graphically) (4)

2.3.4 $9^{2x+3}=27^{x+5}$ (4)

2.4 Solve for x and y simultaneously $2x-y=-1$ and $x+2y=12$ (4)

[27]

EKURHULENI SOUTH DISTRICT March 2023

QUESTION 3

3.1 Given that

$P=\sqrt{\frac{9}{11-x}}$, where $x\epsilon\{-11;\ -5\ ;0\ ;15\}$. For which value(s) of x, is P

3.1.1 A rational number? (1)

3.1.2 An irrational number? (2)

3.1.3 Non-real? (1)

3.2 Simplify the following expressions:

3.2.1 $(x-2y)(2x^2+xy-y^2)$ (2)

3.2.2 $\frac{x^2-x+1}{x^3+1}\div\frac{2}{x^2-1}$ (4)

[10]

QUESTION 4

4.1 Simplify the following:

4.1.1 $5x^0+(5x)^0$ (1)

4.1.2 $\frac{8\times 3^{-n}}{3^{-n+2}-3^{-n}}$ (3)

4.2 Solve for x:

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4.2.1 $2^{x+2} = 8$ (3)

4.2.2 $15 - 3x = 2x - 25$ (1)

4.2.3 $-3 \leq 2x - 7 \leq 7$ (2)

4.2.4 $(x + 5)(2x - 8) = 0$ (2)

4.3 Given that:

$3x = 12$ and $2x + y = 2$. Determine value of $(x - y)^2$ (3)

[12]

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QUESTION 5

5.1 If $x\epsilon\{0 ; 1 ; 2 ; 3 ; 4\}$, write down a value of x such that $\mathrm{K} = \sqrt{\frac{9}{4-x}}$ is:

5.1.1 Undefined (1)

5.1.2 Rational (1)

5.1.3 Irrational (1)

5.2 Simplify the following:

5.2.1 $2b(b - 5c)^2$ (2)

5.2.2 $\dfrac{3^x - 2.3^{x-1}}{3^{x+2} + 2.3^{x+1}}$ (3)

5.3 Factorise completely:

$a^2 - ax - 1 + x$ (3)

[11]

QUESTION 6

Solve the following equations:

6.1 $3x^2 = 2x$ (2)

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6.2 $\frac{7}{3-x} = \frac{5}{x+3} + \frac{4}{x^2-9}$ (4)

6.3 $16.2^{x-1} = (0{,}5)^{x-4}$ (4)

6.4 Solve the inequality: $2 - \frac{3x}{4} < 14$ (2)

6.5 Solve simultaneously:

$2x + y = 8$ and $2y + 3x = -2$ (4)

[16]

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QUESTION 7

7.1 Factorise the following expressions fully:

7.1.1 $2x^6 - 8$ (2)

7.1.2 $-x + (x-y)^3 + y$ (4)

7.2 Simplify the following completely:

7.2.1 $\left(x^{\frac{1}{2}} - 3\right)^2$ (2)

7.2.2 $x^{-3} \div x^{-5} + (x^{-2})^{-1}$ (2)

7.2.3 $\frac{5^{x+1}.(4^x)^3}{2^{5x-2}.10^{x-1}}$ (4)

7.2.4 $-\frac{11}{2x^2-5x-12} - \frac{1}{4-x}$ (5)

7.2.5 Determine the value of d if $(3x+2)$ is a factor of :

$6x^2 + dx - 10$ (3)

[22]

QUESTION 8

8.1 Solve for x:

8.1.1 $(3x-1)(x+2)$ (2)

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8.1.2 $3^x - 2.3^{x-1} = 3$ (3)

8.2 Given: $-1 \leq 1 - \frac{2x}{3} \leq 5$

Solve the inequality for x and write down the number of integers that will satisfy the inequality (3)

8.3 Solve for x and y simultaneously: (5)

$x - y = 4$ and $\frac{x}{5} + \frac{y}{2} = 5$

[14]

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QUESTION 9

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

9.1.1 Determine the value of q if $a = 2$; $b = -1$; $c = -4$. (2)

Leave your answer in simplest surd form

9.1.2 Is q a rational or irrational number? (1)

9.1.3 Determine between which two consecutive integers will q lie (2)

9.2 Represent $x \in [-3\,;4]$ graphically (2)

9.3 Given: $P = \sqrt{\frac{x-2}{(x-3)^2}}$

For which values of x will p be undefined? (1)

[8]

QUESTION 10

10.1 Simplify each of the following expressions:

10.1.1 $(2x - 3)(4x^2 + 6x + 9)$ (3)

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10.1.2 $\left(\frac{x}{2}-\frac{y}{3}\right)\left(\frac{x}{2}+\frac{y}{3}\right)$ (2)

10.2 Factorise the following expressions:

10.2.1 x^2-x-20 (2)

10.2.2 $2a^2(a-b)+8b^2(b-a)$ (4)

10.3 Simplify

$$\frac{3.2^m-4.2^{m-2}}{2^m-2^{m-1}}$$ (3)

[14]

QUESTION 11

11.1 Solve for x:

11.1.1 $\frac{2x}{3}-\frac{3x}{8}=7$ (3)

11.1.2 $x(x-1)=6$ (4)

11.1.3 $-1<-2x+3\leq 5$ (3)

11.1.4 $2^x.2^{x+1}=32$ (3)

11.2 Solve simultaneously for x and y if: (4)
$3x+5y=8$ and $x-2y=-1$

[17]

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12.1 Factorise the following expressions fully:

12.1.1 x^2+x-42 (2)

12.1.2 $2ab^2-b^3+b^2-2ab$ (4)

12.1.3 $3-\frac{27}{x^2}$ (2)

12.2 Simplify the following completely:

12.2.1 $(4a^2-2ab+b^2)(2a+b)$ (2)

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12.2.2 $(8x^{12})^{-\frac{1}{3}} \times 2x^{-4} - x^{-8}$ (3)

12.2.3 $\dfrac{7^{2n+2} - 3.7^{2n+1}}{49^n.4}$ (3)

12.3 If $6^7 = x$, determine the value of $6^2.5^3.4^4.3^5$ in terms of x, without the use of a calculator. (3)

[19]

QUESTION 13

13.1 Solve for x:

13.1.1 $\sqrt[x]{16} = 2$ (1)

13.1.2 $\dfrac{x}{x-3} - \dfrac{x}{2-x} = \dfrac{2x^2 - 25}{x^2 - 5x + 6}$ (5)

13.2 Given: $0 < 3 - \frac{x}{2} < 2$

13.2.1 Solve the inequality. (3)

13.2.2 Write down an integer that will make the equation invalid. (1)

13.3 Solve for x and y simultaneously:

$2x - 4y = 6$ and $3x - 5y = 10$ (5)

[15]

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QUESTION 14

14.1 Factorise the following expressions completely. Leave your answers in simplest form:

14.1.1 $x^2 - 16x + 15$ (1)

14.1.2 $a(6a + 2b) - 3(3a + b)$ (2)

14.2 Simplify the following expressions completely

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14.2.1 $27^{\frac{2}{3}}$ (2)

14.2.2 $\frac{x+3}{x-3} \times \frac{x^3-27}{x^2-9} \div \frac{x^2+3x+9}{x-3}$ (4)

14.2.3 $\frac{3^{x+1}-3^{x+2}}{3^{x+2}+3^x}$ (4)

[13]

QUESTION 15

15.1 Solve for x:

15.1.1 $2.3^{2x} = 18$ (4)

15.1.2 $\frac{2x-1}{3} \geq 2x+1$ (4)

15.1.3 $2x^2 - x - 10 = 0$ (4)

15.2 How much must be added to $(x+5)(x-5)$ so that it will be equal to

$(x+1)(x-25)$? (4)

15.3 Solve for x and y simultaneously:

$y - 3x = -2$ and $7x - 2y = 8$ (4)

[20]

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16.1 Simplify fully:

16.1.1 $(3x-2)(2x^2-4x+1)$ (2)

16.1.2 $\frac{4^x.8^{x+1}}{32^{x+1}}$ (3)

16.1.3 $\frac{x+7}{x^2-x-6} - \frac{3}{x-3} + \frac{2}{2x+4}$ (5)

16.2 Factorise fully:

16.2.1 $5x^2 - 2x - 3$ (2)

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16.2.2 $x^3 + \frac{1}{125}$ (2)

16.3 Solve for x:

16.3.1 $x(x-1) = 6$ (3)

16.3.2 $3^x + 3^{x-1} = 36$ (3)

16.3.3 $-2 < \frac{x}{3} - 1 \leq 1$ (3)

16.4 A shop sells bicycles and tricycles. In total there are 7 cycles (cycles include both bicycles and tricycles) and 19 wheels. Determine how many of each there are, if a bicycle has two wheels and a tricycle has three wheels. (5)

[28]

LIMPOPO March 2023 (SEKHUKHUNE S. DISTRICT)

17.1 If $x = \sqrt{2}$ and $y = -2$, decide whether the following expressions are rational, irrational or non-real

17.1.1 xy (1)

17.1.2 $\frac{1}{x}$ (1)

17.1.3 x^2 (1)

17.1.4 $\sqrt{y}$ (1)

17.2 Expand the following expressions:

17.2.1 $(a-2)(a^2+2a+4)$ (2)

17.2.2 $-(2x-5)^2$ (2)

17.2.3 $\left(\frac{a}{2}+1\right)\left(\frac{a}{2}-1\right)$ (2)

17.3 Simplify completely

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17.3.1 $x-3-\frac{5x-6}{2-x}-\frac{4}{x-2}$ (4)

17.3.2 $\frac{4^{2y-1}.9^{y+1}}{18^{y}.8^{y-1}}$ (4)

17.3.3 $\frac{2^{n+2}-2^{2n+1}}{4^{n+1}}$ (3)

17.4 Factorise the following:

17.4.1 $8x^3+1$ (2)

17.4.2 $2x^2-x-6$ (2)

17.4.3 $a^2-2ab-2b^2+ab$ (3)

17.5 Solve for x:

17.5.1 $x^2=5x$ (3)

17.5.2 $R=\frac{2\sqrt{x}}{3s}$ (3)

17.5.3 $\left(\frac{1}{3}\right)^{x-1}=27$ (3)

17.5.4 $3(2-3x)\geq 15$ (4)

17.6 Solve for a and b simultaneously:

$a+b=12$ and $4a+2b=44$ (5)

17.7 George is 7 times as old as his son. In 25 years' time he will be twice as old as his son. Calculate his son's present age. Hint: variable x may be used to develop equations. (4)

[50]

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NUMBER PATTERNS

KZN November 2023

QUESTION 1

1.1 Consider the following linear number pattern:

$37\ ;\ 33\ ;\ 29\ ;\ p\ ;\ 21\ ;\ ...$

1.1.1 Write down the value of p (1)

1.1.2 Determine the n^{th} term of the number pattern (2)

1.1.3 Determine the 15^{th} term of the sequence. (2)

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

1.2 Consider the number pattern below:

$-\frac{3}{5}\ ;\ -\frac{6}{9}\ ;\ -\frac{9}{13}\ ;\ ...\ ;\ ...$

1.2.1 Determine the next two terms of the number pattern (2)

1.2.2 Determine the n^{th} term of the number pattern (2)

[12]

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QUESTION 2

2.1 Your friends Zain and Letti have been trying to solve an exercise based on the following sequence: $2\ ;\ 6\ ;\ 10\ ;\ 14$

2.1.1 Letti says that $T_n = 4n - 2$ and Zain says that $T_n = 4(n-1) + 2$. Who is right? Use algebra to justify your answer. (3)

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2.1.2 Determine the value of the 27^{th} term of the sequence. (2)

2.2 Consider the following sequence: $-3\ ;\ 2\ ;\ 7\ ;\ 12\ ;\ 17\ ;\ ...$

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

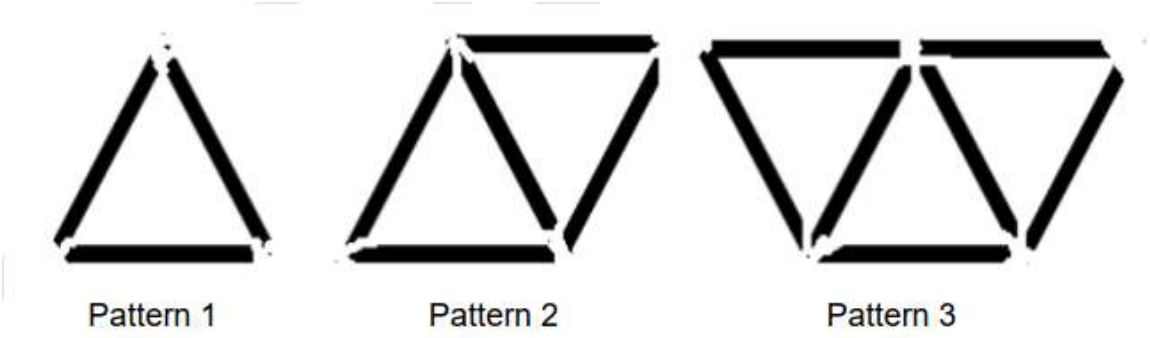
2.2.2 Determine the value of 52^{nd} number to end in a 7. (3)

[10]

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QUESTION 3

Study the patterns below and answer the questions that follow.



The patterns are the first three terms of a sequence for which the value of the term is given by the number of sticks in the pattern.

3.1 Write down the number of sticks in each of the first five terms of the sequence (2)

3.2 Write down the general term, T_n of the sequence (2)

3.3 Calculate the value of T_{131} (2)

[6]

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QUESTION 3

Consider the following linear pattern:

$$4x - 3\ ;\ 6x + 4\ ;\ \ 3x - 9\ ;\ ...$$

Determine the value of x **[2]**

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QUESTION 4

4.1 In each diagram below, there are shaded squares and white squares

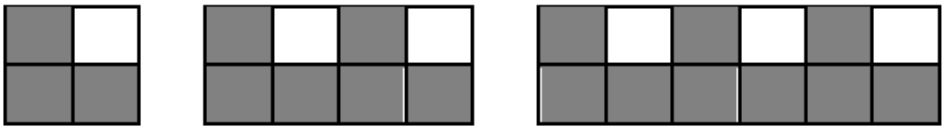


Diagram 1 **Diagram 2** **Diagram 3**

4.1.1 Write down the formula or general term for the number of shaded squares (1)

4.1.2 Determine the number of shaded squares of diagram 300 (2)

4.1.3 Which diagram will consist of 1500 shaded squares? (2)

4.2 If the pattern **TERMSTERMS**… continue on the same way, what will be the 383rd letter? (3)

4.3 Consider the pattern: $8\ ;15\ ;22\ ;\ \ 29\ ;\ \ldots\ldots$

4.3.1 Write down the next two terms of the pattern.

4.3.2 Describe the pattern in your own words

[12]

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QUESTION 5

5.1 Consider the following linear number pattern:

$$8\ ;\ 3\ ;\ -2\ ;\ ...$$

5.1.1 Write down the next term of the pattern (1)

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

5.1.3 Determine the value of the 25th term (2)

5.1.4 Which term of the pattern is equal to -527? (2)

5.2 $3x + 1\ ;\ 2x\ ;\ 3x - 7\ ;$ ... are the first three terms of a linear number pattern. Determine the value of x. (3)

5.3 If the pattern **MICHAELMICHAELMICHAEL**... is continued in this way, what will the 201st letter be? (2)

[12]

KZN November 2025

QUESTION 6

6.1 The n^{th} term of arithmetic sequence is given as $T_n = 7n - 3$.

6.1.1 Determine the first term of the sequence. (1)

6.1.2 Which term is equal to 683? (3)

6.2 A grade 10 learner wrote the WHEAT over and over again on a piece of paper as follows:

WHEATWHEATWHEATWHEATWHEAT…

6.2.1 Write down the 30th letter (1)

6.2.2 Determine the 508th letter (3)

6.2.3 The first H is in the second position, the second H is in the seventh position, the third H is in the twelfth position, and so forth.

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Determine in which position the 103rd H is? (3)

6.3 Consider the number pattern: -3×1 ; -7×4 ; -11×7 ; -15×10

Determine the 62nd term of the above pattern. (4)

[15]

MIND ACTION SERIES G10

QUESTION 7

Sipho wrote the name **SWEET** over and over again as follows:

SWEETSWEETSWEETSWEET…

7.1 What is the 23rd letter? (1)

7.2 Find the 402nd letter. (3)

7.3 The first W is in the second position, the second W is in the seventh position, the third W is in the twelfth position, and so forth. Determine in what position is the 100th W? (3)

[7]

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QUESTION 8

A linear pattern has the terms $x - 1$; $4x + 1$; $6x$; ⋯. Which term is equal to -277? (5)

QUESTION 9

The ninth term of a linear pattern is 40 and the nineteenth term is 100. Determine the first three terms (5)

QUESTION 10

The fifth term of an arithmetic series is 25, the fifteenth term is 55. Calculate the fortieth term. (5)

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FUNCTIONS

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QUESTION 1

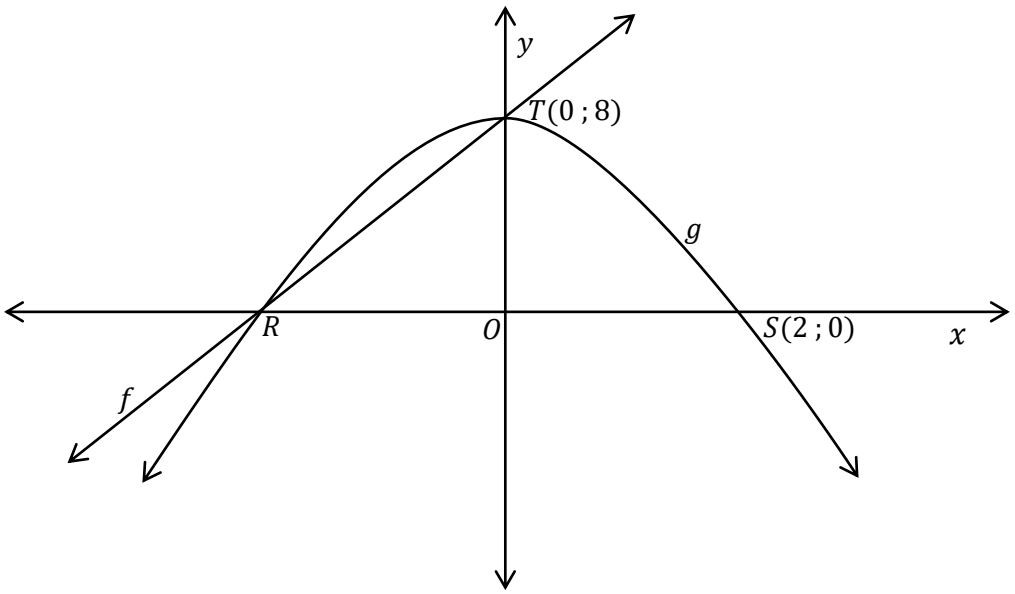
1.1 Consider: $f(x) = \frac{2}{x} - 1$

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

1.1.2 Determine y-intercept of f. (2)

1.1.3 Sketch f on a Cartesian plane. Show all the intercepts with the axes and the asymptotes. (3)

1.2 The diagram shows the graphs of $g(x) = -2x^2 + 8$ 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 and f. Graph f intersects R and T.



1.2.1 Write down the range of g. (1)

1.2.2 Write down the coordinates of R. (1)

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

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

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[11]

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QUESTION 2

Consider the functions $f(x) = ax^2 + c$ and $g(x) = bx + q$. f and g intersect at points $A(-1\,;\,-3)$ and $B(2\,;0)$.

2.1 Calculate the values of a and c. (4)

2.2 Calculate the values of b and q. (3)

2.3 Sketch the graphs of f and g on the same set of axis. (6)

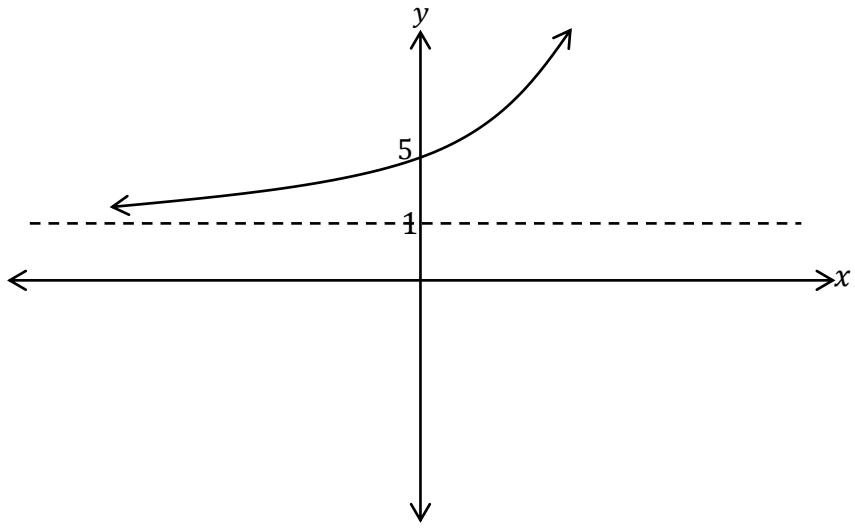
2.4 Determine the value of $g(x) - f(x)$. (2)

2.5 For which values of x is $g(x) \geq f(x)$ (2)

[17]

QUESTION 3

The graph of $f(x) = 2^{x+2} + k$ is drawn below.



3.1 Use the laws of exponents to show that $2^{x+2} + k = 4.2^x + k$. (2)

3.2 Determine the value of k. (2)

3.3 Write down the equation of the asymptote of f. (1)

[5]

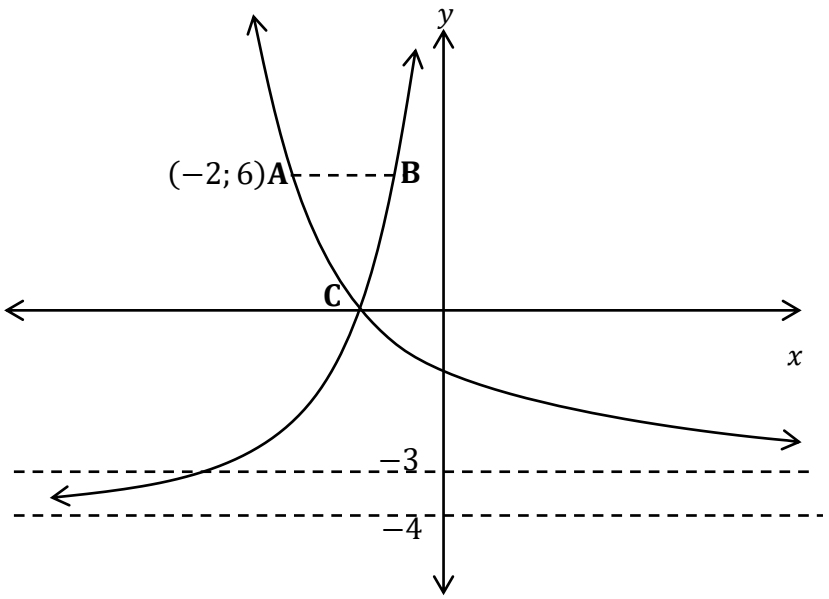
QUESTION 4

The sketch alongside shows the graphs of $f\ (x) = a^x - 3$ and

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

$A(-2\ ;\ 6)$ is a point on the graph of f and B is a point on the graph of g. C is the x-intercept of the graphs.



4.1 Write down the:

4.1.1 Domain of f (1)

4.1.2 Range of g (1)

4.1.3 Equation of the asymptote of f (1)

4.2 Show that the value of a is $\frac{1}{3}$. (2)

4.3 Determine the coordinates of C. (3)

4.4 Write down the values of x for which $g(x) > f(x)$ (2)

4.5 Determine the equation of :

4.5.1 The straight-line through A and C. (4)

4.5.2 The axis of symmetry of g with a negative gradient. (2)

4.6 If AB is a horizontal line, calculate the length of AB. (3)

[19]

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QUESTION 5

Consider a quadratic function, h, with the following characteristics:

- Axis of symmetry is the y-axis
- The x-intercepts are $(-4\,;0)$ and $(4\,;0)$
- The graph cuts the y-axis at -8

5.1 Sketch the graph of h on a system of axes. Clearly show ALL intercepts with the axes. (3)

5.2 Determine the equation of the graph in the form $h(x) = ax^2 + q$. (3)

5.3 Write down the values of x for which $h(x) \leq 0$. (2)

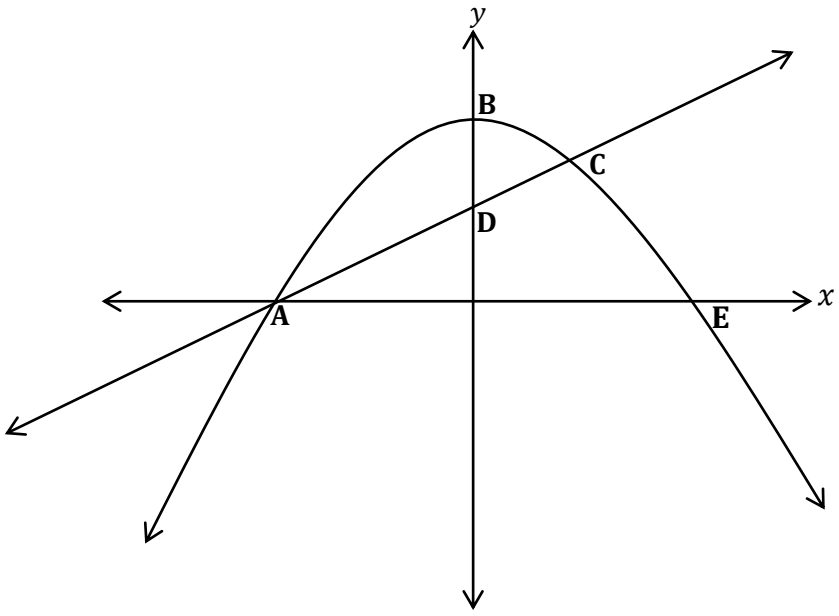
5.4 Write down the equation of k if $k(x) = -h(x) - 6$. (2)

[10]

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QUESTION 6

The graphs of $f(x) = -x^2 + 4$ and $g(x) = mx + 2$ are sketched. A and E are the x-intercepts of f. B and D are the y-intercepts of f and g respectively. f and g intersect at A and C.



6.1 Determine the coordinates of points B and D. (2)

6.2 Write down the range of f. (1)

6.3 Determine the length of AE. (4)

6.4 Calculate the value of m. (2)

6.5 Determine the coordinates of A and C, the points of intersection of f and g. (3)

6.6 If $(x) = (-x)$, determine the values of x such that $(x) \geq (x)$. (2)

[14]

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QUESTION 7

7.1 Sketch the graphs of $f(x) = -x^2 + 4$ and $g(x) = 2^x + 3$ on the same set of axes on the diagram sheet provided. (5)

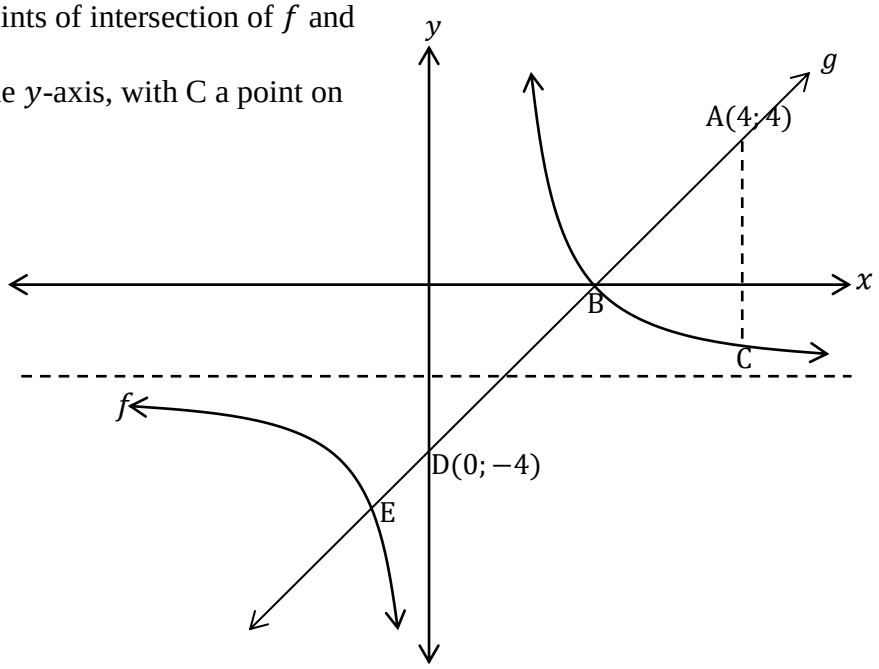
7.2 Write down the coordinates of the turning point of f. (1)

7.3 The graph of $h(x) = x^2 - 4$ is obtained by transforming the graph of f. Describe the transformation that maps the graph of f onto the graph of h. (2)

[8]

QUESTION 8

The graphs of $f(x) = \frac{4}{x} - 2$ and $g(x) = mx + c$ are drawn below. $A(4\,;4)$, B, $D(0\,;-4)$ and E are points of intersection of f and g. AC is parallel to the y-axis, with C a point on f.



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8.1 Determine the values of m and c (2)

8.2 Write down the range of f (2)

8.3 Determine the coordinates of the point(s) of intersection of the two graphs (4)

8.4 Determine the value(s) of x for which $g(x) \geq f(x)$ (2)

8.5 Calculate the length of AC (3)

[13]

QUESTION 9

Given the equation of an exponential graph: $h(x) = a.b^x + q$. The following information of the function is known:

- $0 < a < 2; a \in \mathbb{Z}$
- The range of h is $y > -2$
- $A(1\ ;0)$ is a point on the graph

9.1 Write down equation of the asymptote of h. (1)

9.2 Determine the equation of h. (4)

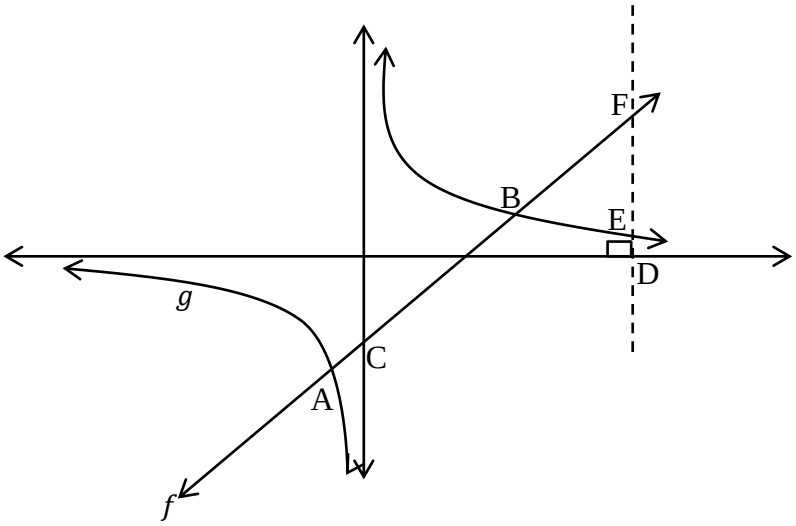
9.3 Write down the y-intercept of h. (1)

[6]

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QUESTION 10

10.1 Given: $f(x) = x - 2$ and $g(x) = \frac{3}{x}$, which are not drawn to scale. A and B are points of intersection of the graphs. DF is perpendicular to the x-axis, with points A and F on the graphs of g and f respectively.



Determine:

10.1.1 The coordinates of point C. (1)

10.1.2 The x-coordinates of A and B (4)

10.1.3 The length of EF if $OD = 6\text{units}$ (3)

10.1.4 The equation of j if $j(x) = g(x) + 2$ (1)

10.1.5 The value(s) of x for which $f(x) \geq g(x)$ where $x \leq 0$ (2)

10.2 Sketch the graph of $h(x) = ax^2 + q$ if it is given that:

- The range of h is $[-4; \infty)$
- $a \neq 0\,; a > 0$
- $q < 0$
- One root of h is positive and one root of h is negative.

(3)

10.3 Given: $g(x) = 3.2^x - 12$

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10.3.1 Write down the equation of the asymptote of g. (1)

10.3.2 Determine the y-intercept of g. (2)

10.3.3 Determine the x intercept of g. (2)

10.3.4 Sketch the graph of g, clearly showing the asymptote and the intercepts with the axes. (3)

[21]

KZN June 2025

QUESTION 11

11.1 Given: $f(x) = x^2 + 4$

11.1.1 Sketch the graph of f. Clearly indicate all the intercepts with the axes on the graph. (3)

11.1.2 Write down the range of f. (1)

11.1.3 Determine the value(s) of x for which $f(x) > 0$. (2)

11.1.4 Describe the transformation from f to h in words if $h(x) = -(x-1)(x+1)$. (2)

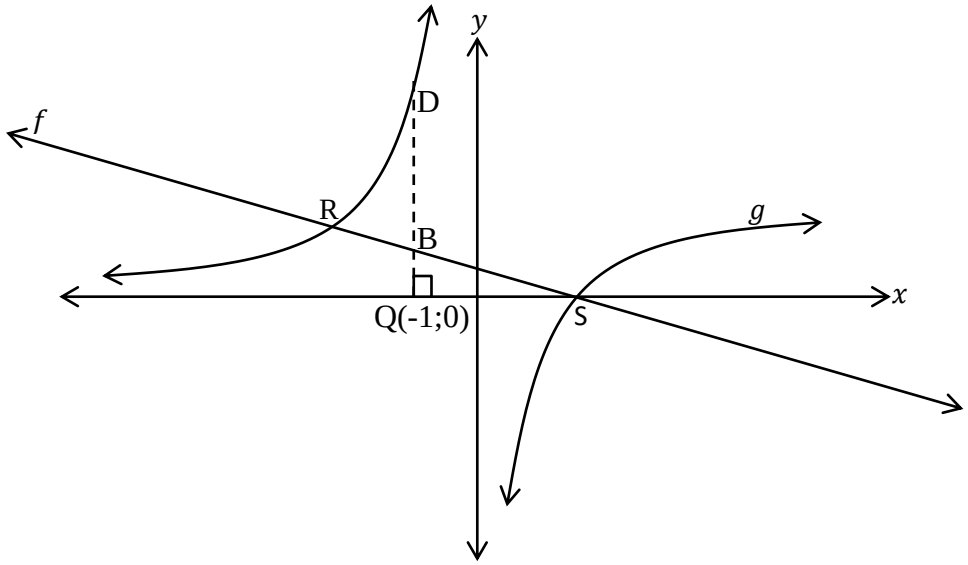
11.2 Determine the equation of the function $k(x) = \frac{a}{x} + q$ with the horizontal asymptote $y = 3$. The straight line $f(x) = x + 2$ intersects with the graph of k at the point $(2\,;4)$. (3)

[11]

QUESTION 12

Given: $f(x) = -x + 1$ and $g(x) = -\frac{2}{x} + 2$, which are not drawn to scale. R and S are points of intersection of the graphs. DBQ is a line perpendicular to the x-axis with D and B on g and f respectively. The coordinates of Q are $(-1\,;0)$.

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Determine:

12.1 The equation of the line of symmetry of g with a negative gradient (2)

12.2 The coordinates of R and S (6)

12.3 The length of DB (3)

[11]

KZN November 2024

QUESTION 13

13.1 Given that $f(x) = -\frac{2}{x} + 4$

13.1.1 Determine the equation of the horizontal asymptote of f. (1)

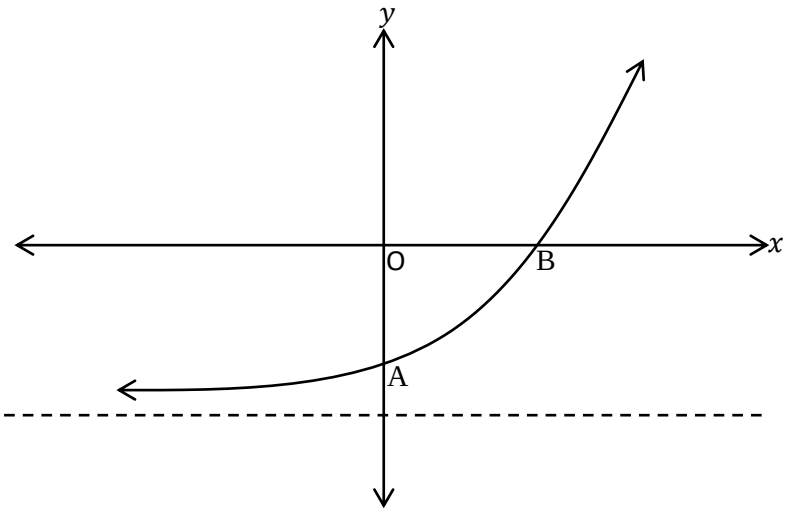
13.1.2 Determine the coordinates of the x-intercept of f. (2)

13.1.3 Sketch the graph of f, clearly showing the intercept with axes and the asymptotes. (3)

13.1.4 Determine the equation of g, if g is formed by shifting the graph of f 7 units down (1)

13.2 The graph of $h(x) = 2^x - 2$ is sketched below.

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13.2.1 Determine the coordinates of A. (2)

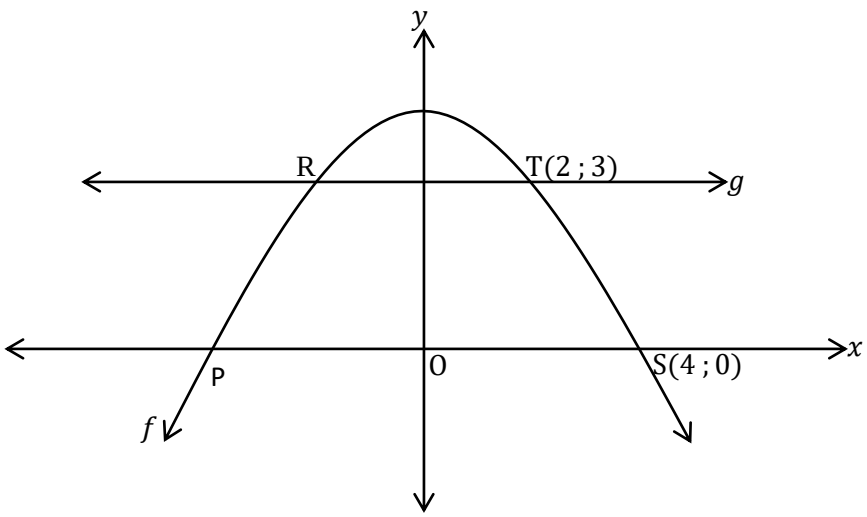
13.2.2 Write down the range of h (2)

13.2.3 Determine the equation of j, if j is formed by reflecting the graph of h about the y-axis. (1)

[12]

QUESTION 14

Sketched below are the graphs of $f(x) = ax^2 + q$ and the straight line g. g is parallel to the x-axis and $S(4\,;0)$ is the x-intercept of f. The graph of f passes through points T$(2\,;3)$, P and R.



14.1 Write down the coordinates of :

a) P (1)

b) R (2)

14.2 Write down the equation of g. (2)

14.3 Determine the values of a and q. (4)

14.4 If $f(x) = k$, determine the value(s) of k, for which f has no x-intercepts. (2)

14.5 Determine the coordinates of F, if F is the reflection of $T(2\ ;3)$ about the x-axis (2)

14.6 Using the graphs, determine for which value(s) of x:

a) $f(x) - g(x) > 0$ (2)

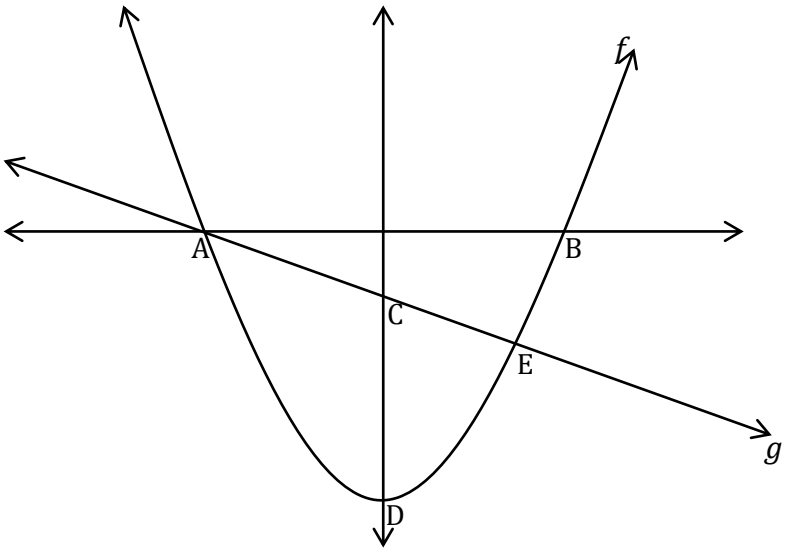
b) $f(x).g(x) \leq 0$ (2)

[17]

KZN June 2021

QUESTION 15

The graphs of $f(x) = \frac{1}{2}x^2 - 8$ and $g(x) = -x - 4$ are given. A and B are x-intercepts of the graph of f, and D is the turning point of f. The graph of g meets f at A and E. C is the



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y-intercept of g.

15.1 Determine:

15.1.1 The coordinates A, B, C, D and E (10)

15.1.2 The length of CD (2)

15.1.3 The equation of $k(x)$, if $k(x) = -f(x)$ (2)

15.2 The following functions are given: $f(x) = \frac{2}{x} + 2$ and $h(x) = 2^x + 2$.

15.2.1 Sketch the graphs of f and h on the same set of axes, clearly showing all intercepts with the axes and asymptotes where applicable (8)

15.2.2 Write down the domain of f. (2)

[24]

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FINANCIAL MATHEMATICS

KZN November 2023

QUESTION 1

1.1 Gugu buys a double bed which costs R12 000 on hire purchase. She is charged a simple interest of 12% p.a. over six years.

1.1.1 Calculate the total amount she will pay for the double bed. (3)

1.1.2 How much interest will she pay over this period? (1)

1.1.3 Calculate her monthly instalment. (2)

1.2 The population of a city in KwaZulu-Natal is 2 500 000 in the year 2020. Assuming that the population will continue to increase at a constant rate of 5,25% each year, estimate the population of the city at the beginning of 2024. Give your answer to the nearest whole number. (3)

1.3 If the current exchange rate is $\$1 = R19{,}08$ and $£1 = R23{,}31$, determine the exchange rate between dollar and pound. (2)

1.4 Brent crude oil costs $\$93{,}78$ a barrel. Calculate the cost in Rands, of importing a barrel when the exchange rate is $R19{,}08$ to the dollar. (2)

[13]

KZN November 2025

QUESTION 2

Amanda is planning a trip to England in 2 years. She considers two different ways to save her money.

Option 1: She invests R8 000 at 6% per annum **simple interest** for 2 years.

Option 2: She invests R8 000 at 5.5% per annum compound interest for 2 years.

2.1 Calculate the total amount Amanda will have after 2 years if she chooses the 2nd option. (2)

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2.2 Which option gives Amanda a better return after 2 years? Show calculations to support your answer. (3)

2.3 If the exchange rate is £1 = $R22{,}50$, How many British pounds (£) will she have after 2 years if she chooses the better option? (2)

[7]

GP November 2022

QUESTION 3

3.1 Amy needs to buy a new computer. The computer costs R7 990. Amy does not have the full amount of money available, so she has decided to enter into a hire purchase agreement. The terms are as follows:

Determine the monthly amount payable, including interest and fees.

15% per annum simple interest
48 monthly payments
Monthly processing fee of R13,50

(5)

3.2 On his 29th birthday, John invested R5 000 on the Johannesburg Stock Exchange. His share increased in value by 20% compounded annually. How much would his investment be worth on his 60th birthday? (5)

[10]

GP November 2021

QUESTION 4

The Nkosi family of three from Dobsonville wish to attend the Soccer World Cup in Qatar in 2022. The cost of tickets at present is 2 150 Qatar Rials per person per game. The family would like to attend the last four games.

4.1 Calculate the total cost, in Rands, of the tickets for the family if the exchange rate is: **One Rial =R 4.012778** (3)

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4.2 On the 1st of January 2019 Mr. Nkosi invested R50 000 at a simple interest rate of 13%. Determine whether the value of the investment at the end of 2021 will cover the cost of the tickets. (3)

4.3 Would the family want a strong rand or a week rand, when they purchase the tickets? Give a reason for your answer. (2)

4.4 The inflation rate over the last four years remained at a constant rate of 0,5%. Calculate the cost of one ticket, in Qatari Rials, four years ago. ((3)

[11]

NW November 2024

QUESTION 5

5.1 Mark has booked himself a hotel room for three nights during his visit to New York. The exchange rate is $\$1 = R18{,}10$. The cost per night of the hotel is $450. How much did three nights cost him in Rands? (3)

5.2 A television set costs R20 000. Belinda buys it on hire purchase. She traded in an old television for R3 000 and also paid a deposit of R2 000. She made monthly instalments of R900 for a period of 2 years.

5.2.1 Calculate the total interest paid (6)

5.2.2 Calculate the simple interest rate (4)

[13]

KZN November 2024

QUESTION 6

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6.1 Thembekile wants to buy a laptop computer costing R11 500, on a hire-purchase agreement. The conditions of the agreement are as follows:

- Thembekile must pay a deposit of 20% of the purchase price.
- 11% p.a. simple interest is charged on the balance.
- She must alos pay a compulsory monthly insurance premium of R60,75.
- The balance is settled in 36 monthly instalments

6.1.1 Calculate her balance after paying the deposit (2)

6.1.2 Calculate Thembekile's total monthly instalment (4)

6.2 It costs £71,72 to fill a car with 55 litres of petrol in England. In South Africa, 1 litre of petrol costs R22,30. In which country is petrol more expensive, if the same car is used and the exchange rate between the countries is £1 =R23,23. (3)

6.3 Brent crude oil costs $77,36 a barrel. Calculate the cost in Rands, of importing 100 barrels, if the exchange rate is R17,83 to the dollar. (2)

[11]

LP November 2024

QUESTION 7

7.1 Wendy made a deposit of R5 000 in the bank for her 5 year old son's 21st birthday. She gave her son the amount of R18 000 on his birthday. At what rate was the money invested, if simple interest was calculated? (3)

7.2 Junior buys a bedroom suite costing R8 500 on a hire purchase agreement. He is charged an interest rate of 17,5% p.a. over 3 years

7.2.1 How much will he pay over the given period? (2)

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7.2.2 What is his monthly instalment? (3)

7.3 New York, a city in America is experiencing a huge increase in births. If the average growth rate of the population is 16% p.a. how many babies will be born to the 1600 residents in the next two years. (3)

7.4 Lethabo wants to travel to Europe in December, she has saved R20 000, how much euro can she buy if £1=R21,39? (2)

[13]

EC November 2024

QUESTION 8

8.1 Jenny buys a bicycle which costs R12 000,00 on hire purchase. She is charged a **simple interest** of 12% p.a. over six years.

8.1.1 Calculate the total amount that she will pay for the bicycle. (3)

8.1.2 How much interest will she pay over this period? (1)

8.1.3 Calculate Jenny's monthly instalment. (2)

8.2 Kenny invests a certain amount of money at 7.2% p.a. compound interest. After how many years would the amount have doubled? (4)

8.3 The table below shows the exchange rate of the British pound and the South African rand as well as the US dollar and the South African Rand on a certain day.

Country	**Unit**	**Exchange rate**
England	Pound (£)	R23,04
USA	Dollar ($)	R17,32

8.3.1 Calculate the exchange rate between the British Pound (£) and the US dollar ($) on that day. (1)

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8.3.2 Brent crude oil cost \$74,59 a barrel. Calculate the cost in Rands, of importing a barrel of brent crude oil. (1)

[12]

KZN September 2022

QUESTION 9

9.1 Tyler decides to purchase a sound system which costs R7 999 on a hire purchase agreement.

9.1.1 If Tyler pays a 11% deposit, calculate the balance after Tyler has paid the deposit. (2)

9.1.2 The store charges Tyler 20% interest per year, with the loan payable over 4 years. Calculate the total amount that he will have to pay back. (3)

9.1.3 Tyler is also required to pay a monthly insurance of R30 and an administration fee of R12. How much will Tyler's monthly repayments be? (3)

9.2 On a trip to Florida, Akwande booked into a hotel for four nights. The exchange rate at that time was $\$1 = 16{,}77$. The cost per night was &450. How much did she spend, in Rands, for the four nights? (2)

9.3 After 7 years, an investment increased to R95 798,35. If the interest rate was 8,25% per annum, compounded annually, calculate the amount initially invested. (3)

9.4 Lynda deposits R4500 into a savings account. The interest paid on the savings is 7,5% p.a. compounded annually.

9.4.1 Calculate how much money is in the account at the end of 4

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years, immediately after the second deposit. (3)

9.4.2 Calculate how much there will be available in the savings account 10 years after the first deposit. (3)

[18]

KZN September 2025

QUESTION 10

10.1 Amanda invests R25 000 for 9 years into a savings account that pays 8,25% per annum compound interest.

10.1.1 Calculate the accumulated value of the investment at the end of 9 years. (3)

10.1.2 She leaves the money in the account for a further three years. The interest rate changes to 6% per annum simple interest. How much money will she then have saved? (3)

10.2 South Africa's population is increasing by 2,5% per year. If the current population is 64,7 million, what was the population three years ago? (2)

10.3 On a certain day the exchange rate between the US dollar and the South African Rand is $\$1 = R18{,}16$. At the same time the exchange rate between the British pound and the South African $£1 = \text{R}23{,}52$. Calculate the exchange rate between the British pound and the US dollar on that day. (2)

[10]

KZN September 2024

QUESTION 11

An advertisement in a local newspaper reads as follows:

- Buy an iPhone 14 Pro Max cell phone for only R1 029 per month.
- You have 36 months to pay.
- No deposit is required

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11.1 Calculate the total amount to be paid over a period of 36 months. (1)

11.2 The monthly instalment quoted in the advertisement, is calculated on a hire purchase agreement which charges an interest of 8.2% p.a. on the cash price of the cell phone. (3)

11.3 The cost of the cell phone is subject to inflation and increases to a cash price of R31 968,11 after 3 years. Calculate the annual inflation rate. (4)

[8]

QUESTION 12

12.1 On the trip to America, Charity booked into a hotel for five days. The exchange rate at that time was $\$1 = R18{,}73$. The cost of the hotel per day was $\$104$. How much did she spend, in Rands, for five days? (3)

12.2 Mr Zungu from Sparks Estate Secondary takes out a loan to buy furniture for his office. The loan is repaid in ONE payment of $R189\ 389{,}80$ at the end of 4 years. The interest paid on the loan is 10% p.a. compounded annually. Calculate the amount of money borrowed from the bank to buy furniture. (4)

[7]

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PROBABILITY

EC November 2024

QUESTION 1

1.1 In a random experiment, A and B are two different events.

$P(A) = 0,4$ and $P(B) = k$.

1.1.1 If the $P(A \text{ or } B) = 0,6$ determine the value of k if A and B are mutually exclusive. (2)

1.1.2 For which value of k is A and B complementary events? (2)

1.2 For two events V and W, which are not mutually exclusive, you are given the following information:

$P(V) = 0,35$; $P(W) = 0,55$; $P(V \text{ or } W) = 0,80$; $P(V \text{ and } W) = x$

1.2.1 Represent the information above in a Venn diagram (3)

1.2.2 Determine the value of x (2)

1.2.3 Determine $P(\text{not } V \text{ or } W)$ (2)

1.2.4 Determine $P(V \text{ and not } W)$ (2)

[13]

KZN September 2025

QUESTION 2

2.1 For two events A and B, it is given that:

$P(A) = 0,6$; $P(\text{not } B) = 0,55$ and $P(A \text{ or } B) = 0,8$

2.1.1 Determine $P(B)$ (1)

2.1.2 Determine $P(A \text{ and } B)$ (2)

2.1.3 Determine $P(\text{not}(A \text{ or } B))$ (1)

2.2 There are 130 Grade 10 learners in a school.

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- 68 learners take Mathematics (M)
- 50 learners take Life Science (L)
- 32 learners take Mathematics and Life Sciences

2.2.1 Draw a Venn diagram to illustrate the given data (4)

2.2.2 Use the diagram to determine the probability that a learner chosen at random takes Mathematics but not Life Sciences (2)

2.2.3 Use the diagram to determine the probability that a learner chosen at random takes Mathematics or Life Sciences. (2)

[12]

GP November 2022

QUESTION 3

3.1 For any two events, A and B, it is given that:

$$P(A) = 0{,}25,\ P(B) = 0{,}89,\ P(A \text{ or } B)' = 0{,}05$$

3.1.1 Calculate $P(A \text{ or } B)$ (2)

3.1.2 Are the two events mutually exclusive? Justify your answer (2)

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

3.1.4 What is the probability of event B only? (2)

3.2 In a small town of 1 500 people, there are two main banks, Add Savings and Multiplier Bank. Most people in the town bank with one or both of the banks. 600 people bank with Add Savings and 950 bank with Multiplier Bank. 235 people in the town do not use either Add Savings or Multiplier Bank.

3.2.1 Draw a Venn diagram to illustrate the information given above. (4)

3.2.2 What is the probability that a person from the town uses both banks? (1)

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3.2.3 What is the probability that a person from the two does not use Multiplier Bank? (2)

[15]

GP November 2021

QUESTION 4

4.1 For two events A and B which are not mutually exclusive, you are given the following information:

- $P(A) = 0{,}45$
- $P(A') = 0{,}55$
- $P(A \text{ or } B) = 0{,}8$

Let the value of $P(A \text{ and } B)$ be x

4.1.1 Draw a Venn diagram based on the information given above (4)

4.1.2 $P(A \text{ and } B)$ (2)

4.1.3 $P(A \text{ or}(\text{not } B))$ (2)

4.2 In a survey, 80 people were questioned about their preference between an iPhone (A) and a Samsung (B) or both.
The results show that 30 people prefer iPhones while 45 people prefer Samsungs. 12 people prefer neither. Determine how many people prefer both. (4)

[12]

NW November 2024

QUESTION 5

Consider events A and B. $P(A) = 0{,}43$, $P(B) = 0{,}37$ and $P(A \text{ and } B) = 0{,}1591$.

5.1 Determine whether events A and B are complimentary. (2)

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5.2 Are events A and B mutually exclusive? Explain your answer. (2)

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

[8]

QUESTION 6

Two different events, A and B, forms part of an investigation.

- $P(A) = \frac{2}{3}$
- $P(B') = \frac{3}{5}$
- $P(A \text{ or } B) = \frac{4}{7}$

Determine the value of:

6.1 $P(\text{not } A)$ (2)

6.2 $P(B)$ (2)

6.3 $P(A \text{ and } B)$ (3)

[7]

KZN November 2024

QUESTION 7

7.1 The letters of the word COORDINATES were put into a hat. A letter is chosen at random. Determine the probability that:

7.1.1 The letter N is chosen. (1)

7.1.2 The letter O is chosen. (1)

7.2 Balls numbered from 1 to 10 were put into a container.

7.2.1 From the balls numbered 1 to 10, list the numbers that will be event A, the factors of 18 (1)

7.2.2 From the balls numbered 1 to 10, list the numbers that will be event B, all odd numbers (1)

7.2.3 Draw a Venn diagram to illustrate the above information. (3)

7.2.4 Determine:

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a) $P(A \text{ and } B)$ (2)

b) $P(A \text{ or } B)$ (2)

c) $P((\text{not } A) \text{or } B)$ (2)

[13]

KZN November 2025

QUESTION 8

8.1 If $P(D) = 0{,}25$; $P(K) = 0{,}5$ and $P(D \text{ or } K) = 0{,}625$

8.1.1 Calculate $P(D \text{ and } K)$ (2)

8.1.2 Are events D and K complementary? Give a reason. (2)

8.2 A survey was conducted among 100 learners to determine their participation in two subjects: **Maths (M)** and **Life Orientation (LO).** The following results were obtained:

- 42 learners participate in Maths
- 35 learners participate in Life Orientation
- x learners participate in both subjects
- 38 learners did not participate at all

8.2.1 Draw a Venn diagram to represent the above information (3)

8.2.2 Determine the number of learners who participated in both subjects (2)

8.2.3 Determine the probability that a learner selected at random participates in:

a) Neither Maths nor LO (1)

b) Maths or LO (1)

c) Maths only (1)

[12]

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LP November 2024

QUESTION 9

9.1 Lesiba has 18 loose socks in a drawer. Eight if these are orange and two are pink, calculate the probability that the first sock taken out at random is:

9.1.1 Pink (2)

9.1.2 No Orange (3)

9.2 A survey was conducted at Modubatse Secondary School to establish how many of the 650 learners buy vetkoek and how many buy sweets during break. The following was found:

- 300 learners bought sweets
- 400 learners bought vetkoek
- 50 learners bought nothing

9.2.1 Represent the information with a Venn diagram (3)

9.2.2 If a learner is chosen at random, what is probability that this learner buys:

a) Vetkoek only (1)

b) Vetkoek and sweets (2)

c) Vetkoek or sweets (2)

[13]

KZN November 2023

QUESTION 10

10.1 A bag contains 3 green balls and 5 red balls. The balls are placed in a bag and one is chosen at random. Determine the probability that the ball selected is red. (1)

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10.2 Two events A and B are complementary and also $P(\text{not A}) = 0,25$

10.2.1 Complete the statement: $P(A) + P(B) = \cdots$ (1)

10.2.2 Write down the value of $P(A)$ (2)

10.3 For two events V and W which are not mutually exclusive, you are given the following information:

- $P(V) = 0,35$
- $P(W) = 0,55$
- $P(V \text{ or } W) = 0,8$

Let the value of $P(V \text{ and } W) = x$

10.3.1 Draw a Venn diagram based on the information given above (4)

10.3.2 Determine the value of $P(V \text{ and } W)$ (2)

10.3.3 Write down the value of $P(\text{not V or W})$ (2)

10.3.4 Write down the value of $P(V \text{ and not } W)$ (2)

[14]

GP November 2023

QUESTION 11

11.1 In a random experiment, A and B are two different events. Suppose $P(A) = 0,4$; $P(B) = k$.

11.1.1 If $P(A \text{ or } B) = 0,6$, for which value of k is A and B mutually exclusive? (2)

11.1.2 For which value of k is A and B complementary events (2)

11.2 In a class of 60 learners, 8 learners take History (H), 41 learners take Mathematics (M) and 16 learners take neither of these two subjects.

11.2.1 Calculate the number of learners that do both History and Mathematics (2)

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11.2.2 Draw a Venn diagram to illustrate the above information (4)

11.2.3 Determine:

a) The probability of a learner taking History only (1)

b) The probability that a learner does not take Mathematics (2)

11.2.4 The probability that a Mathematics learner is also a Science learner is 0,927. Determine the number of learners that take Science. (2)

[15]

EC November 2020

QUESTION 12

12.1 An entire sample space is made up of two complementary events, S and T, where $P(S') = 0{,}33$.

12.1.1 Complete the statement: $P(S) + P(T) = \cdots$ (1)

12.1.2 Write down the value of $P(T)$ (1)

12.2 A survey was conducted among 180 residents of a small town to establish how many people contracted tuberculosis (TB) and/or human immunodeficiency virus (HIV) during the last 5 years. The results were as follows:

- x people were diagnosed with TB
- 30 people were diagnosed with both TB and HIV
- 69 people were HIV positive
- 51 people did not have either disease

12.2.1 Represent the information above in a Venn diagram (4)

12.2.2 How many people contracted TB only? (3)

12.2.3 Calculate the probability that a person selected at random:

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a) Will only have been diagnosed with TB (2)

b) Will not have any of the two diseases (1)

[12]

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STATISTICS

GP November 2023

QUESTION 1

The maximum temperature (in degrees Celsius) at 20 tourist resort centres were measured and recorded. The results were recorded in the table below.

22	23	24	25	26	28	29	29	30	32
32	33	34	35	36	37	37	38	39	40

1.1 Write down the median temperature measured (1)

1.2 Determine:

1.2.1 The mean temperature (2)

1.2.2 The range (1)

1.2.3 The interquartile range (3)

1.3 Draw a box and whisker diagram to represent the data above (2)

1.4 The tourism sector claims that 20% of the resort centres recorded temperatures too hot for tourist activities. Determine the minimum recorded temperature that satisfies the above claim. (2)

[**11**]

QUESTION 2

A supermarket sells light bulbs. The store keeps a record of the wattage of the light bulbs that they sold in the month of October 2023. The monthly sales are summarised in the table below.

Wattage Interval	**Frequency**
$80 \leq x < 95$	3
$95 \leq x < 110$	17
$110 < x < 125$	31
$125 < x < 140$	16
$140 < x < 155$	10

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2.1 How many light bulbs were sold in the month of October? (1)

2.2 Write down the modal class of the data above (1)

2.3 Determine the interval in which the median lies (2)

2.4 Express the number of light bulbs with the most popular wattage as a percentage of the October sales. (2)

2.5 Estimate the mean wattage of the light bulbs that were sold. (3)

2.6 The manager of the store decided to display the data collected on a pie chart. Calculate the size of the largest angle of the pie chart. (2)

[11]

GP November 2022

QUESTION 3

The heights of 18 grade 8 learners were recorded in cm as shown below. Use the data below to answer the questions that follow.

147	131	142	133	152	125
128	162	129	165	151	130
143	162	110	129	139	153

3.1 Represent the data on a stem and leaf diagram (4)

3.2 Determine the:

3.2.1 Median (2)

3.2.2 Mode (1)

3.2.3 Lower quartile and the upper quartile (2)

3.2.4 Mean (2)

[11]

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QUESTION 4

The figures in the table below are the ages, to the nearest year, of a random sample of 30 people negotiating a mortgage in a bank. Use the data below to answer the questions that follow.

29	26	31	42	38	45	35	37	38	38
36	39	49	40	32	32	34	27	56	29
33	31	33	52	44	32	30	38	42	33

4.1 Complete the frequency table on the table below

AGE INTERVALS	**TALLY**	**FREQUENCY**
$25 \leq x < 33$		
$33 \leq x < 41$		
$41 \leq x < 49$		
$49 \leq x < 57$		

(4)

4.2 Use the information from the frequency table to draw a histogram on the grid provided in the SPECIAL ANSWER SHEET (2)

4.3 Calculate the estimated mean of the above data (4)

[10]

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GP November 2021

QUESTION 5

A group of learners at Beacon High School carried out a survey of the number of sweets in 25 packets produced by Dotito brands. Their results are shown in the diagram below.

2	4 6 6 7 7
3	0 0 0 0 0 1 1
3	5 5 5 6 6 7 7
4	0 0 1 1 2 4

5.1 Write down the modal number of sweets in a packet (1)

5.2 Determine the following measures of spread:

5.2.1 Median (1)

5.2.2 Lower quartile (1)

5.2.3 Upper quartile (1)

5.3 Calculate the range (2)

5.4 Give the number of packets of sweets, as a percentage, that have sweets above the upper quartile (2)

[8]

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QUESTION 6

The amounts spent by 120 motorists at KG petrol garage on a certain day were recorded as shown in the table below.

Amount spent (in x Rands)	**Number of Motorists**
$0 < x \leq 50$	12
$50 < x \leq 100$	38
$100 < x \leq 150$	42
$150 < x \leq 200$	20
$200 < x \leq 250$	8

6.1 Write down the interval that has the least number of motorists (1)

6.2 Draw a histogram to represent the data (2)

6.3 Identify in which interval the thirtieth (30th) percentile lies (2)

6.4 Calculate the size of the angle that will represent the modal class on a pie chart (2)

[7]

NW November 2024

QUESTION 7

Mr Baloyi conducted a survey on the amount of airtime (in Rands) EACH learner had on his or her cellphone.

12	16	20	22	26	30	32	38	40	46	54	60	68

7.1 Draw a box and whisker diagram to represent the data (3)

7.2 Determine the interquartile range (IQR) (2)

7.3 Calculate the range of the data (2)

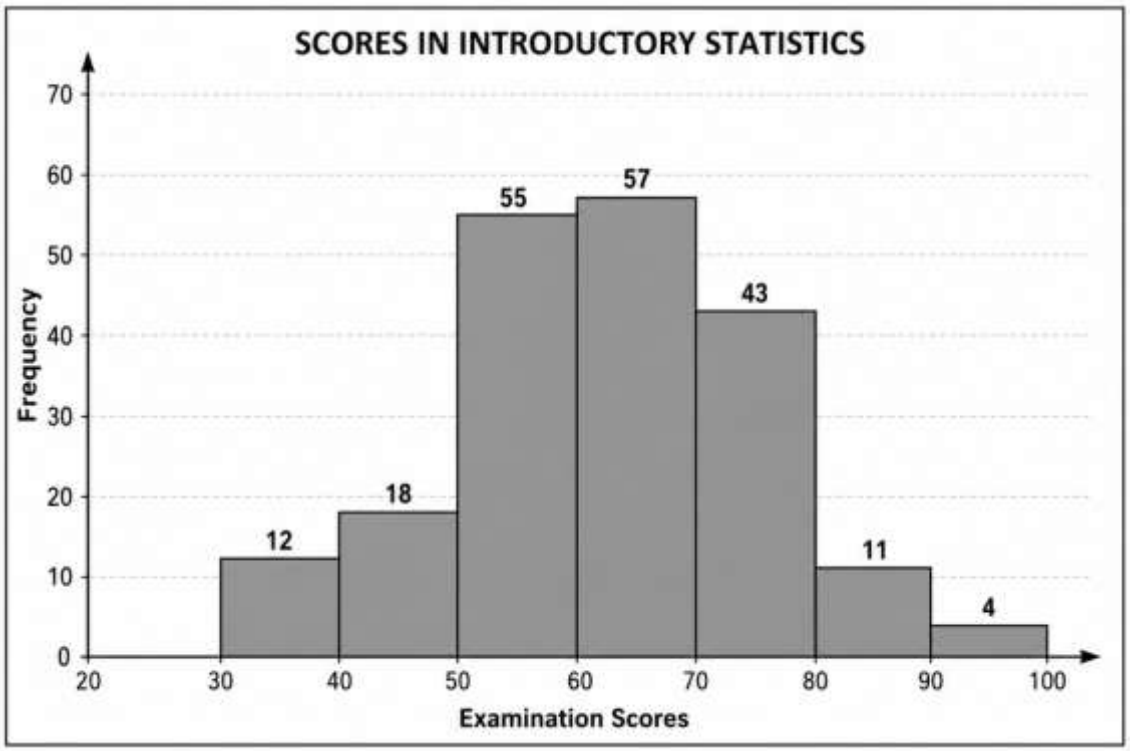
7.4 Comment on the skewness of the data (1)

[8]

QUESTION 8

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The histogram below shows the distribution of examination scores for learners in Mathematics.



8.1 How many learners wrote the examination? (1)

8.2 Identify the modal class of the data. (1)

8.3 Estimate the mean of this data. Show all calculations (4)

8.4 Estimate the median mark obtained by the group (2)

8.5 In which interval does the upper quartile lie? (1)

[9]

KZN November 2023

QUESTION 9

The data below shows the marks for a Mathematics test written out of 50 by 15 learners.

49	37	37	30	16	28	14	43	25	11	34	27	40	23	19

9.1 Calculate the range for the data (1)

9.2 Determine the median mark for the test (1)

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9.3 Calculate the interquartile rage (IQR) (2)

9.4 Draw a box and whisker diagram for the data above (3)

[7]

QUESTION 10

Employees who use company cars were asked to record the number of kilometres they travel to and from work each day. The table below shows the results:

Number of Kilometres	**Number of employees**	**Midpoint**	**midpoint $\times$ frequency**
$5 \leq x < 10$	4		
$10 \leq x < 15$	7		
$15 \leq x < 20$	18		
$20 \leq x < 25$	10		
$25 \leq x < 30$	3		
$30 \leq x < 35$	3		

10.1 How many employees were there? (1)

10.2 Estimate the mean distance travelled (3)

10.3 Write down the modal class (1)

10.4 In which interval does the median distance lie? (1)

10.5 Calculate the percentage of employees who travel at least 25km in a day. (2)

[8]

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KZN November 2025

QUESTION 11

The table below shows the number of public schools from the NINE provinces in South Africa.

Provinces	**Number of public schools**
Eastern Cape	5 468
Free State	1 214
Gauteng	x
KwaZulu Natal	5 895
Limpopo	3 897
Mpumalanga	1 725
Northern Cape	544
North West	1 472
Western Cape	1 450
Total	23 718

11.1 Determine the value of x (1)

11.2 Calculate the mean number of schools in South Africa (2)

11.3 Write down the median province (1)

11.4 Determine the interquartile range (3)

11.5 Due to the population increase in South Africa, 0,68% more schools will be required in the next 15 years. Determine the number of schools needed in the next 15 years (2)

[19]

QUESTION 12

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The following table represents the Grade 10 Mathematics test results at Excel Secondary School.

MARKS	**FREQUENCY**
$20 \leq x < 30$	6
$30 \leq x < 40$	11
$40 \leq x < 50$	9
$50 \leq x < 60$	7
$60 \leq x < 70$	8
$70 \leq x < 80$	13
$80 \leq x < 90$	6

12.1 How many learners wrote the test? (1)

12.2 Calculate the estimated mean (4)

12.3 Calculate the percentage of learners who obtained less than sixty percent. (2)

[7]

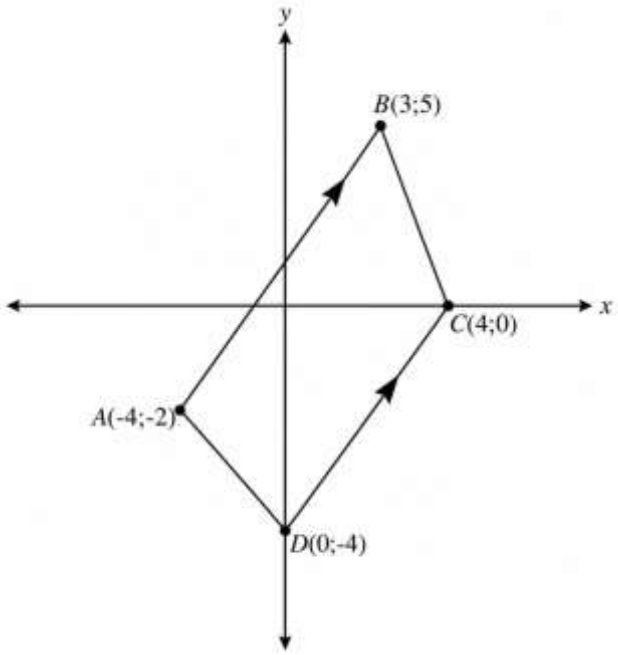
ANALYTICAL GEOMETRY

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LP June 2025 (modified)

QUESTION 1

From the diagram below, $A(-4;-2)$ and $B(3;5)$ are given, determine the following:



Determine the:

1.1 Gradients of lines AB, AD, CD and BC (5)

1.2 Lengths of AB, AD, CD and BC (5)

1.3 The midpoints of AB, AD, CD and BC (5)

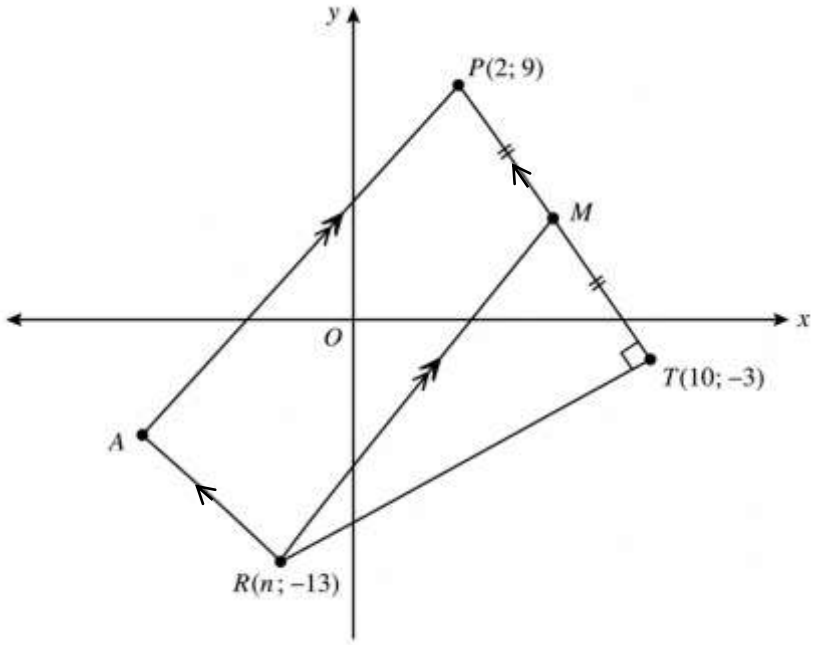
1.4 Equations of AB, AD, CD and BC (8)

GP November 2024

QUESTION 2

In the diagram below, $P(2;9), A, R(n;-13)$ and M are vertices of parallelogram PARM. PMT is a straight line such that M is the midpoint of PT. $T(10;-3)$ is a point such that PT $\perp$ RT.

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2.1 Determine:

2..1.1 The length of PT (leave your answer in surd form) (2)

2.1.2 The gradient of PT (2)

2.1.3 The gradient of AR (1)

2.1.4 The coordinates of M (3)

2.2 Determine the equation of PM in the form $y = mx + c$ (3)

2.3 Show that $n = -5$ (3)

2.5 Calculate the area of ΔRMT (4)

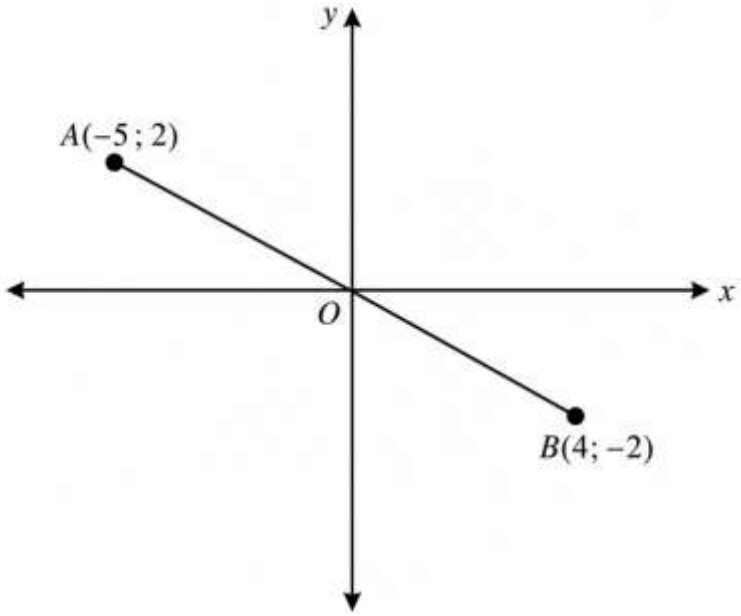
[18]

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GP June 2024

QUESTION 3

In the figure below, $A(-5\,;2)$ and $B(4\,;\,-2)$ are points on a line segment AB.



3.1 Determine the length of AB (3)

3.2 Determine the coordinates of the midpoint of AB (3)

3.3 Determine the gradient of line AB (3)

3.4 Point A undergoes a certain transformation to a point A" such that the gradient of the line A'B becomes undefined. Describe the transformation that maps point A to A' (2)

[11]

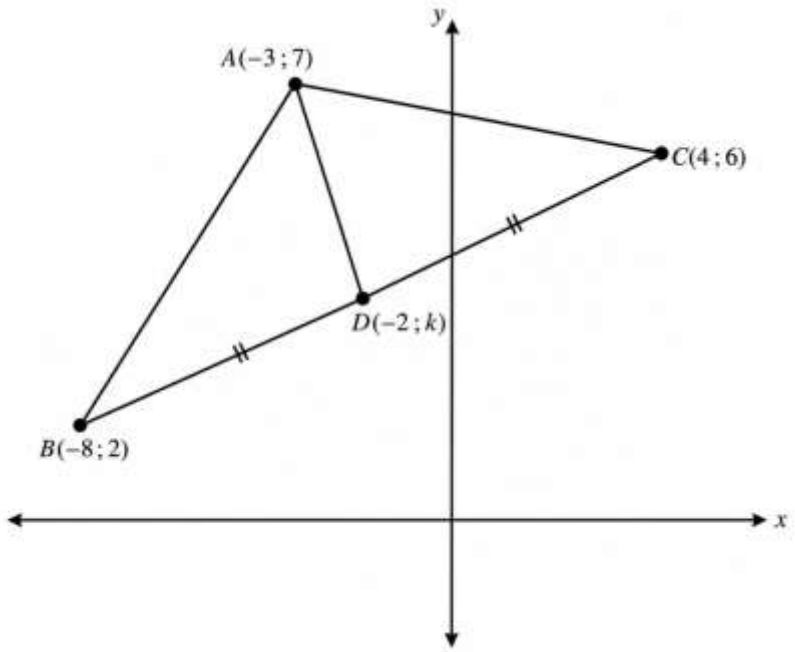
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GP November 2022

QUESTION 4

In the diagram below $A(-3\,;7)$, $B(-8\,;\,2)$ and $C(4\,;6)$ are the vertices of triangle ABC

AD is drawn such that $D(-2\,;k)$ is the midpoint of BC.



4.1 Determine the gradient of BC (2)

4.2 Calculate the length of BC (2)

4.3 Determine the value of k (2)

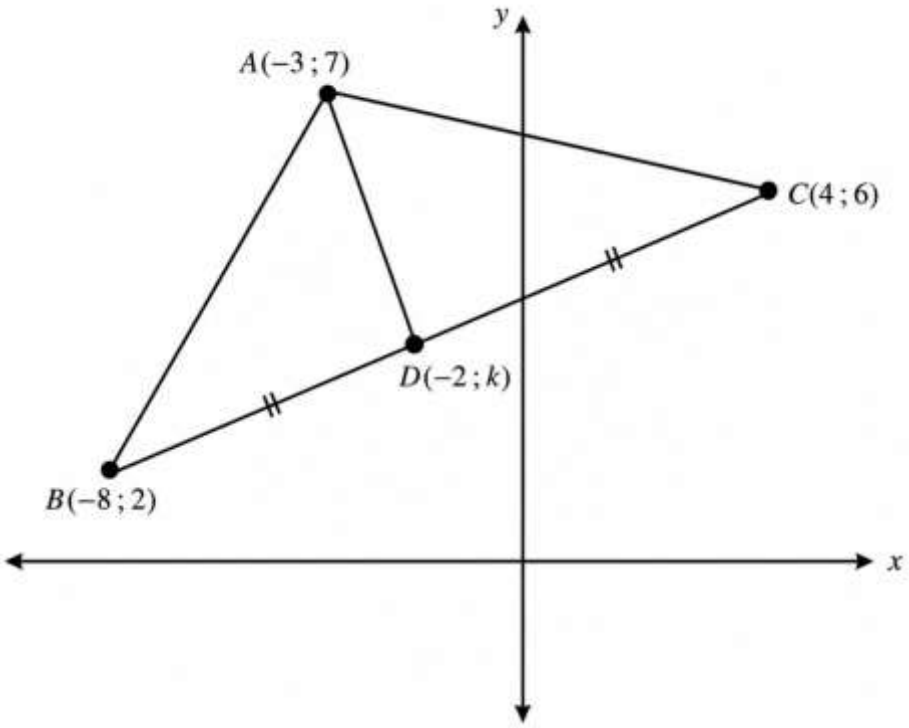
4.4 Is AD ⊥ BC? Show all your calculations. (3)

[9]

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QUESTION 5

In the Cartesian Plane below, points A(5; 5), B(–7; 1) and C(1; –7) are the vertices of a triangle. Point S is the midpoint of BC. The line AS is perpendicular to BC.



5.1 Determine the coordinates of point S (3)

5.2 Determine the gradient of the line AC (2)

5.3 Determine the distance of BC (3)

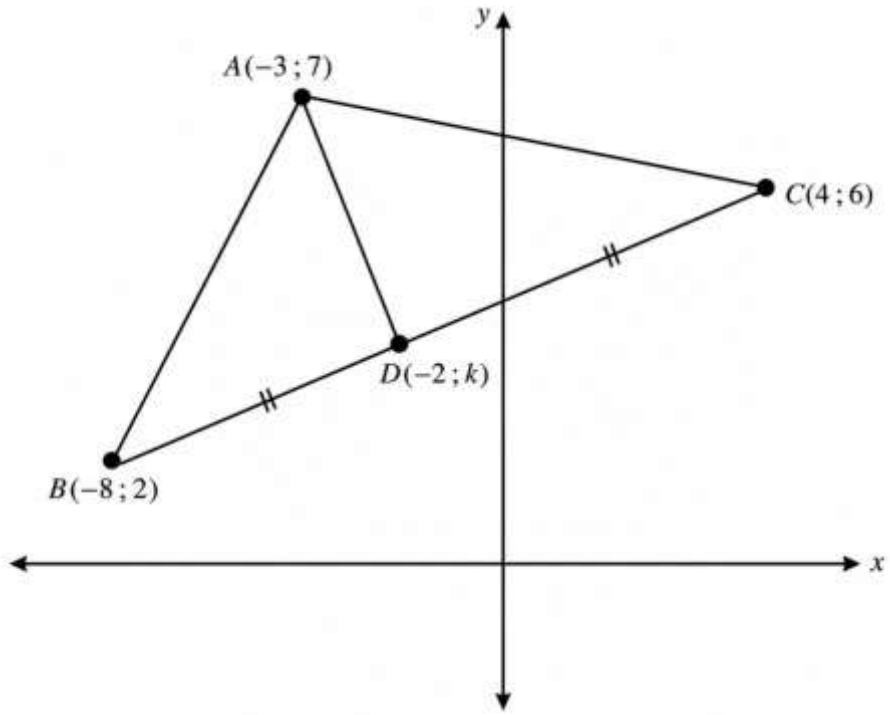
5.4 Determine the area of △ ABC (5)

[13]

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QUESTION 6

In the figure, $\triangle$ ABC has vertices $A(-11\,;2), B(3\,;-5)$ and $C(6\,;1)$.



6.1 Calculate the length of BC. Leave the answer in surd form. (2)

6.2 Write down the coordinates of the midpoint D, of AB. (4)

6.3 Prove $A\hat{B}C = 90$ (5)

6.4 Calculate the area of $\triangle$ ABC (4)

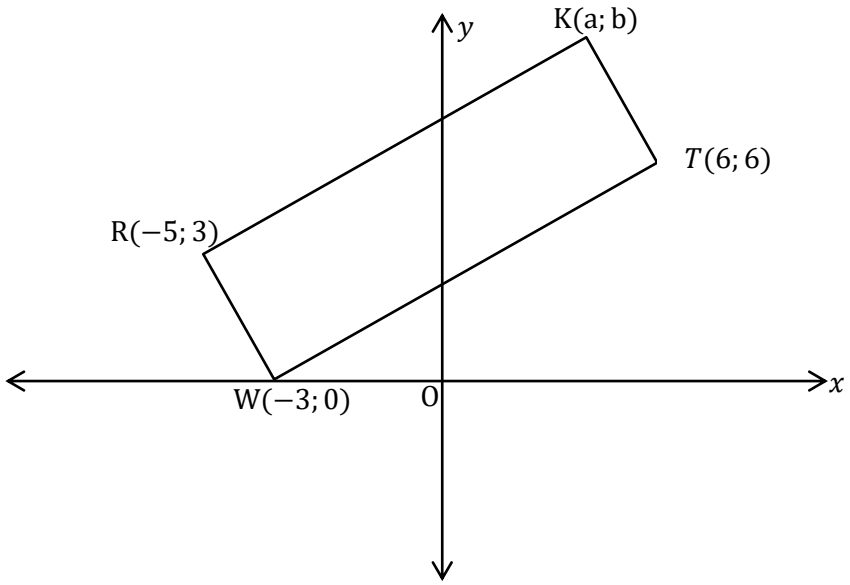
[15]

KZN June 2024

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QUESTION 7

In the diagram $\mathrm{R}(-5;3), \mathrm{W}(-3;0), \mathrm{T}(6;6)$ and $\mathrm{K}(\mathrm{a};\mathrm{b})$ are the vertices of quadrilateral RWTK.



7.1 Determine the coordinates of M the midpoint of line RT (3)

7.2 Calculate the gradient of the line WT (3)

7.3 Prove that RW is perpendicular to WT (3)

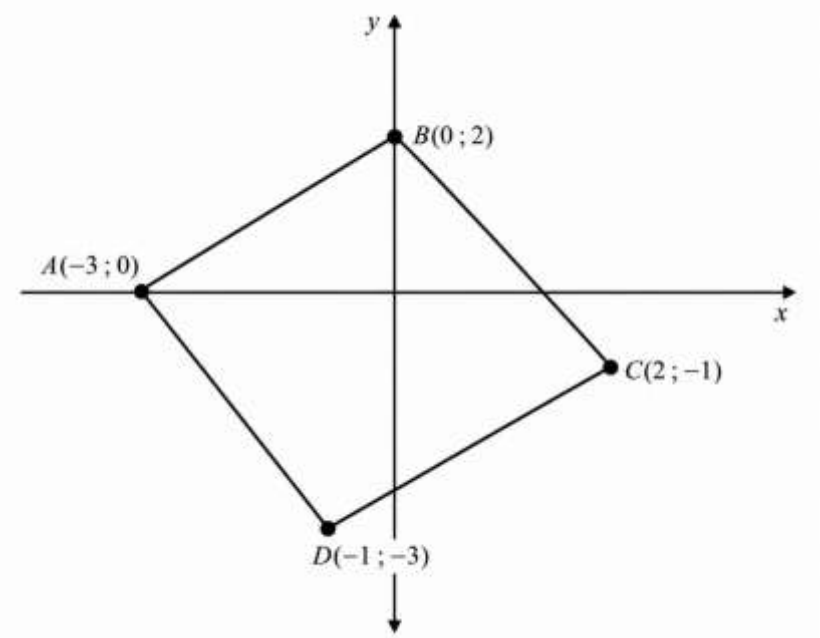
7.4 If RWTK is parallelogram, determine the values of a and b (4)

[13]

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QUESTION 8

In the Cartesian plane below, $A(-3;0), B(0;2), C(2;-1)$ and $D(-1;-3)$ are points on a quadrilateral.



8.1 Determine the coordinates of R, the midpoint of AC. (3)

8.2 Calculate the gradient of the line AB (2)

8.3 Calculate the length of AC (3)

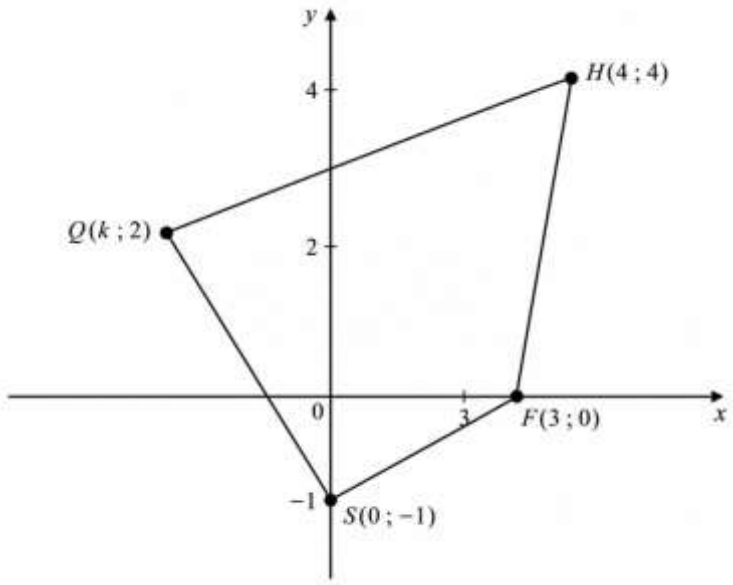
8.4 If ABCD is a rhombus, calculate the area of ABCD (5)

[13]

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QUESTION 9

In the diagram below, trapezium QHFS is drawn, such that QH||SF.



9.1 Determine

9.1.1 The gradient of SF (2)

9.1.2 The equation of QH (3)

9.1.3 Calculate the value of k (2)

9.1.4 The length of HF (2)

9.1.5 The coordinates of M, the midpoint of HS (3)

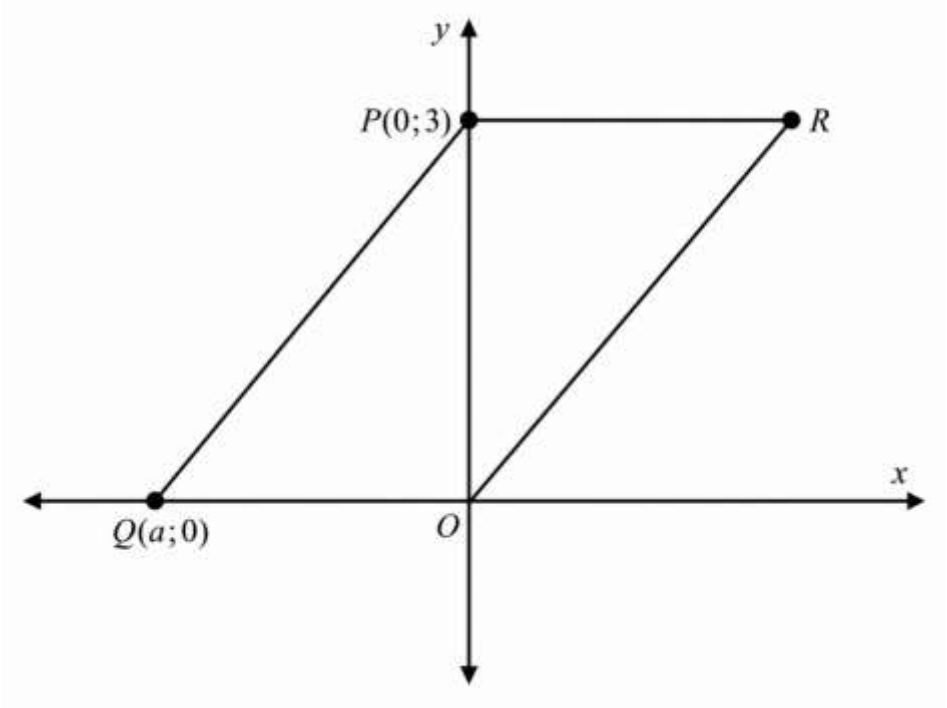
9.2 Line segment AB is perpendicular to the segment CD. A$(-5\,;2)$ and B$(\mathrm{p}\,;-1)$ are points on AB. If the gradient of segment CD is 2, calculate the value of p. (4)

[16]

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QUESTION 10

In the diagram below, OR is drawn parallel to the straight line through $Q(a;3)$ and $P(0;3)$ such that $PR||QO$. The length of $PQ = 5$



10.1 Find the value of a (2)

10.2 Determine the equation of PQ (4)

10.3 Determine the midpoint of OP (2)

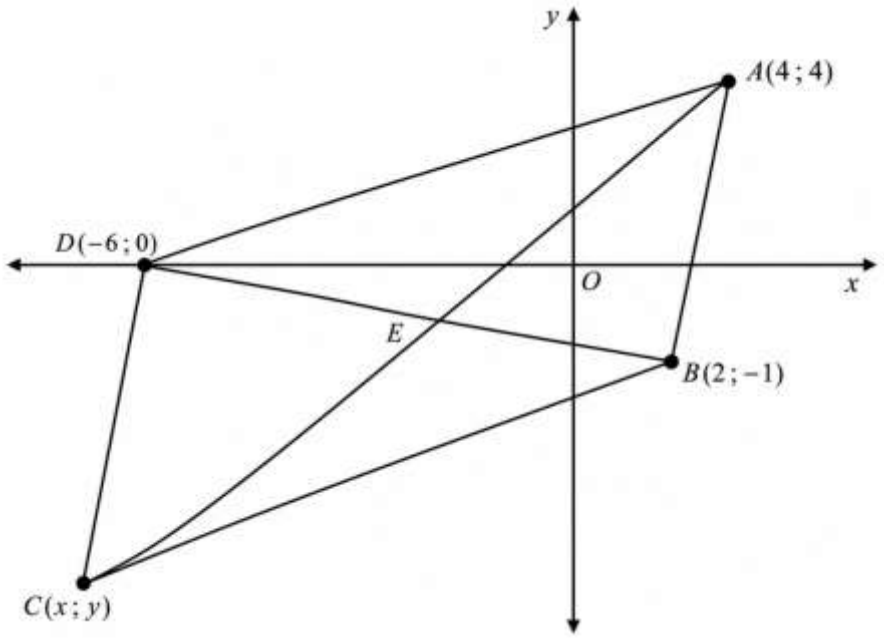
10.4 If $PQ||RO$. Calculate the coordinates of R (2)

[10]

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QUESTION 11

11.1 In the diagram below, $A(4\,;4), B(2\,;-1), C(x\,;y)$ and $D(-6\,;0)$ are four vertices of a quadrilateral ABCD.



11.1.1 Calculate the gradient of AD (2)

11.1.2 Determine the equation of line BC which is parallel to AD (4)

11.1.3 Determine the coordinates of E, the midpoint of line BD. (2)

11.1.4 Given that the quadrilateral ABCD is a parallelogram, calculate the coordinates of point C. (4)

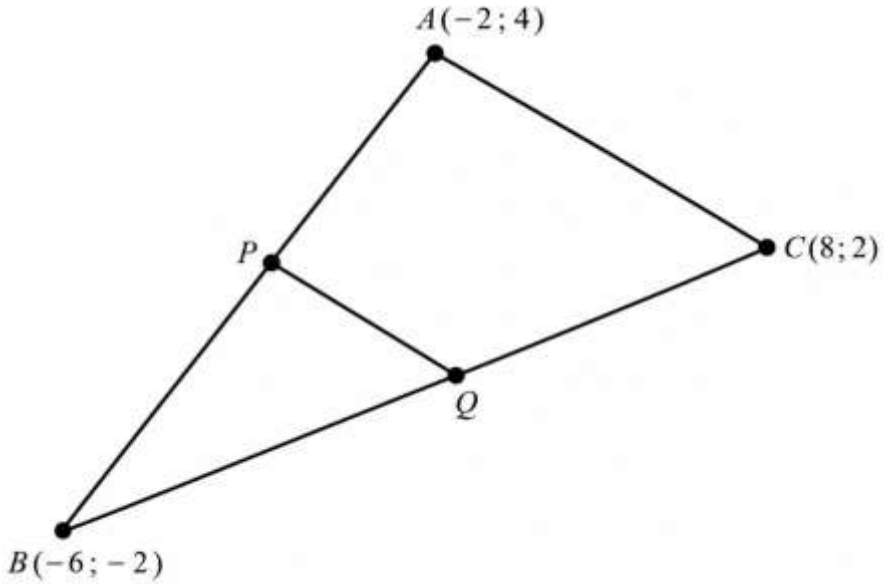
11.2 Given the points $P(-2\,;3), Q(1\,;4), R(-4\,;1)$ and $S(x\,;4)$. Determine the value of x if $PQ \perp RS$. (3)

[15]

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QUESTION 12

In the diagram below, the coordinates of ΔABC are given as A(– 2 ; 4) , B(– 6 ; – 2) and C(8 ; 2). P and Q are the midpoints of AB and BC respectively.



12.1 Calculate the coordinates of P and Q (4)

12.2 Show that:

12.2.1 PQ||AC (4)

12.2.2 $PQ = \frac{1}{2}AC$ (4)

[16]

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TRIGONOMETRY

GP November 2023

QUESTION 1

1.1 Use a calculator to find the values of the following, correct to two decimal places.

1.1.1 $4 \sin 65°$ (1)

1.1.2 $\dfrac{\cos^2(32° - 10°)}{\tan 22°}$ (2)

1.2 Calculate θ where $0° \leq \theta \leq 90°$

$$3 \sin\left(\frac{\theta}{2} - 20°\right) = 0{,}85 \quad (4)$$

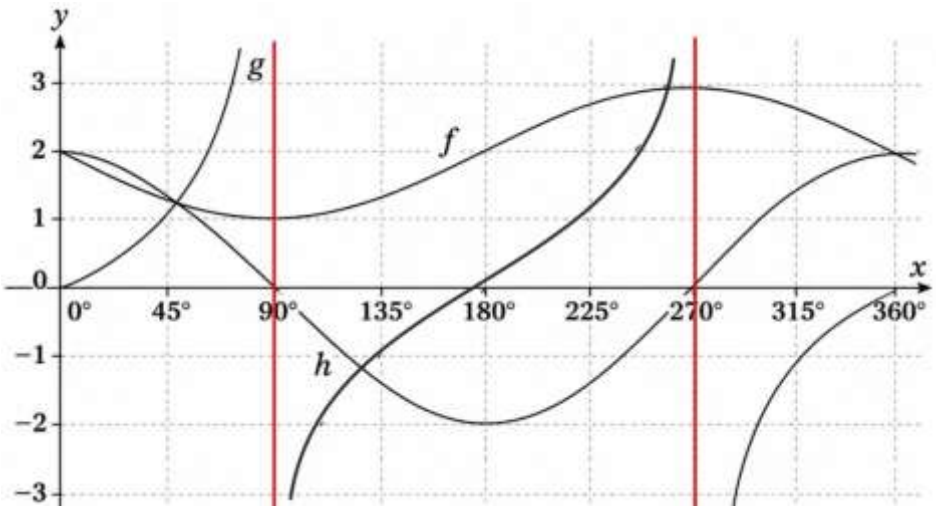
1.3 **Without the use of a calculator**, determine the value of

$$\frac{\cos 45°}{\sin 45°} + 5 \operatorname{cosec} 90° \times 3 \tan^2 30° \quad (4)$$

[11]

QUESTION 2

The graphs of $f(x) = a \sin x + q$, $h(x) = p \cos x$ and $g(x) = \tan x$ for $x \in [0° ; 360°]$ are drawn below.



2.1 Determine the values a, p and q. (3)

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2.2 For which values of x is $h(x) \leq 0$ for $x \in [0\,;360°]$? (2)

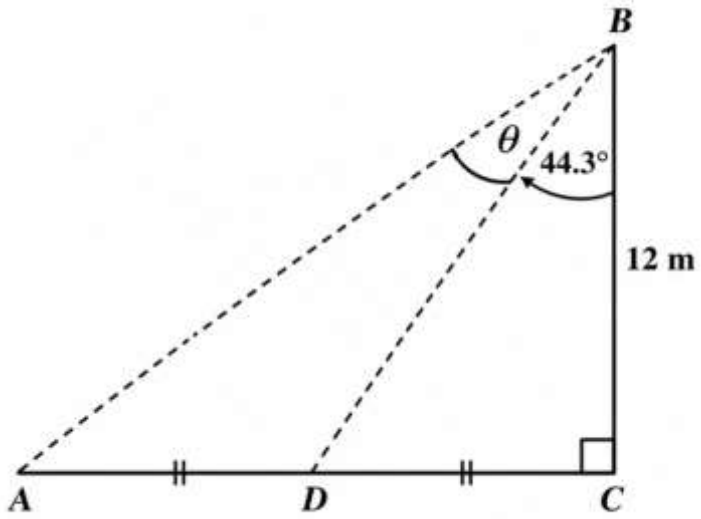
2.3 Determine for which value(s) of x will $f(x) = h(x)$ (3)

2.4 Write down the range of f (2)

[10]

QUESTION 3

The diagram below shows a spotlight at point B, which is mounted 12 m directly above point C at the front of the field. The spotlight swings 44,3° from the vertical to illuminate another point, D, the midpoint of AC.



3.1 Calculate the length of DC (3)

3.2 Calculate through how many degrees the spotlight must swing in order to illuminate point A (i.e calculate θ). (3)

[6]

GP June 2024

QUESTION 4

4.1 If A $= 78°$ and B $= 34°$, calculate the values of the following expressions correct to two decimal places

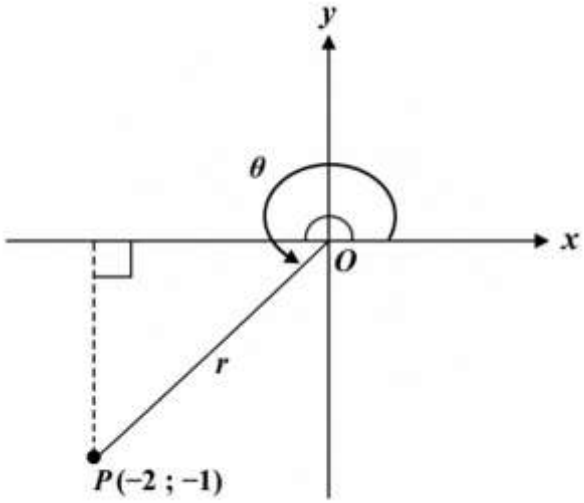
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4.1.1 $\sin A - \sin B$ (2)

4.1.2 $\sqrt[3]{\sec A}$ (2)

4.2 In the diagram below, point $P(-2; -1)$ lies in the third quadrant.

$OP = r$ cm. The axes intersect at O, which represents the origin on the sketch.



Using the sketch and **without using a calculator**, calculate the:

4.2.1 Length of OP. (2)

4.2.2 Value of $\sqrt{5}\cos\theta + 4\,\text{cosec}^2\theta$ (4)

4.3 Evaluate **without using a calculator:**

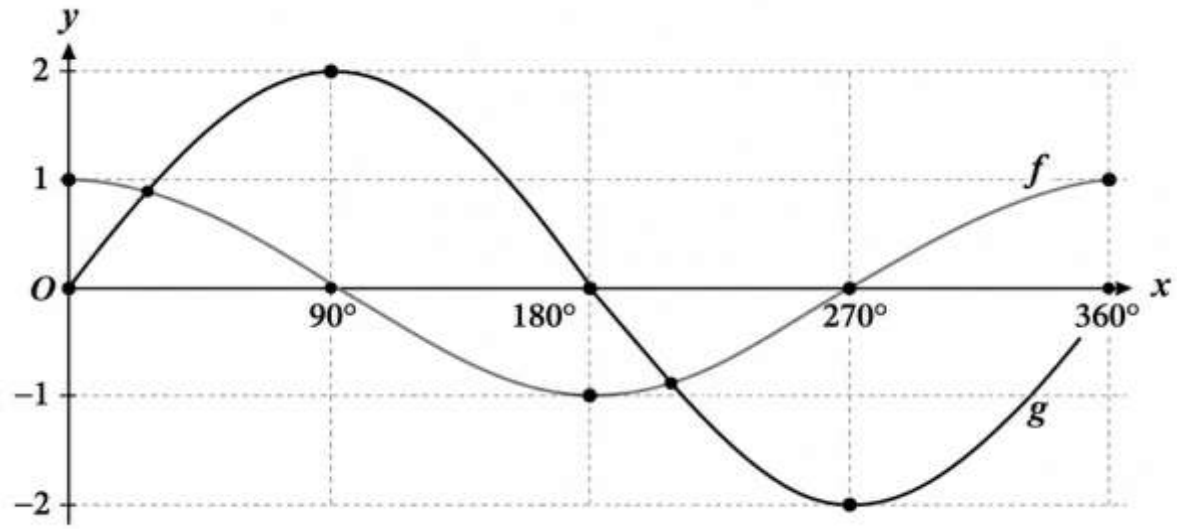
$$\frac{\sin 45°}{\frac{\sqrt{2}}{2}.\tan^2 30°}$$ (3)

[13]

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QUESTION 5

The sketch below shows the graph of $f(x) = \cos x$ and $g(x) = 2\sin x$ for the interval $x \in [0°; 360°]$.



5.1 Write down the period of g (1)

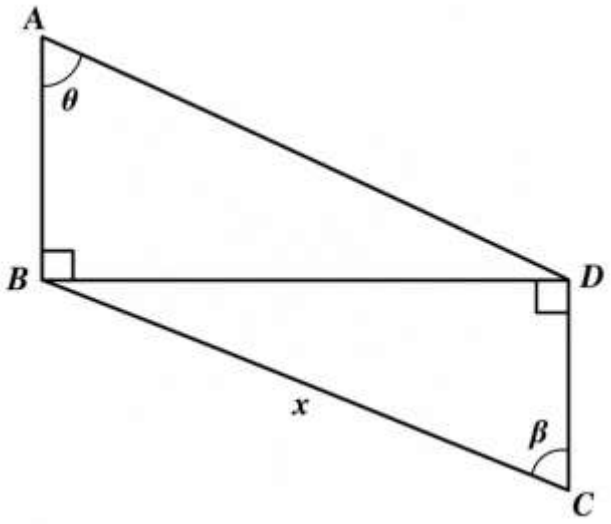
5.2 For which value(s) of x will $f(x) \geq 0$? (2)

5.3 Determine the range of $m(x) = -4f(x) + 1$ (3)

[6]

QUESTION 6

In the diagram below, $\hat{A} = \theta$ and $A\hat{B}D = 90°$. $BC = x\ m$. $\hat{C} = \beta$ and $B\hat{D}C = 90°$.



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6.1 Show that $AB = \frac{x \sin \beta}{\tan \theta}$ (4)

6.2 Hence or otherwise, calculate the length of AB, correct to two decimal places, if $\theta = 52°$, $\beta = 40°$ and $x = 12\ m$. Write your answer to the nearest whole number (2)

[6]

GP November 2022

QUESTION 7

7.1 If $x = 66{,}4°$ and $y = 114{,}7°$, evaluate the following correct to TWO decimal places.

7.1.1 $\cos(x + y)$ (2)

7.1.2 $2 \sin x$ (2)

7.1.3 $\text{cosec}\ x$ (2)

7.2 Determine the value of θ correct to ONE decimal place.

7.2.1 $\sin \theta + 0{,}38 = 1$ (2)

7.2.2 $2 \cot 2\theta = 3$ (3)

7.2.3 $2 \cos(3\theta - 60°) = 1{,}71$ (4)

[15]

QUESTION 8

8.1 Given that $\sin \theta = \frac{4}{5}$ and $\tan \theta < 0$. Determine with the aid of a diagram and WITHOUT using a calculator:

8.1.1 $\tan \theta$ (4)

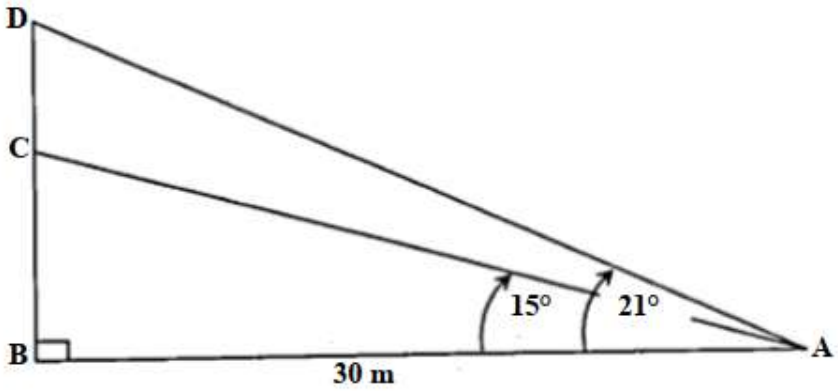
8.1.2 $2 \cos^2 \theta - 1$ (2)

8.2 Simplify the following expression WITHOUT using a calculator

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$$\cos 0° + \sin^2 60° + \sqrt{2}.\sec 45°$$ (4)

8.3 In the diagram below, a person is standing at point A which is 30 m away from point B. Point A and point B are on the same horizontal plane. The angle of elevation of a first storey window at point C from point A is 15°. The angle of elevation of the second storey window at point D from point A is 21°.

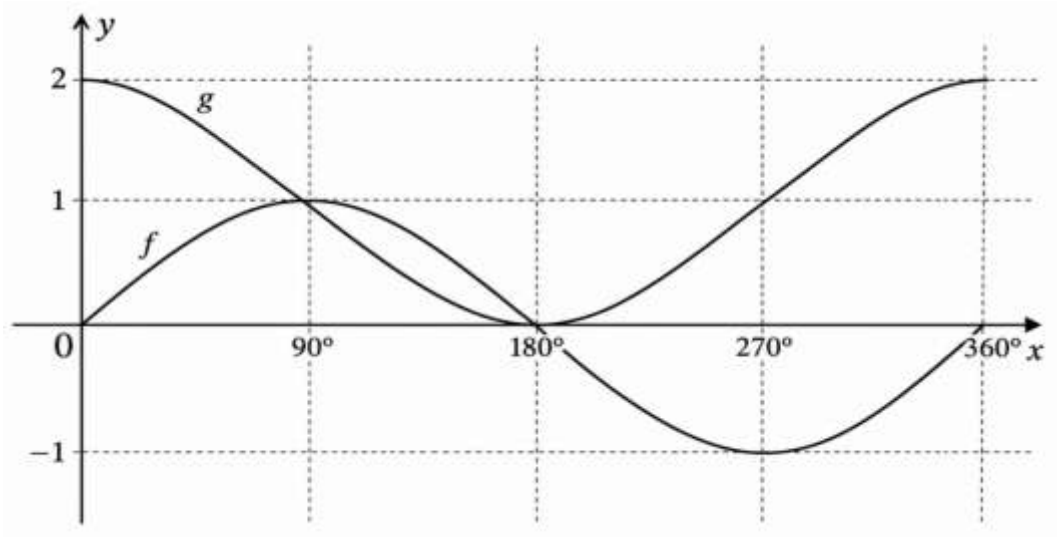


Determine the distance between the two windows. (6)

[16]

QUESTION 9

The graph pf $f(x) = a\sin x$ and $g(x) = \cos x + 1$ for $x \in [0° ; 360°]$.



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9.1 Write down the value of a (1)

9.2 Determine the range of g (2)

9.3 Determine the amplitude of g (1)

9.4 For which value(s) of x will $f(x) \geq g(x)$ (2)

9.5 For which value(s) of x will $g(x) - f(x) = 2$ (3)

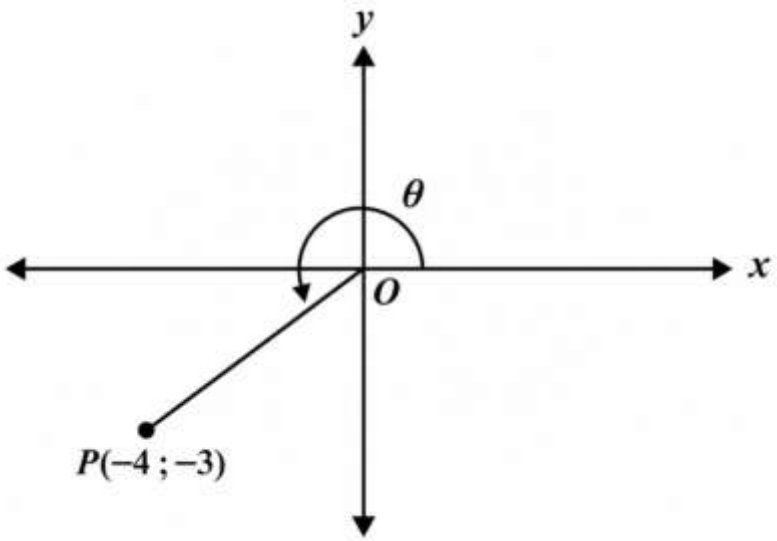
9.6 The graph of f is reflected across the x-axis. Write down the equation of the new graph h (1)

[10]

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QUESTION 10

Study the diagram below and answer the questions that follow, without the use of a calculator.



Determine the value of:

10.1 $\sin\theta$ (3)

10.2 $5\cos(90° - \theta) + 3\cot\theta$ (3)

[6]

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QUESTION 11

Determine the acute angle β to 2 decimals:

11.1 $\sin(\beta - 17{,}8°) = 0{,}215$ (2)

11.2 $\tan 3\beta = \sqrt{3}$ (2)

11.3 $3\sin\frac{\beta}{2} = 2{,}012$ (3)

[7]

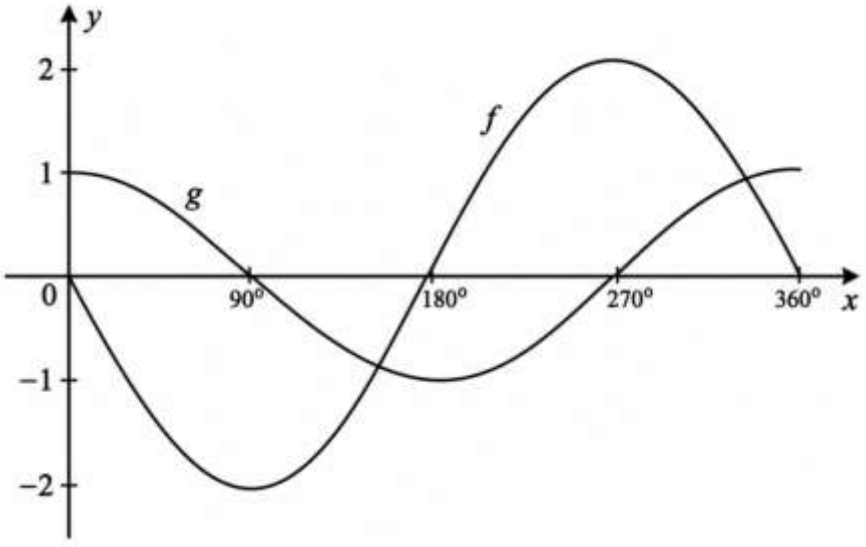
QUESTION 12

Determine the value of θ if $\theta \in [0° ; 90°]$, without the use of a calculator.

$$\frac{\tan 30° \,.\, \text{cosec}\, 60°}{\cos 45° \,.\, \sin 45°}$$ **[4]**

QUESTION 13

The diagram below represents the graphs of $f(x) = a\sin x$ and $g(x) = b\cos x$ for $\in [0°; 360°]$.



13.1 Write down the values of a and b (2)

13.2 For which value(s) of x will g be a decreasing function? (2)

13.3 What is the amplitude of ? (1)

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13.4 What is the range of g? (2_

13.5 For which value(s) of x is $f(x) - g(x) = 2$? (1)

[8]

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QUESTION 14

14.1 Given $\sqrt{3}\,\text{cosec}\,\theta + 2 = 0$ and $90° < \theta < 270°$. Use a sketch to determine the value of the following **WITHOUT USING A CALCULATOR.**

14.1.1 $\cos\theta$ (4)

14.1.2 $\dfrac{\sin\theta\cos\theta}{\cos\theta}$ (4)

14.2 If $\theta = 25°$ and $\alpha = 38°$, determine the value of $\cos(2\alpha - \theta)$ correct to 1 decimal place. (3)

14.3 Simplify the following expression WITHOUT using a calculator.

$$\text{cosec}^2 60° + \tan^2 45° + \sec 60°$$ (6)

14.4 Solve for θ correct to TWO decimal places, if

$2\tan(\theta - 45°) = 1$ and $0° \leq \theta \leq 90°$ (3)

[20]

QUESTION 15

Given $f(x) = 3\sin x$ and $g(x) = 2\cos x + 1$

15.1 Sketch the graphs of f and g for $0° \leq \theta \leq 360°$ (6)

15.2 Write down the following:

15.2.1 Amplitude of g (1)

15.2.2 Period of f (1)

15.3 For which value(s) of x is:

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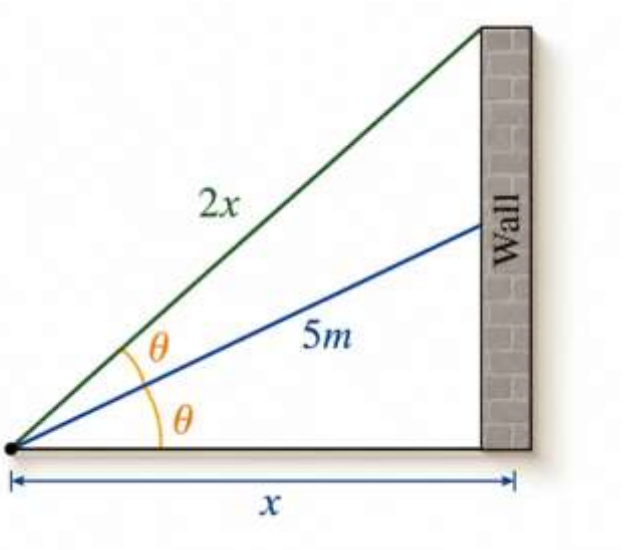
15.3.1 $g(x) - f(x) = 4$ (2)

15.3.2 $f(x).g(x) \geq 0$ (3)

[13]

QUESTION 16

A handyman attempts to reach the roof of a hall with a ladder 5 metres in length. Unfortunately, the ladder is too short, and a new ladder will be required. Suppose that the length of the ladder needed to reach the top has to be double the distance from the foot of the ladder to the wall. Also, the angle between his current ladder and the ground will need to be equal to the angle between the two ladders.



16.1 Calculate the value of θ (4)

16.2 Hence, or otherwise, determine what length the ladder should be to get the handyman to the roof (4)

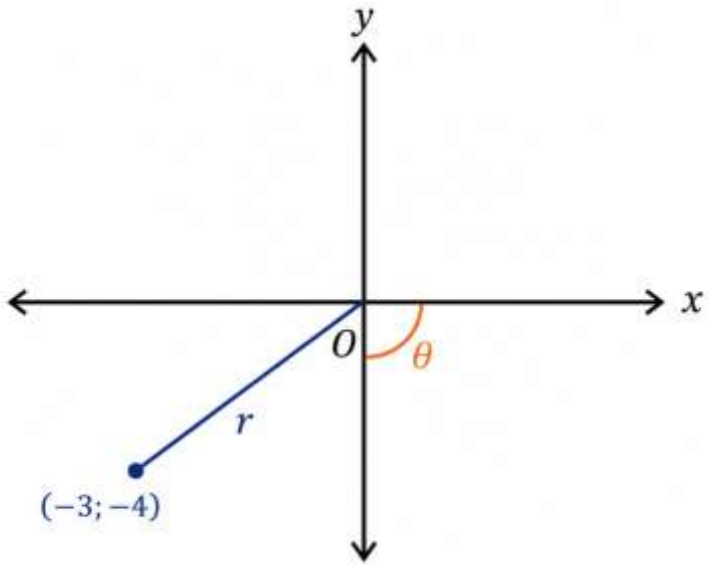
[8]

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QUESTION 17

Use the diagram below with point $A(-3\ ;\ -4)$ to answer the following questions:



17.1 Determine the value of r (2)

17.2 Calculate the value of $\cos\theta$ and $\tan\theta$ (2)

17.3 Prove that $\cos\theta\,.\tan\theta\,.\sec\theta = \frac{4}{3}$ (2)

[6]

QUESTION 18

18.1 Determine the values of the following using a calculator:

$$\frac{3\cos 120\,^\circ}{\sin 150\,^\circ - \cos 80^\circ}$$ (2)

18.2 Determine the value of each of the following equations, correct to two decimals places:

18.2.1 $4\sin\theta = 2{,}1$ (2)

18.2.2 $\cos(\theta + 15^\circ) = 0{,}845$ (2)

18.3 Without the use of a calculator, determine the value of:

$$\sin 0\,^\circ + \cos^2 60\,^\circ + \sqrt{2}\cos 45\,^\circ$$ (4)

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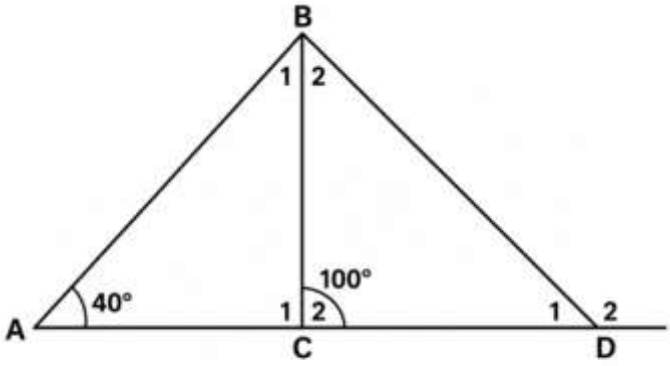
18.4 Find the value of x without the use of a calculator:

$$x\cot 60° = \frac{\sin 50°.\sin 30°\text{cosec } 50°}{\cot 45°} \quad (5)$$

[15]

QUESTION 19

19.1 In the diagram below, $\hat{A} = 40°; \hat{C}_2 = 100°$ and BC = CD.



Determine, with reasons the sizes of the following angles:

19.1.1 $\hat{B}_1$ (2)

19.1.2 $\hat{B}_2$ (3)

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QUESTION 20

20.1 If $x = 67{,}7°$ and $y = 52{,}3°$. Calculate the following correct to TWO decimal places.

20.1.1 $\frac{\sin x}{2}$ (2)

20.1.2 $\cos 3y$ (2)

20.1.3 $\text{cosec}\left(\frac{x-y}{2}\right)$ (2)

20.2 Solve for θ in the following equations correct to ONE decimal place:

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20.2.1 $3 + \cos 4\theta = 3{,}706$ (3)

20.2.2 $4\tan\theta = 7 - 4\tan\theta$ (3)

20.3 In which quadrant does the terminal arm of the angle θ lie if:

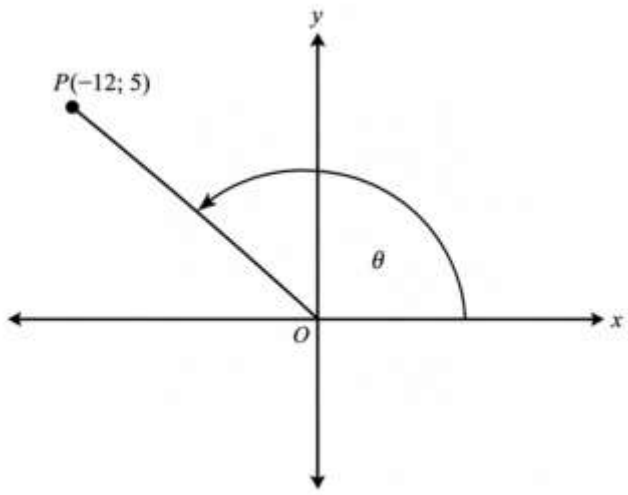
20.3.1 $\sin\theta < 0$ and $\cos\theta < 0$ (1)

20.3.2 $\tan\theta < 0$ and $\cos\theta > 0$ (1)

[14]

QUESTION 21

21.1 In the diagram below, $P(-12; 5)$ is a point in the Cartesian plane such that $X\hat{O}P = \theta$.



21.1.1 Calculate the length of OP (2)

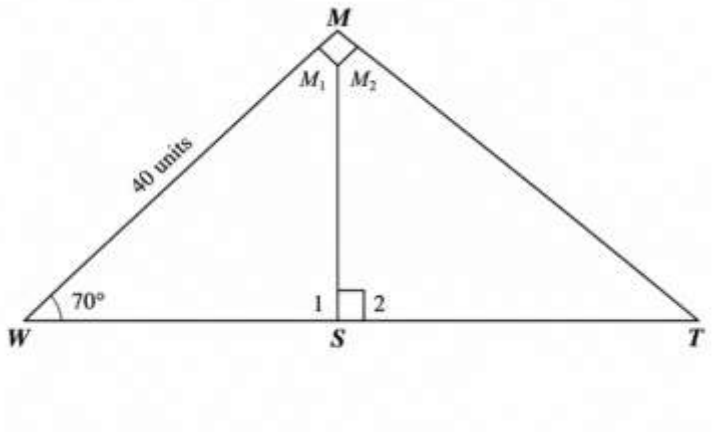
21.1.2 Hence, WITHOUT the use of a calculator, determine the value of:

a) $\tan\theta$ (1)

b) $(\sin\theta + \cos\theta)^2$ (3)

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21.2 In the diagram, $W\widehat{M}T = 90°$, MS ⊥ WT, $\widehat{W} = 70°$ and MW = 40 units.



21.2.2 Determine the length of WS. (3)

21.2.3 Hence, or otherwise determine the length of ST (5)

[14]

QUESTION 22

Given: $g(x) = \cos x + 1$ and $f(x) = 2\sin x$ for $x \in [0°; 360°]$.

22.1 Sketch the graphs of f and g on the same set of axes for $x \in [0° ; 360°]$ (4)

22.2 Write down the period of f (1)

22.3 Determine the range of g (2)

22.4 For which value of x will $\frac{g(x)-f(x)}{3} = 1$? (2)

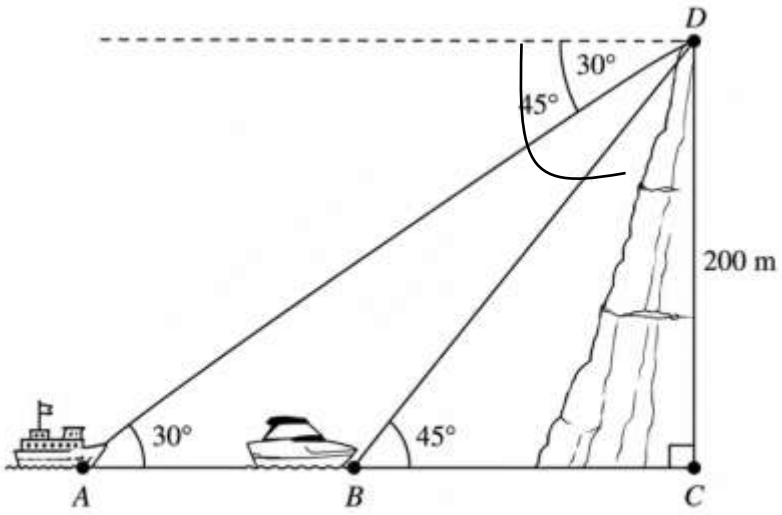
[9]

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QUESTION 23

An observer on the top of a cliff, 200m above the sea level, observes the angles of depression of the two ships to be 45° for ship A, and 30° for ship B, as shown below.



23.1 Determine the size of $B\hat{D}C$ (2)

23.2 Calculate the length of BC (2)

23.3 Determine the distance between Ship A and Ship B (4)

[8]

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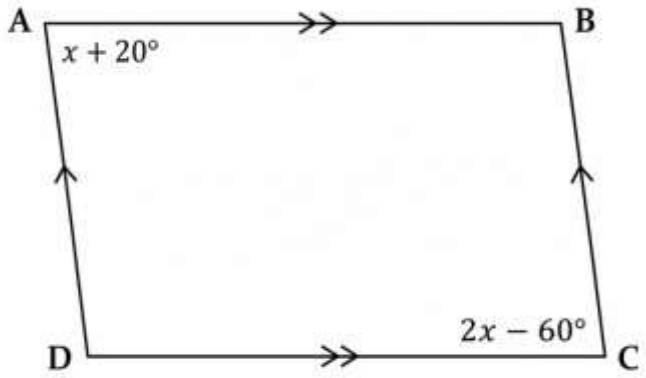
EUCLIDEAN GEOMETRY

LP JUNE 2025

QUESTION 1

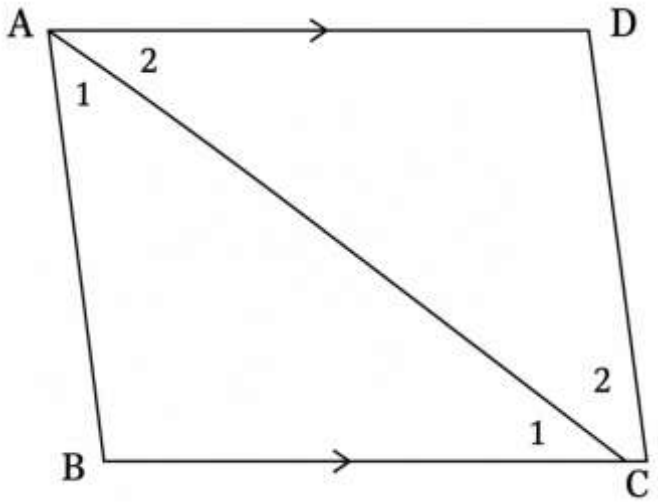
1.1 Give two properties of a rhombus (2)

1.2 The diagram below shows a parallelogram ABCD, with AB||CD and AD||BC. $\hat{A} = x + 20°$ and $\hat{C} = 2x - 60°$.



Determine the value of $\hat{C}$ (3)

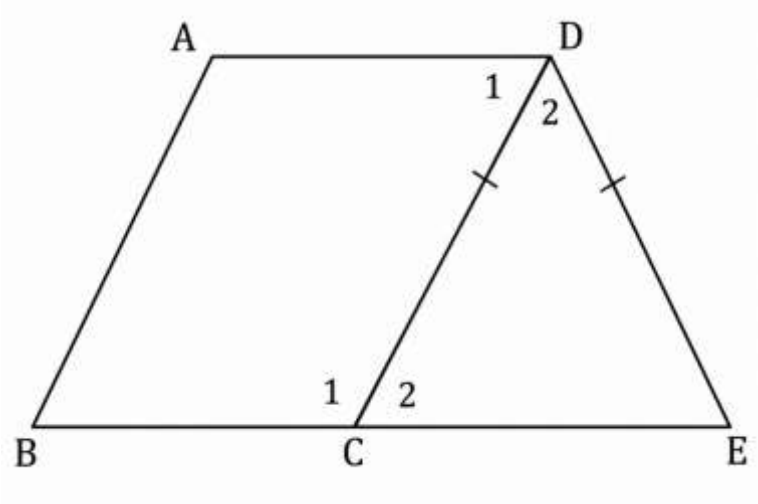
1.3 In quadrilateral ABCD, AD||BC and $\hat{B} = \hat{D}$. Prove that ABCD is a parallelogram.



(5)

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1.4 If quadrilateral ABCD is a parallelogram, AD||BC and AB||CD, $\widehat{A} = 100°$ and $CD = DE$.

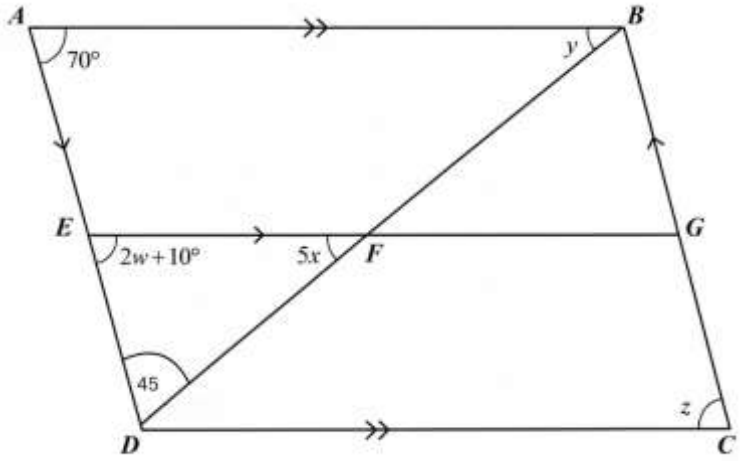


If $\widehat{D}_2 = 2x$, calculate the value of x (4)

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QUESTION 2

2.1 In the diagram below, ABCD is a parallelogram with AB||EG||DC.

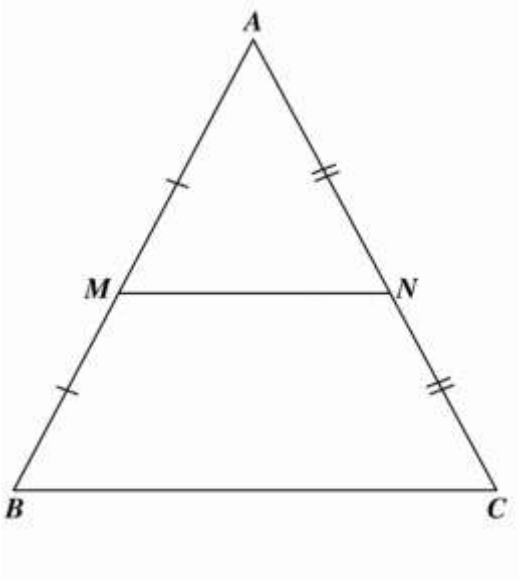


2.1.1 Determine the values of w and x (4)

2.1.2 Calculate the values of y and z (4)

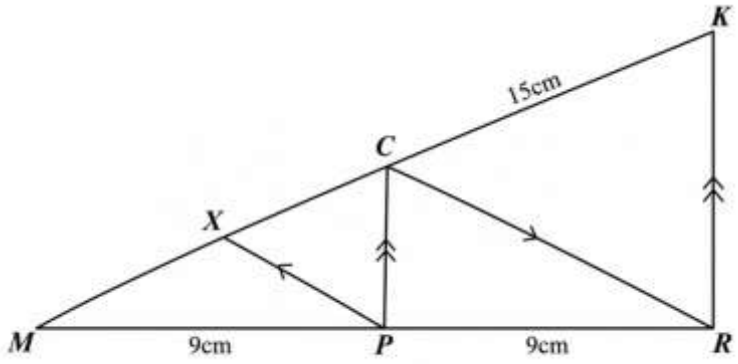
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2.2 Given ΔABC, where $AM = MB$ and $AN = NC$.



Prove the theorem which states that $MN = \frac{1}{2}BC$ (5)

2.3 In the diagram below $KR||CP$, $PX||RC$, $MP = PR = 9cm$ and $CK = 15cm$.



2.3.1 Prove that $MX = \frac{15}{2}cm$ (3)

2.3.2 Calculate KR if $KR = \frac{16}{5}MX$ (2)

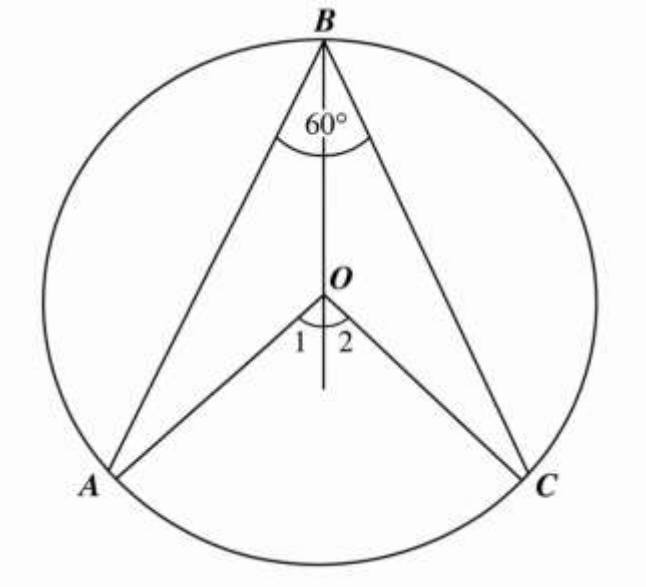
2.3.3 Hence, prove that $M\hat{R}K = 90°$ (2)

[20]

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QUESTION 3

In the diagram below, OB bisects $A\hat{B}C$. O is the centre of the circle and $A\hat{B}C = 60°$.



3.1 Determine the size of $A\hat{B}O$ (1)

3.2 Calculate the size of $\hat{O}_1$ (3)

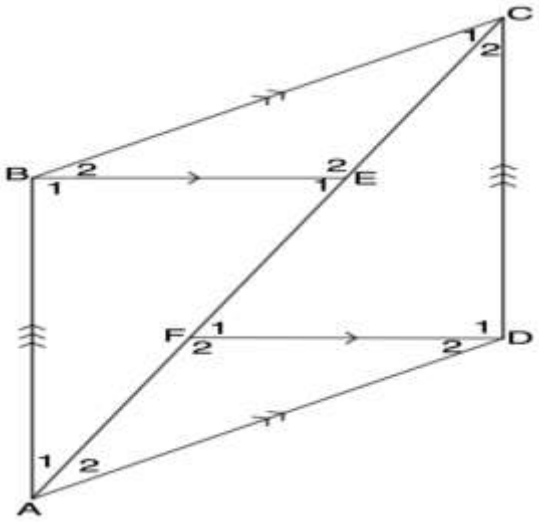
3.3 Hence, prove that $\Delta OAB \equiv \Delta OCB$ (3)

[7]

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QUESTION 4

ABCD is a parallelogram and AC is a diagonal, with A, F, E and C as collinear points.



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Prove that:

4.1 $\Delta ABE \equiv \Delta CDF$ (4)

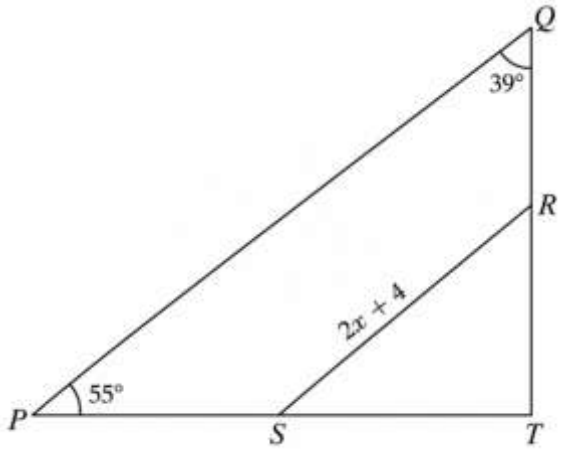
4.2 $C\hat{E}B \equiv A\hat{F}D$ (3)

4.3 $AF = CE$ (3)

[10]

QUESTION 5

In the diagram below, R is the midpoint of QT and S is the midpoint of PT; The length of SR is $2x + 4$. $\hat{Q} = 39°$ and $\hat{P} = 55°$.



5.1 Determine the length of PQ in terms of x (2)

5.2 If the length of PQ is 18, determine the value of x (3)

5.3 Prove that $\Delta TRS \,|||\, \Delta TQP$ (5)

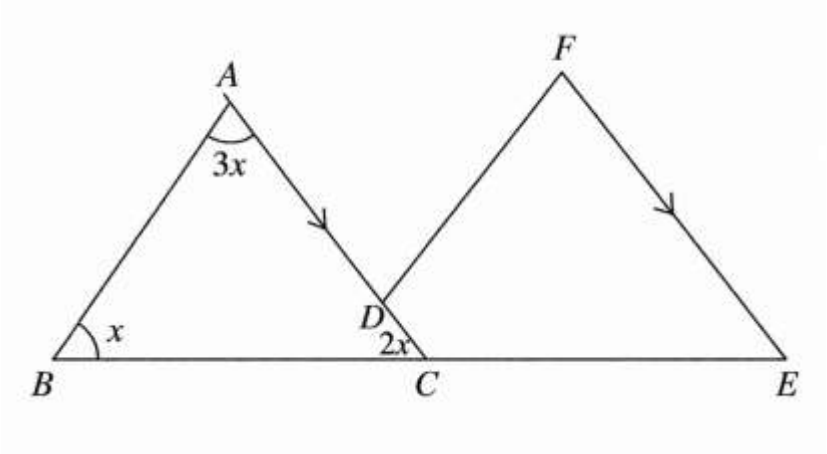
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QUESTION 6

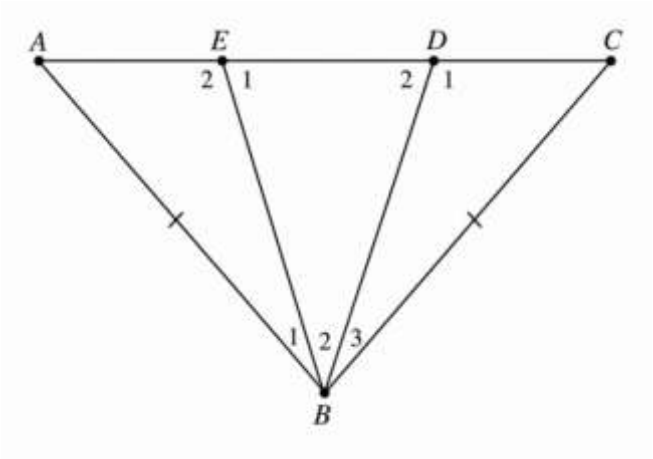
In the diagram below, a polygon ABEFD is drawn. AD is produced to a point, C, that lies on BC. AC||FE. Given $\hat{A} = 3x$, $\hat{B} = x$ and $A\hat{C}B = 2x$



8.1.1 Determine, with reasons, the numerical value of x (2)

8.1.2 What type of triangle is ΔABC? Give a reason for your answer (2)

8.2 In the diagram below ΔABC is drawn. AB = BC and $\hat{B}_1 = \hat{B}_3$.



Prove that $\hat{E}_1 = \hat{D}_2$ (5)

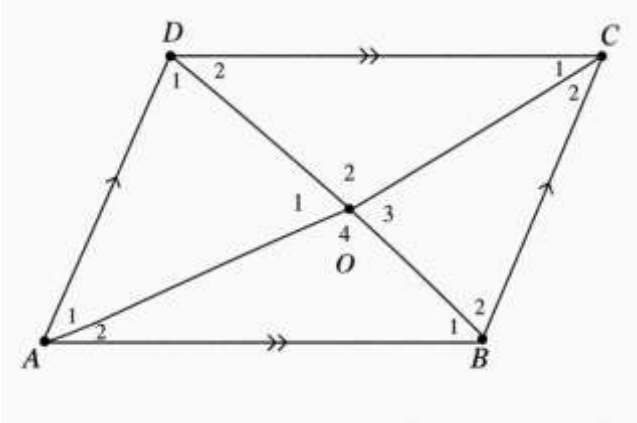
[9]

QUESTION 9

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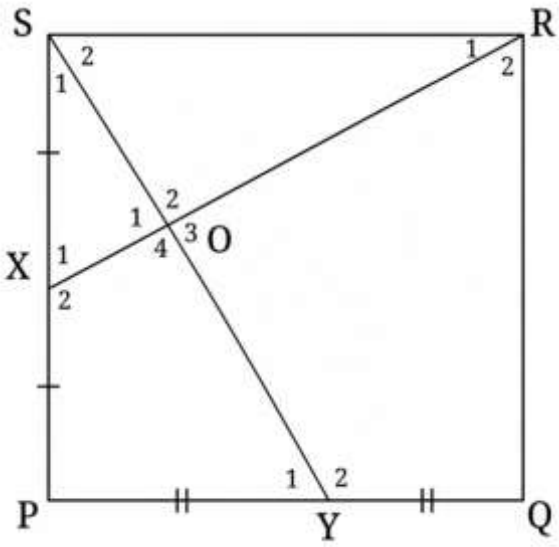
9.1 In the diagram below, a parallelogram ABCD is drawn such that AD || BC and DC || AB. AC and DB intersect at point O.

Prove that $DO = OB$ and $AO = OC$



(6)

9.2 PQRS is a square. X is a midpoint of SP, and Y is the midpoint of PQ.



9.2.1 Prove that $\Delta SPY \equiv \Delta RSX$ (6)

9.2.2 Given that $\hat{R}_1 = x$. Identify, with reasons, another angle equal to x (2)

9.2.3 Prove that SY $\perp$ RX (5)

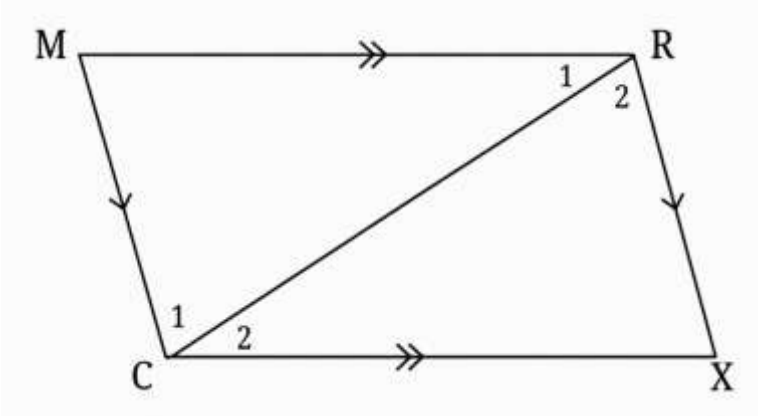
[19]

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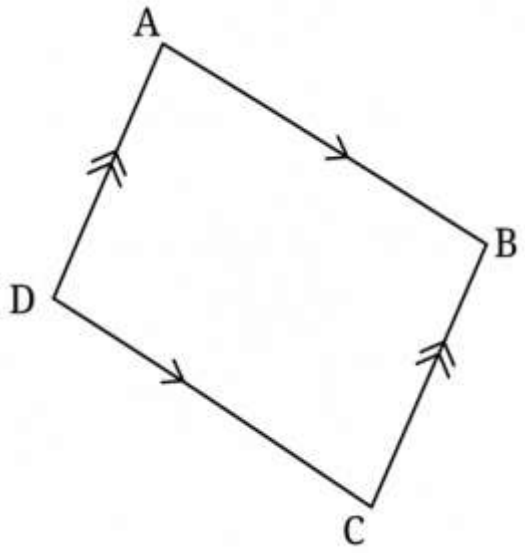
QUESTION 10

10.1 Use the diagram below to prove that the opposite sides of a parallelogram are equal



(4)

10.2 In the diagram below ABCD is a parallelogram with $\hat{A} = 5x + 5°$ and $\hat{C} = 8x - 16°$



10.2.1 Calculate the value of x (3)

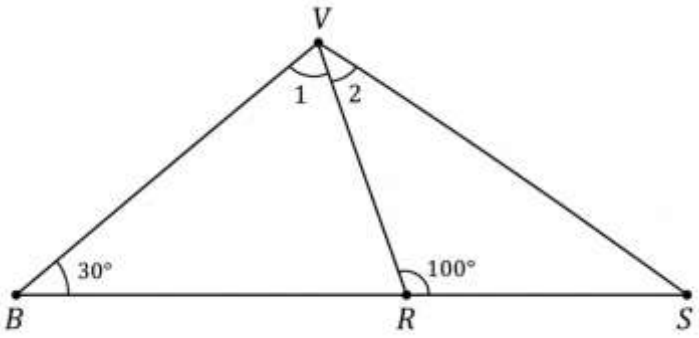
10.2.2 Determine the size of $\hat{B}$ (4)

[11]

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QUESTION 11

11.1 In the diagram, $\hat{B} = 30°$ and $V\hat{R}S = 100°$

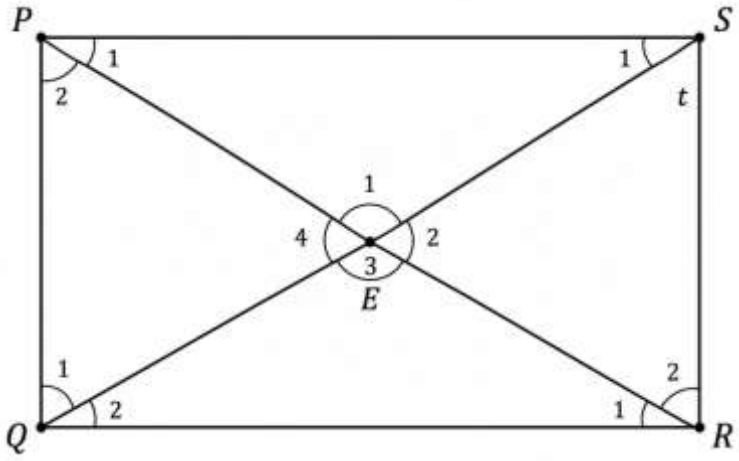


Determine, with reasons the size of the following angles:

11.1.1 $\hat{V}_1$ (2)

11.1.2 $\hat{S}_1$, if VR = RS (2)

11.2 In the diagram below PQRS is a rectangle with E being the point of intersection of the diagonals. $Q\hat{S}R = t$



Calculate the size of $\hat{E}_4$ in terms of t (4)

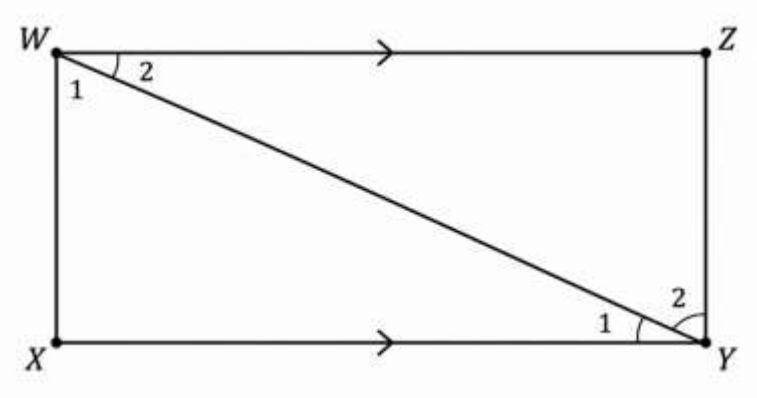
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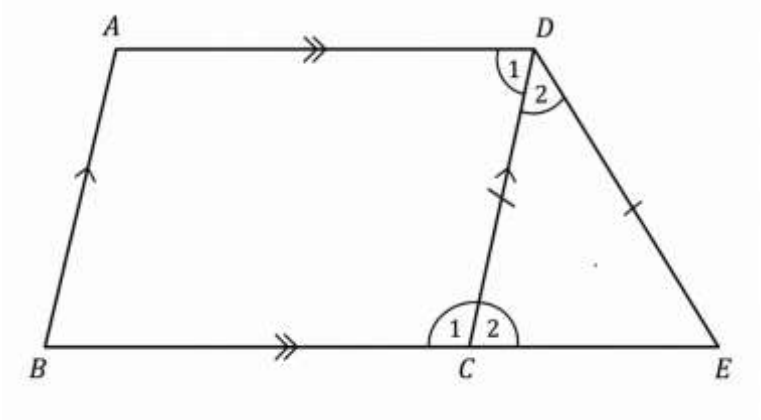
QUESTION 12

12.1 In quadrilateral WXYZ, WZ||XY and $\hat{X} = \hat{Z}$



Prove that WXYZ is a parallelogram (5)

12.2 In the sketch below, ABCD is a parallelogram. DC = DE and $\hat{A} = 120°$



12.2.1 Calculate the size of:

a) $\hat{B}$ (2)

b) $\hat{C}_2$ (2)

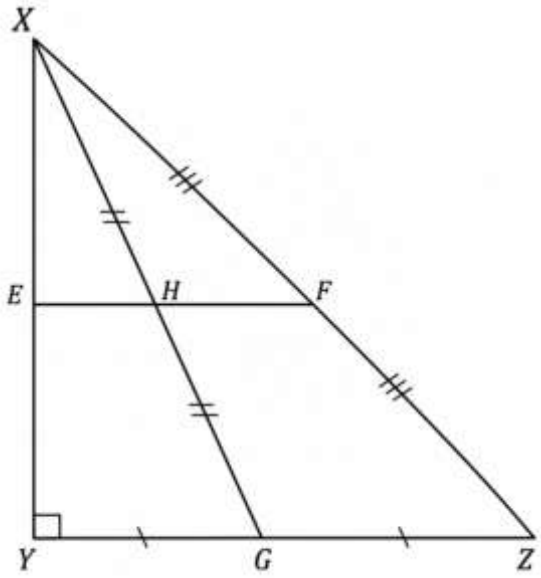
12.2.2 If $\hat{D}_2 = 4x$. Calculate the value of x (4)

[13]

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QUESTION 13

ΔXYZ is right angled at Y. F and G are the midpoints of XZ and YZ respectively. H is the midpoint of XG. E lies on XY such that FHE is a straight line



13.1 Prove that E is the midpoint XY (3)

13.2 If EH $= 3{,}5cm$ and the area of ΔHEX $= 9{,}5\text{cm}^2$. Calculate the length of XY (4)

13.3 Hence, calculate the area of ΔXYZ (3)

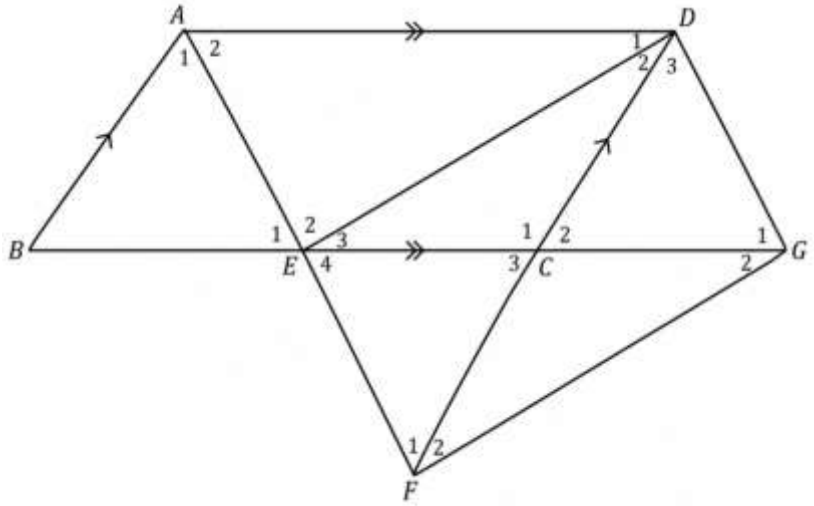
[10]

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QUESTION 14

In the diagram below, AB||DF, AB = EC and AE bisect $\hat{BAD}$



14.1 Prove that ΔDCE is an isosceles triangle (3)

14.2 If $\hat{A}_1 = x$, determine with reasons:

14.2.1 Four other angles equal to x (8)

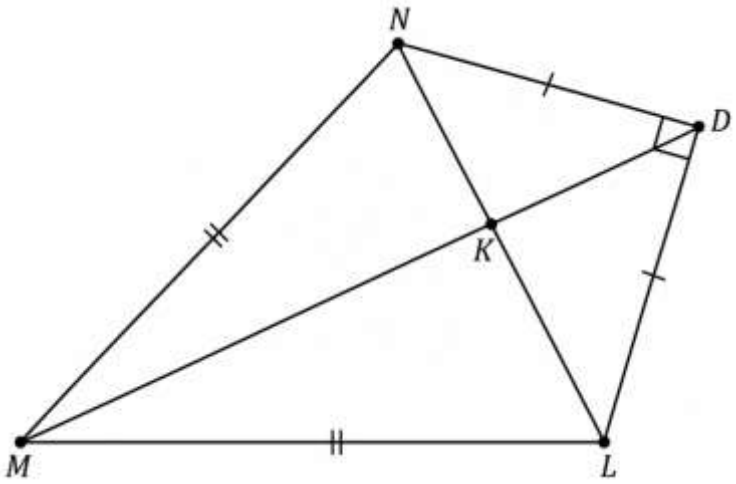
14.2.2 $\hat{B}$ in terms if x (2)

[13]

QUESTION 15

In the diagram below, LMND is a kite with DM = $45\sqrt{2}$ units, $L\hat{D}N = 90°$ and

DN = 30units. The diagonals meek at K.



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15.1 Determine the size of $N\hat{D}K$ (2)

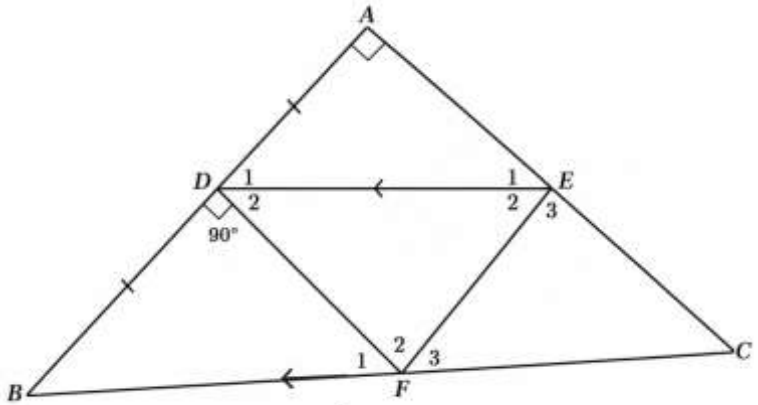
15.2 Show that $NK = \frac{30}{\sqrt{2}}$ (2)

15.3 Show that $NM = 15\sqrt{10}$ (3)

[7]

QUESTION 16

In the diagram below, ΔABC is a right angled at $\hat{A}$. D is the midpoint AB; $DE||BC$ and $FD \perp AB$



Prove that:

16.1 $AE = EC$ (3)

16.2 $DF||AC$ (2)

16.3 $BF = FC$ (2)

16.4 If $\hat{E}_1 = 30°$ and $AB||EF$. Determine what type of quadrilateral will ADFE be.

(Show all your working) (4)

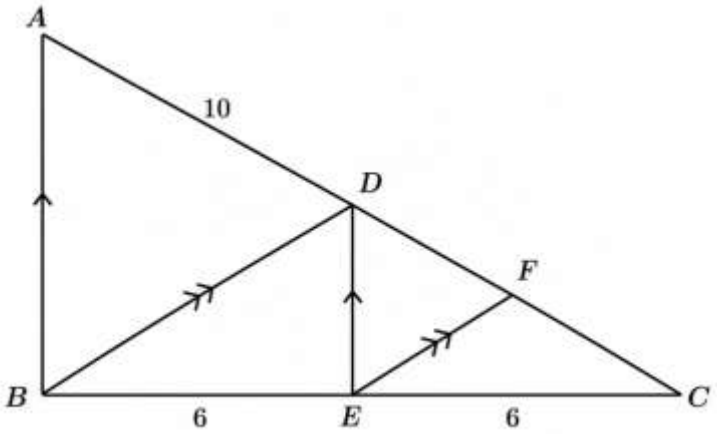
[11]

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QUESTION 17

17.1 In the diagram below, $BD||EF$, $AB||DE$; $BE = EC = 6cm$ and $AD = 10cm$

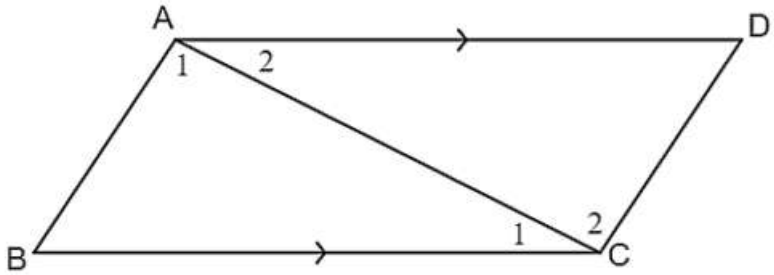
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17.1.1 Show that $FC = 5cm$ (2)

17.1.2 If $AB = \frac{16}{5}FC$, prove that $A\hat{B}C = 90°$ (3)

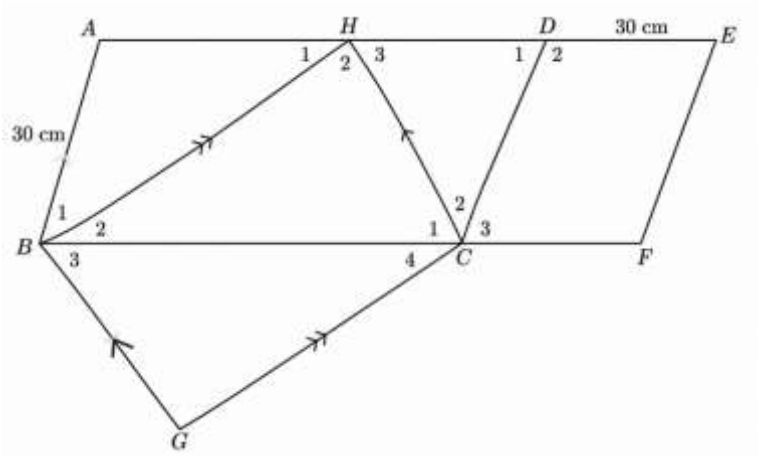
17.2 In quadrilateral ABCD, AD||BC and $\hat{B} = \hat{D}$. Prove that ABCD is a parallelogram.



(5)

QUESTION 18

ABCD is parallelogram. BH bisects $A\hat{B}C$ and HC bisects $B\hat{C}D$. $A\hat{B}C = 60°, \hat{F} = 120°, BG||HC$. AD is produce to E such that $AB = DE = 30cm$. BC is produced to F.



Prove that:

18.1 $\hat{C}_1 = 60°$ (3)

18.2 BGCH is a rectangle (2)

18.3 DC||EF (2)

18.4 DC=DE (2)

18.5 DCFE is a rhombus (3)

[12]

QUESTION 19

19.1 Complete the theorem:

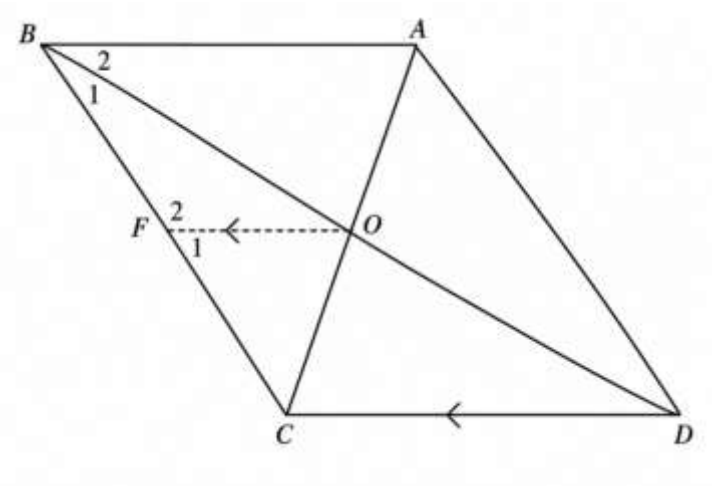
The line segment joining the midpoints of two sides of a triangle is

…… and ……

(Write down the missing words only.)

19.2 ABCD is a rhombus with the diagonals AC = 16 cm and DB = 30 cm

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19.2.1 Calculate the length of BC (4)

19.2.2 Calculate OF, if OF is parallel to DC with F on BC (3)

19.2.3 Determine the size of $0\hat{B}F$ if $0\hat{F}C = 64°$ (3)

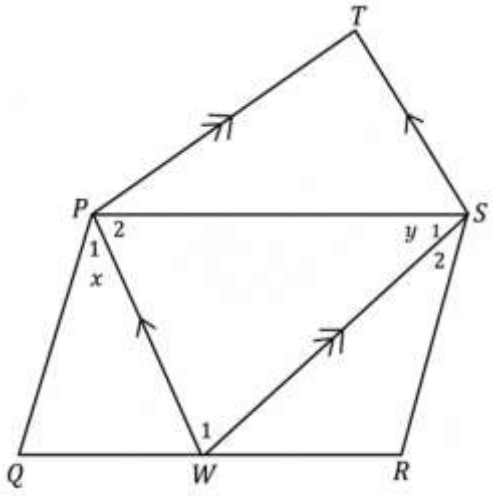
19.3 Determine the area of the rhombus ABCD (2)

[14]

GP November 2022

QUESTION 20

In parallelogram PQRS, PW bisects $Q\hat{P}S$ and SW bisects $P\hat{S}R$. PW||ST and PT||WS.



20.1 Prove that $x + y = 90°$ (4)

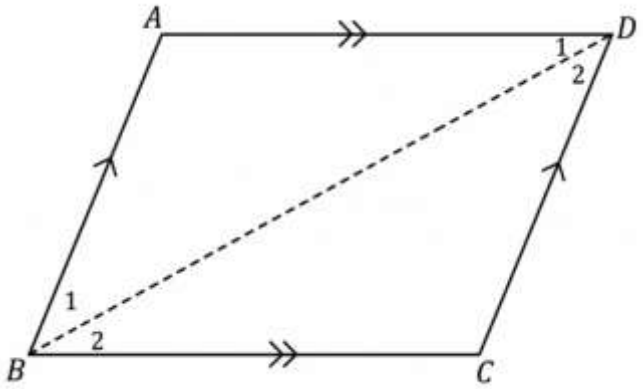
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20.2 Prove that PWST is a rectangle (4)

[8]

QUESTION 21

ABCD is a parallelogram with AD||BC and BA||CD.

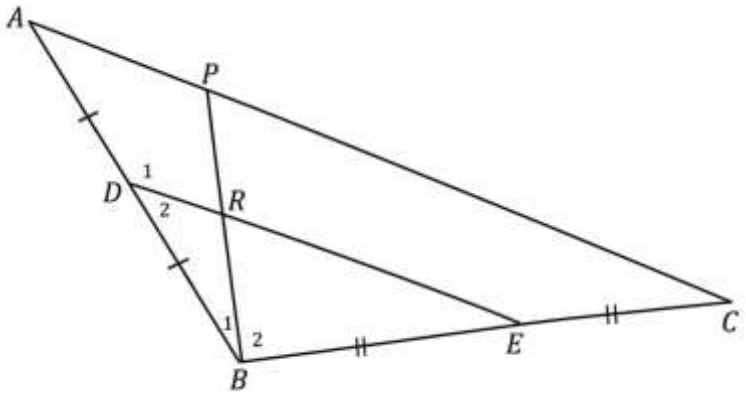


Using the diagram above, prove the theorem that states that the opposite sides of a parallelogram are equal.

[5]

QUESTION 22

In the diagram below, D and E are midpoints of sides AB and BC of ΔABC. Point P is on BC such that PA = PB. PB cuts DE at R.



Prove that ΔRDB is isosceles

[5]

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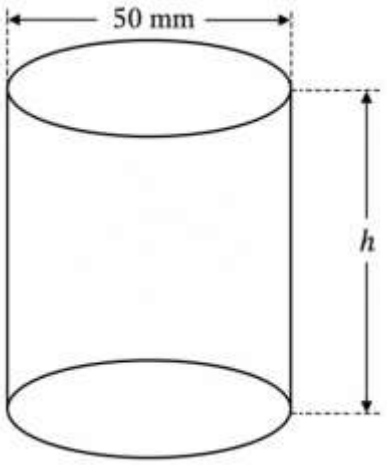
MEASUREMENT

KZN November 2023

QUESTION 1

The diagram below shows a drinking glass with an inner diameter of 50mm and a height h.

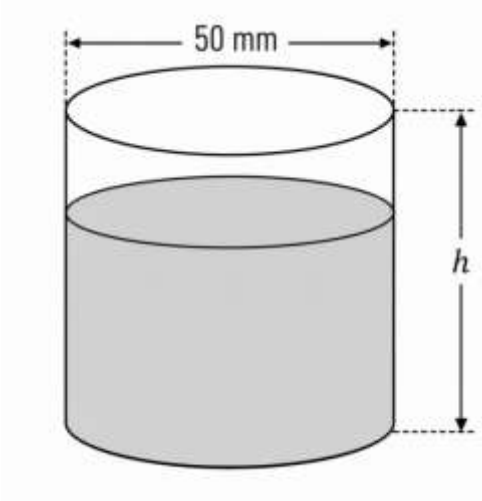
Ignore the thickness of the glass.



The volume of the glass is 250cm^3.

1.1 Calculate the height h (3)

1.2 Water is now poured into the glass until it is 65% full.



(4)

Calculate the total surface area covered by the water

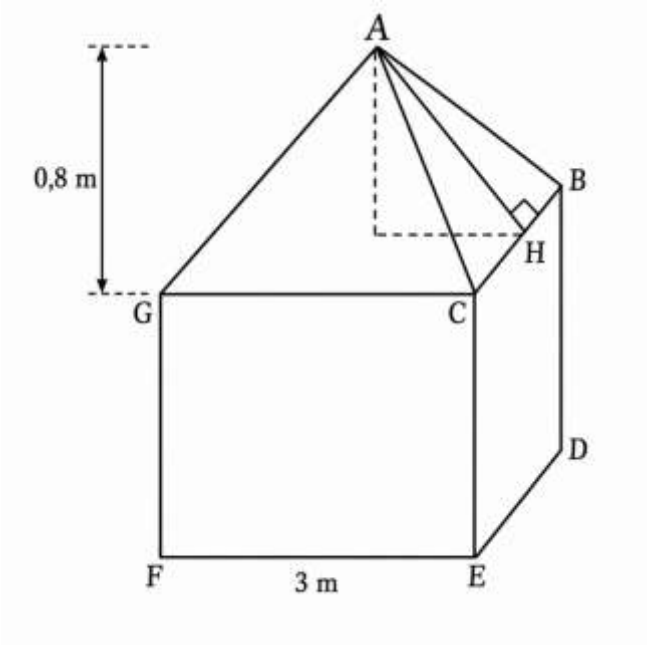
[7]

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QUESTION 2

2.1 The roof of a canvas tent is in the shape of a right pyramid having a perpendicular height of 0,8 meters on a square base. The length of one side of the base is 3 metres.



2.1.1 Calculate the length of AH (2)

2.1.2 Calculate the surface area of the roof (2)

2.1.3 If the height of the walls of the tent is 2,1 metres, calculate the total amount of canvas required to make the tent if the floor is excluded (2)

2.2 A metal ball has a radius of 8 millimetres.

Volume of sphere $= \frac{4}{3}\pi r^3$

2.2.1 Calculate the volume of metal used to make this ball. Give your answer correct to TWO decimal places. (2)

2.2.2 If the radius of the ball is doubled, write down the ratio of the new volume : the original volume. (2)

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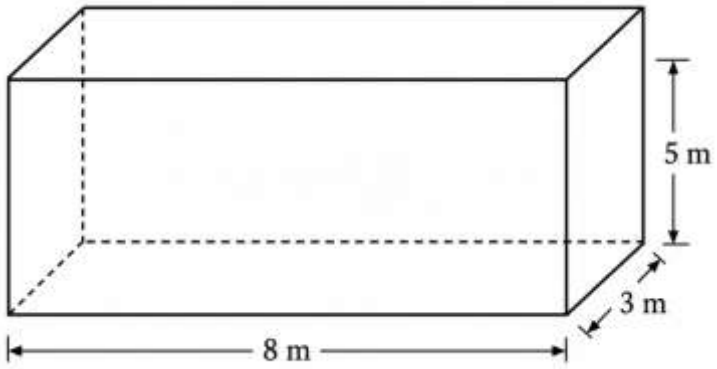
2.2.3 You would like this ball to be silver plated to a thickness of 1 millimetre. What is the volume of silver required? Give your answer correct to TWO decimal places. (2)

[12]

NW November 2024

QUESTION 3

Given the rectangular prism below:



$V = l.b.h, \quad SA = 2(lb + lh + hb)$

3.1 Calculate the surface area of the prism (2)

3.2 Calculate the volume of the prism if the height is doubled and the breadth halved (2)

3.3 Calculate the volume if the length is doubled, the height is halved and the breadth is tripled (3)

[7]

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QUESTION 4

A metal marble has a diameter of 16 millimetres.



Volume of sphere $= \frac{4}{3}\pi r^3$

4.1 Calculate the volume of a metal used to make this marble. Give your answer correct to TWO decimal places (3)

4.2 If the radius of the marble is doubled, write down the ratio of the new volume to the original volume (3)

[6]

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QUESTION 5

A globe of the world, spherical in shape, is placed in a geography classroom. The globe has a radius of 21cm.

5.1 Calculate the volume of the globe, correct to ONE decimal place (2)

5.2 Determine the area of the globe, correct to ONE decimal place (2)

5.3 If the radius is doubled, what would be the ratio of the volume of the original sphere to the volume of the new sphere? (1)



[5]

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