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Christo Q1 (25)

Andrea Q10, 11 (27)

Marj Q4, 9, 12 (25)

Grant Q3, Q10a (25)

Theresa Q5, 7, 8 (22)

Mads Q2, 6 (26)



ST BENEDICT'S

SUBJECT

Mathematics

GRADE

12

EXAMINER

Miss A Balzer

NAME

TEACHER

Memorandum

PAPER

DATE

MARKS

MODERATOR

DURATION

Prelim Paper 1

21 July 2022

150

Gr 12 Teachers

3 hours

QUESTION NUMBER	DESCRIPTION	MAXIMUM MARK	ACTUAL MARK
SECTION A			
1	Algebra Christo	25	
2	Sequences and Series Mads	12	
3	Functions Grant	16	
4	Calculus Marj	15	
5	Finance Theresa	7	
	Section A Total	75	
SECTION B			
6	Calculus Mads	14	
7	Finance } Theresa	6	
8	Sequences and Series }	9	
9	Calculus Marj	6	
10	Functions Grant / Andrea	19	
11	Probability Andrea	17	
12	Problem Solving Marj	4	
	Section B Total	75	
TOTAL		150	

INSTRUCTIONS:

1. This paper consists of 22 pages and an information sheet. Please check that your question paper is complete.
2. Read the questions carefully.
3. Answer all questions on the question paper in the spaces provided.
4. It is in your interest to write legibly and present your work neatly.
5. Clearly show **ALL** calculations where necessary. **Answers only will NOT necessarily be awarded full marks.**
6. You may use an approved non-programmable and non-graphical calculator, unless otherwise stated.
7. Ensure that your calculator is in **DEGREE** mode.
8. Round off your answers to **ONE** decimal place unless otherwise stated. Remember that in finance monetary values are rounded to **TWO** decimal places.



QUESTION 1

25 MARKS

a) Solve for x :

1) $3x^2 = x + 5$ (leave answers in simplest surd form) (3)

$$3x^2 - x - 5 = 0 \quad \checkmark^m$$

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(3)(-5)}}{2(3)} \quad \checkmark^m \text{ (sub)}$$

$$= \frac{1 \pm \sqrt{61}}{6} \quad \checkmark^a$$

2) $\sqrt{5-x} - x = 1$ (5)

$$\sqrt{5-x} = x + 1 \quad \checkmark^m$$

$$5-x = (x+1)^2 \quad \checkmark^m$$

$$5-x = x^2 + 2x + 1 \quad \checkmark^m$$

$$0 = x^2 + 3x - 4 \quad \checkmark^m$$

$$0 = (x+4)(x-1) \quad \checkmark^m$$

$$x = -4 \text{ or } x = 1 \quad \checkmark^a$$

N/A $\checkmark^a$

3) $5x \geq 2(x^2 + 1)$ (4)

$$0 \geq 2x^2 - 5x + 2 \quad \checkmark^m$$

$$0 \geq (2x-1)(x-2) \quad \checkmark^m$$

$$\begin{array}{c} + \quad \bullet \text{---} \bullet \quad + \\ | \quad \quad | \\ 1/2 \quad 2 \end{array} \quad \checkmark^m$$

$$\frac{1}{2} \leq x \leq 2 \quad \checkmark^a$$

b) Given the following: $\frac{27^{3x} \cdot 9^{2x}}{3^{13x-2}}$

1) Simplify the expression above. (3)

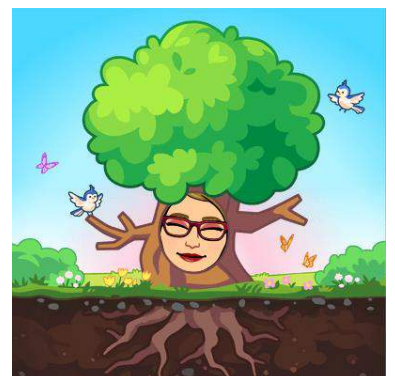
$$\begin{aligned} & \frac{27^{3x} \cdot 9^{2x}}{3^{13x-2}} \\ &= \frac{3^{9x} \cdot 3^{4x}}{3^{13x-2}} \quad \checkmark^m \\ &= 3^{9x+4x-13x+2} \quad \checkmark^m \\ &= 3^2 \\ &= 9 \quad \checkmark^a \end{aligned}$$

2) Hence, solve for p if $\frac{27^{3x} \cdot 9^{2x}}{3^{13x-2}} = 5^p$ (2)

$$\begin{aligned} \therefore 5^p &= 9 \\ p &= \log_5 9 \quad \checkmark^m \\ &= 1,4 \quad \checkmark^a \end{aligned}$$

c) If the roots of the equation $x^2 = 2kx - 9$ are equal, determine the value(s) of k . (3)

$$\begin{aligned} x^2 - 2kx + 9 &= 0 \\ b^2 - 4ac &= 0 \quad \checkmark^m \\ (-2k)^2 - 4(1)(9) &= 0 \\ 4k^2 - 36 &= 0 \\ k^2 - 9 &= 0 \quad \checkmark^a \\ k^2 &= 9 \\ k &= \pm 3 \quad \checkmark^a \end{aligned}$$



d) Solve for x and y in the following equations:

$$x - 3y = 1 \quad \text{and} \quad x^2 - 2xy + 9y^2 = 17$$

(5)

$$x = 3y + 1 \quad \checkmark^m$$

$$\therefore (3y + 1)^2 - 2y(3y + 1) + 9y^2 = 17 \quad \checkmark^{\text{sub}}$$

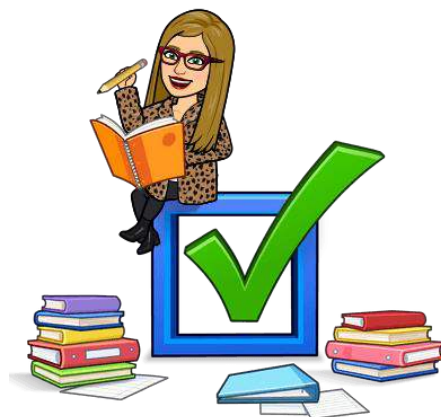
$$9y^2 + 6y + 1 - 6y^2 - 2y + 9y^2 = 17$$

$$12y^2 + 4y - 16 = 0$$

$$3y^2 + y - 4 = 0$$

$$(3y + 4)(y - 1) = 0 \quad \checkmark^m$$

$$\therefore \begin{array}{l} y = -\frac{4}{3} \quad \checkmark^{\text{ca}} \quad \text{or} \quad y = 1 \quad \checkmark^{\text{ca}} \\ x = -3 \quad \checkmark^{\text{ca}} \quad \quad \quad x = 4 \quad \checkmark^{\text{ca}} \end{array}$$



QUESTION 2

12 MARKS

- a) Determine the following: $\sum_{k=3}^{30} (1 - 3k)$ (4)
- $$= -8 - 11 - 14 \dots \checkmark^m$$

$$n = 30 - 3 + 1 = 28 \checkmark^m$$

$$\therefore S_{28} = \frac{28}{2} [2(-8) + (28-1)(-3)] \checkmark^{sub}$$

$$= -1358 \checkmark^a$$

- b) The geometric series $18 ; x+4 ; x$ is given, where $x < 3$.

- 1) Determine the value of x . (4)

$$\frac{x+4}{18} = \frac{x}{x+4} \checkmark^m$$

$$(x+4)^2 = 18x \checkmark^m$$

$$x^2 + 8x + 16 = 18x$$

$$x^2 - 10x + 16 = 0$$

$$(x-8)(x-2) = 0 \checkmark^{ca}$$

$$x = 8 \quad \text{or} \quad x = 2 \checkmark^a$$

N/A $\longrightarrow$

- 2) Explain why the series is convergent. (2)

$$r = \frac{b}{18} = \frac{1}{3} \checkmark^{ca}$$

$$\therefore r < 1 \checkmark^a$$

$\therefore$ series is convergent

- 3) Determine S_{∞} . (2)

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

$$= \frac{18}{1-\frac{1}{3}} \checkmark^{m(sub)}$$

$$= 27 \checkmark^{ca}$$

QUESTION 3

16 MARKS

a) Given the function: $f(x) = x^2 - 1$.

- 1) Write down the inverse of
- f
- in the form
- $y = \dots$
- (2)

$$\begin{aligned}
 x &= y^2 - 1 \quad \checkmark^m \\
 x + 1 &= y^2 \\
 \therefore y &= \pm \sqrt{x+1} \quad \checkmark^a
 \end{aligned}$$

- 2) Explain why the inverse is not a function. (1)

It is a one-to-many relation $\checkmark^a$

- 4) Give the range of the inverse. (1)

$$y \in \mathbb{R} \quad \checkmark^a$$

- 3) Give two ways that you can restrict the domain of
- f
- in order to turn the inverse into a function. (2)

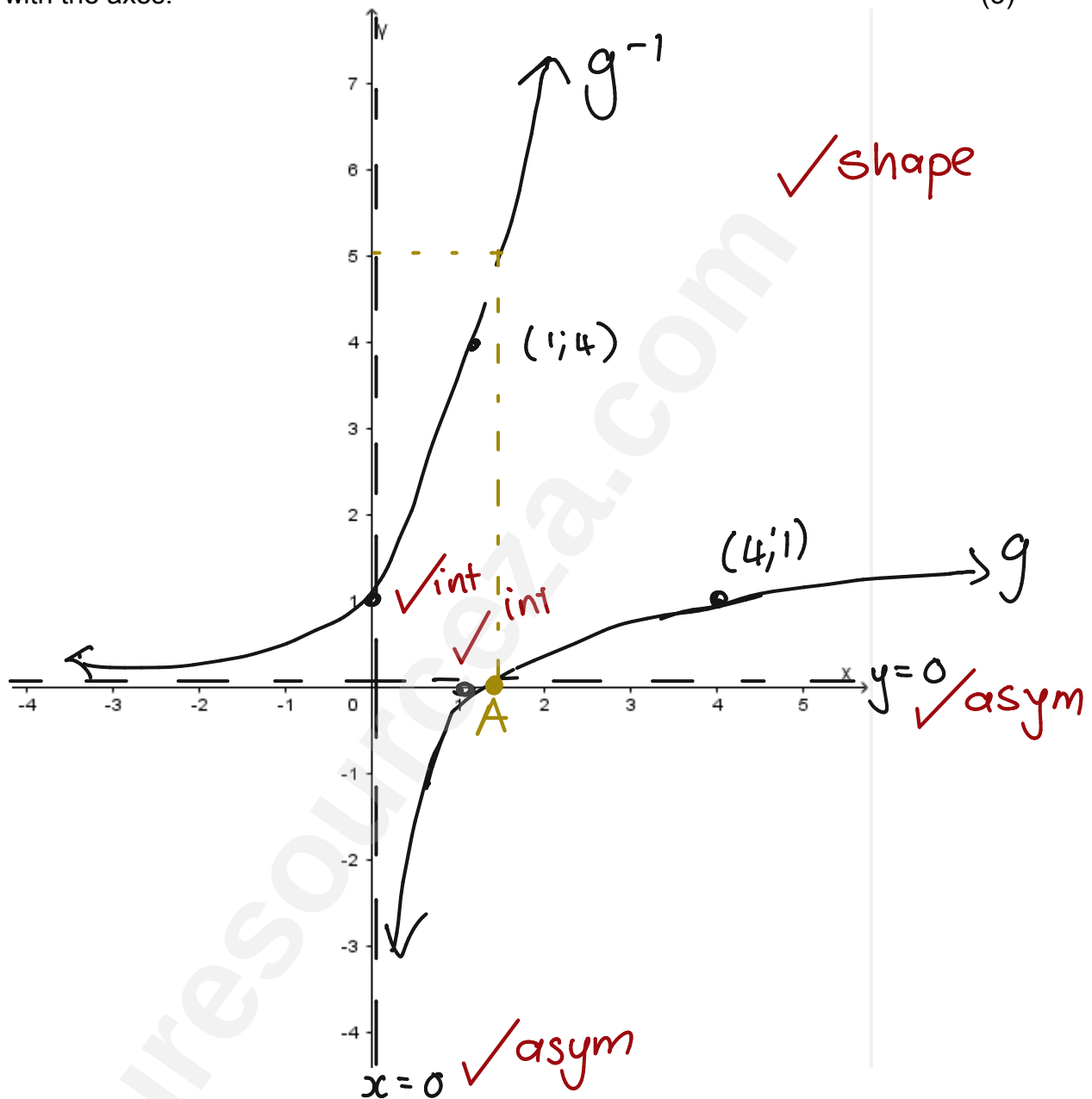
$$f(x) = x^2 - 1 \quad ; \quad x \geq 0 \quad \checkmark^a$$

OR

$$f(x) = x^2 - 1 \quad ; \quad x \leq 0 \quad \checkmark^a$$

b) Given the function: $g(x) = \log_4 x$

- 1) Sketch g and g^{-1} on the set of axes below. Label all asymptotes and intercepts with the axes. (5)



- 2) Determine algebraically $g^{-1}(x) = 5$ and indicate where you would read this off on the graph using the letter A. (3)

$$4^x = 5 \quad \checkmark^m$$

$$x = \log_4 5 \quad \checkmark^a$$

$$= 1,2 \quad \checkmark^a$$

✓ on graph

- 3) Find the equation of h in the form $h(x) = \dots$ if h is the reflection of g in the x -axis and shifted 3 units up. (2)

$$h(x) = -\log_4 x + 3 \quad \checkmark^a \quad \checkmark^a$$

QUESTION 4

15 MARKS

a) Given: $f(x) = 3x^2 - 4x$ 1) Determine $f'(x)$ from first principles.

(5)

$$\begin{aligned}
 f(x+h) &= 3(x+h)^2 - 4(x+h) \quad \checkmark^m \\
 &= 3(x^2 + 2xh + h^2) - 4x - 4h \\
 &= 3x^2 + 6xh + 3h^2 - 4x - 4h
 \end{aligned}$$

$$\begin{aligned}
 \therefore f'(x) &= \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} \quad \checkmark^m \\
 &= \lim_{h \rightarrow 0} \frac{3x^2 + 6xh + 3h^2 - 4x - 4h - 3x^2 + 4x}{h} \quad \checkmark^m \\
 &= \lim_{h \rightarrow 0} \frac{h(6x + 3h - 4)}{h} \quad \checkmark^m \\
 &= 6x + 3(0) - 4 \\
 &= 6x - 4 \quad \checkmark^a
 \end{aligned}$$

2) Hence, find the equation of the tangent to f at $(2; 4)$.

(3)

$$\begin{aligned}
 f'(2) &= 6(2) - 4 \quad \checkmark^m \\
 &= 8 \\
 y - y_1 &= m(x - x_1) \quad \checkmark^m \\
 y - 4 &= 8(x - 2) \quad \checkmark^m \\
 y &= 8x - 16 + 4 \quad \checkmark^m \\
 &= 8x - 12 \quad \checkmark^m
 \end{aligned}$$

- b) Determine the following using the rules of differentiation, leaving all answers with positive exponents:

1) $D_x \left[\frac{2x^3 - 4x}{2x^2} \right]$ (3)

$$= D_x \left[\frac{2x^3}{2x^2} - \frac{4x}{2x^2} \right] \checkmark^m$$

$$= D_x [x - 2x^{-1}] \checkmark^m$$

$$= 1 + 2x^{-2}$$

$$= 1 + \frac{2}{x^2} \checkmark^a$$

2) $\frac{dy}{dx}$ if $y = \frac{1}{4\sqrt{x}} + \frac{1}{x\sqrt{x}}$ (4)

$$y = \frac{1}{4x^{1/2}} + \frac{1}{x \cdot x^{1/2}} \checkmark^m$$

$$= \frac{1}{4} x^{-1/2} + x^{-3/2} \checkmark^m$$

$$\frac{dy}{dx} = -\frac{1}{8} x^{-3/2} - \frac{3}{2} x^{-5/2}$$

$$= -\frac{1}{8x^{3/2}} - \frac{3}{2x^{5/2}} \checkmark^a$$



QUESTION 5

7 MARKS

Ethan's aunt buys him a car for R200 000. It is expected to depreciate using the reducing balance method at a rate of 15% p.a.

- a) What will the car's book value be in 5 years' time? (2)

$$\begin{aligned} A &= P(1-i)^n \\ &= 200\,000(1-15\%)^5 \quad \checkmark \text{sub} \\ &= R88\,741,06 \quad \checkmark^a \end{aligned}$$

- b) What will the cost of the car be in 5 years' time if the inflation rate is 6,5% p.a.? (2)

$$\begin{aligned} A &= P(1+i)^n \\ &= 200\,000(1+6,5\%)^5 \quad \checkmark \text{sub} \\ &= R274\,017,33 \quad \checkmark^a \end{aligned}$$

- c) Convert the annual rate of 6,5% to a nominal interest rate compounded quarterly. (3)

$$\begin{aligned} 1 + i_{\text{eff}} &= \left(1 + \frac{i_{\text{nom}}}{n}\right)^n \\ 1 + 6,5\% &= \left(1 + \frac{i_{\text{nom}}}{4}\right)^4 \quad \checkmark \text{sub} \\ \left(\sqrt[4]{1,065} - 1\right) \times 4 &= i_{\text{nom}} \quad \checkmark^m \end{aligned}$$

$$\therefore i_{\text{nom}} = 0,063473\dots$$

$$\therefore r = 6,35\% \quad \checkmark^a$$

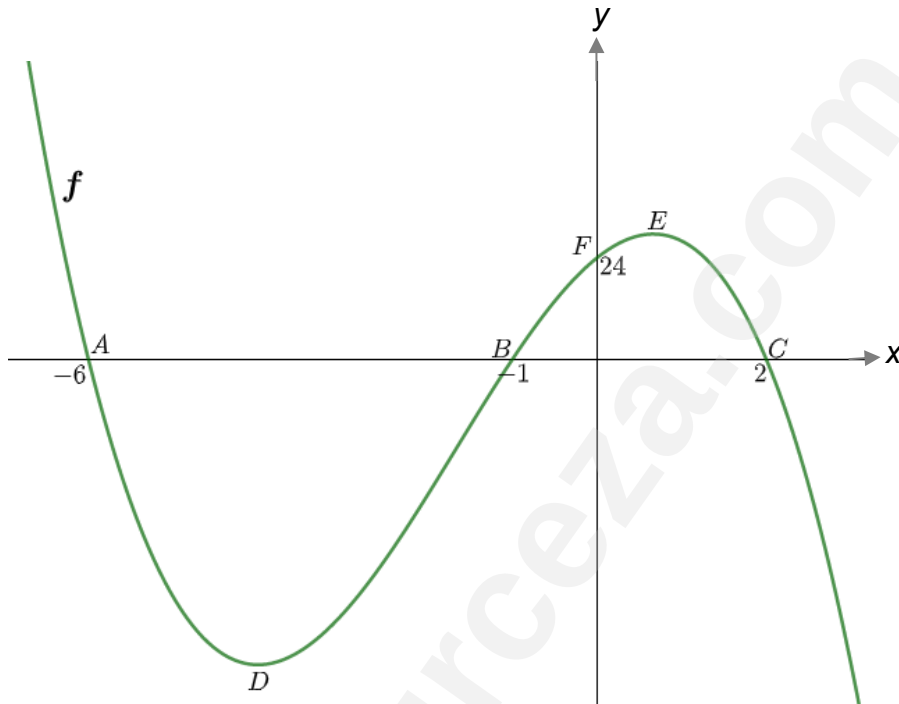


QUESTION 6

14 MARKS

Refer to the figure below showing the graph of a cubic function $f(x) = ax^3 + bx^2 + cx + d$.

$A(-6; 0)$, $B(-1; 0)$, $C(2; 0)$ and $F(0; 24)$ are intercepts with the axes. D and E are turning points of the function.



- a) Show that $a = -2$, $b = -10$, $c = 16$ and $d = 24$.

(5)

$$y = a(x - x_1)(x - x_2)(x - x_3)$$

$$y = a(x + 6)(x + 1)(x - 2) \quad \checkmark m \text{ (sub)}$$

$$24 = a(0 + 6)(0 + 1)(0 - 2) \quad \checkmark m \text{ (sub)}$$

$$24 = -12a$$

$$\therefore a = -2 \quad \checkmark a$$

$$y = -2(x + 6)(x + 1)(x - 2)$$

$$= -2(x + 6)(x^2 - x - 2)$$

$$= -2(x^3 - x^2 - 2x + 6x^2 - 6x - 12)$$

$$= -2(x^3 + 5x^2 - 8x - 12) \quad \checkmark m$$

$$= -2x^3 - 10x^2 + 16x + 24 \quad \checkmark a$$

b) Determine the coordinates of D .

(5)

$$f(x) = -2x^3 - 10x^2 + 16x + 24$$

$$f'(x) = -6x^2 - 20x + 16 \quad \checkmark^a$$

$$-6x^2 - 20x + 16 = 0 \quad \checkmark^m$$

$$3x^2 + 10x - 8 = 0$$

$$(3x - 2)(x + 4) = 0 \quad \checkmark^a$$

$$x = 2/3 \quad \text{or} \quad x = -4$$

$$\therefore f(-4) = -2(-4)^3 - 10(-4)^2 + 16(-4) + 24 \quad \checkmark^m$$

$$= -72 \quad \checkmark^{ca}$$

$$\therefore D(-4; -72)$$

c) For which values of x will f be concave down?~~(3)~~
2

$$f''(x) < 0 \quad \checkmark^{ma}$$

$$-12x - 20 < 0$$

$$-12x < 20$$

$$x > -\frac{5}{3} \quad \checkmark^{ca}$$

d) Suppose that the function is translated in such a way that the point D is moved to the origin. That is, the new graph equation is $y = f(x - p) + q$, where p and q are constants. Write down the values of p and q .

(2)

$$-4 + p = 0$$

$$\therefore p = 4 \quad \checkmark^a$$

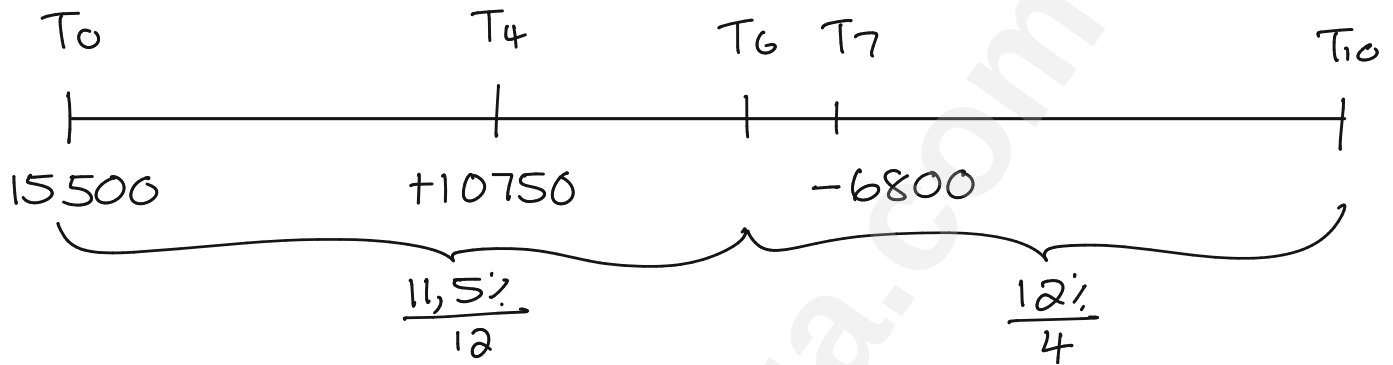
$$-72 + q = 0$$

$$\therefore q = 72 \quad \checkmark^a$$

QUESTION 7

6 MARKS

Noah wants to plan for his future and decides to open an investment account with a reputable financial institution. He initially deposits an amount of R15 500. Four years later, he deposits a further R10 750. Noah then withdraws R6 800 three years after the second deposit. He secures an interest rate of 11,5% p.a. compounded monthly for the first 6 years. Thereafter the interest rate changes to 12% p.a. compounded quarterly. How much will Noah's investment be worth 10 years after his initial deposit?

At T_{10} :

$$\begin{aligned}
 A &= 15500 \left(1 + \frac{11,5\%}{12}\right)^{72} \left(1 + \frac{12\%}{4}\right)^{16} + 10750 \left(1 + \frac{11,5\%}{12}\right)^{24} \left(1 + \frac{12\%}{4}\right)^{16} \\
 &\quad - 6800 \left(1 + \frac{12\%}{4}\right)^{12} \\
 &= R\ 61\ 419,60
 \end{aligned}$$



QUESTION 8

9 MARKS

Consider the following list of numbers that form a sequence:

41 ; 43 ; 47 ; 53 ; 61 ; 71 ; 83 ; 97 ; 113 ; 131 ; ...

- a) Determine a formula to represent the n^{th} term of the sequence. (3)

$$\begin{array}{ccc} 41 & & 43 & & 47 \\ & \swarrow & & \swarrow & \\ & 2 & & 4 & \\ & & \swarrow & & \\ & & 2 & & \end{array}$$

$$2a = 2 \quad \checkmark a \quad 3a + b = 2$$

$$a = 1 \quad \checkmark a \quad 3 + b = 2$$

$$b = -1 \quad \checkmark a$$

$$a + b + c = 41$$

$$1 - 1 + c = 41$$

$$c = 41 \quad \checkmark a$$

$$\therefore T_n = n^2 - n + 41$$

- b) An interesting property of this sequence is that the first 40 terms are all prime numbers. Show that the 41st term is not a prime number. (3)

$$\begin{aligned} T_{41} &= 41^2 - 41 + 41 \quad \checkmark m \\ &= 1681 \quad \text{or} \quad 41^2 \end{aligned}$$

$\therefore$ Factors are 1, 1681 and 41 $\checkmark a$

$\therefore T_{41}$ is not a prime number $\checkmark a$

- c) Find the units digit of the 49 999 998th term. (3)

Pattern: 1 ; 3 ; 7 ; 3 ; 1 $\checkmark a$

$$\begin{array}{r} 49\,999\,998 \\ \hline 5 \end{array} = 9\,999\,999 \text{ rem } 3 \quad \checkmark m$$

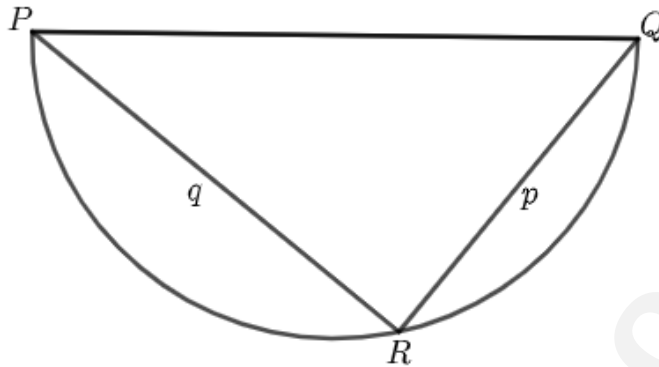
$\therefore$ Unit digit is 7 $\checkmark a$

QUESTION 9

6 MARKS

PQ is the diameter of the semi-circle PRQ and $p + q = 10$.

Calculate **all** the dimensions of the triangle so that the area of the triangle will be a maximum.
Where necessary, leave answers in simplest surd form.



$$\hat{R} = 90^\circ \quad \& \text{ in semi-circle } \checkmark a$$

$$\text{Area} = \frac{1}{2} pq$$

$$p + q = 10$$

$$q = 10 - p \quad \checkmark a$$

$$\therefore \text{Area} = \frac{1}{2} p(10 - p) \quad \checkmark m$$

$$= 5p - \frac{1}{2} p^2$$

$$\frac{dA}{dp} = 5 - p \quad \checkmark m$$

$$5 - p = 0$$

$$\therefore p = 5$$

$$q = 10 - 5 = 5 \quad \checkmark ca$$

$$PQ^2 = 5^2 + 5^2$$

$$PQ = \sqrt{50}$$

$$= 5\sqrt{2} \quad \checkmark ca$$

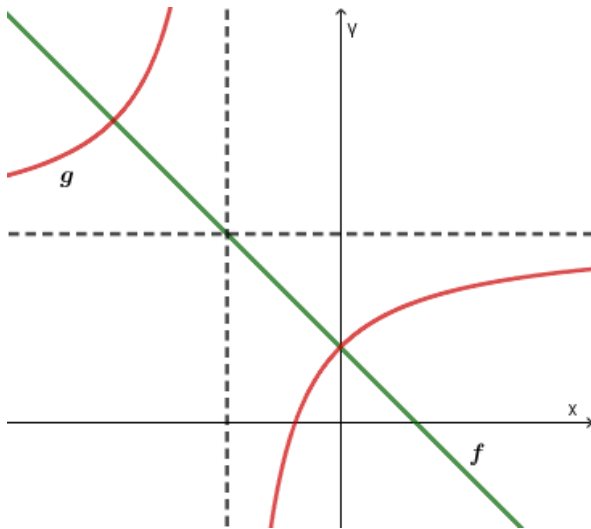
lol wat?



QUESTION 10

19 MARKS

- a) Given the functions $g(x) = \frac{-3}{x+1} + 5$ and $f(x) = -3x + 2$.



- 1) Write down the equations of the asymptotes of g . (2)

$$x = -1 \quad \checkmark^a$$

$$y = 5 \quad \checkmark^a$$

- 2) Write down the negative axis of symmetry of g . (2)

$$y = -x + c \quad \checkmark^m$$

sub $(-1; 5)$

$$5 = -(-1) + c \quad \checkmark^m$$

$$4 = c$$

$$\therefore y = -x + 4 \quad \checkmark^a$$

- 3) Determine the values of x for which $\frac{g(x)}{f(x)} \leq 0$? (5)

x-int of f : $-3x + 2 = 0$

$$x = \frac{2}{3} \quad \checkmark^m$$

x-int of g : $\frac{-3}{x+1} + 5 = 0$

$$\frac{-3}{x+1} = -5$$

$$-3 = -5x - 5$$

$$5x = -2$$

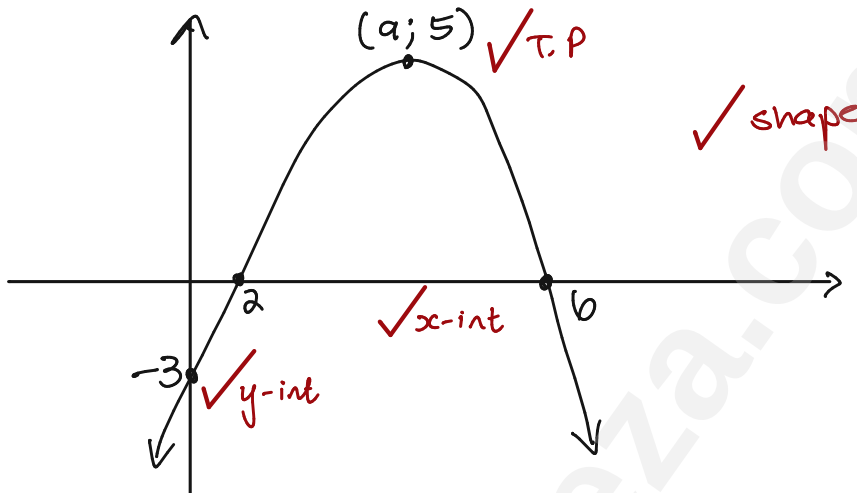
$$x = -\frac{2}{5} \quad \checkmark^m$$

$$\therefore -1 < x \leq -\frac{2}{5} \quad \checkmark^a \quad \text{or} \quad x > \frac{2}{3} \quad \checkmark^a$$

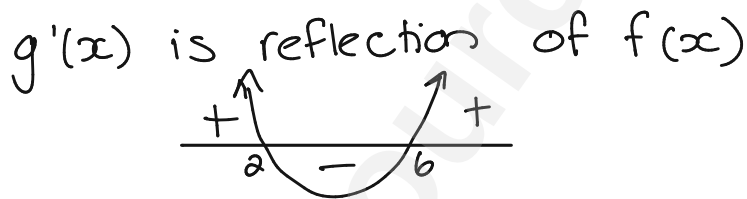
b) Function f is a parabola. It is further given that it has the following properties:

$$\begin{aligned} f(0) &= -3 \\ f(2) &= f(6) = 0 \\ f'(a) &= 0 \\ f(a) &= 5 \end{aligned}$$

1) Draw a sketch graph of f , clearly indicating all important points. (4)



2) If $g'(x) = -f(x)$, state the value(s) for which g is increasing. (2)



$$\therefore x < 2 \quad \checkmark^a \quad \text{or} \quad x > 6 \quad \checkmark^a$$

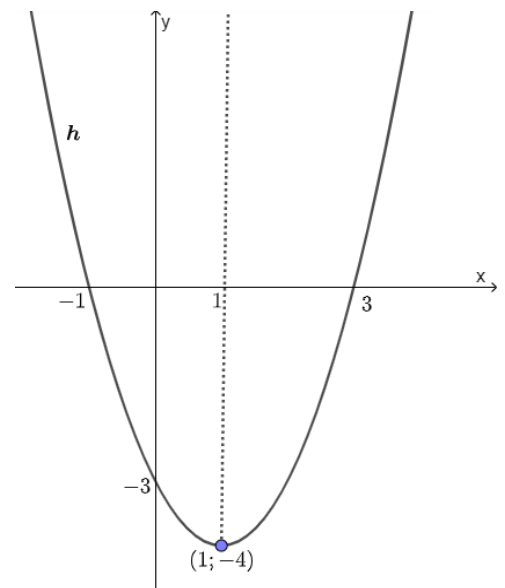
c) Consider the graph of $h(x) = x^2 - 2x - 3$ and use it to determine the value(s) of k for which:

1) $x^2 - 2x - 3 = k$ has non-real roots (2)

$$k < -4 \quad \checkmark \checkmark^a$$

2) $x^2 - 2x + k = 0$ has equal roots (2)

$$k = 1 \quad \checkmark \checkmark^a$$



QUESTION 11

17 MARKS

- a) You are given $P(A) = 0,6$ and $P(A \text{ and } B) = 0,15$. If events A and B are independent calculate the following:

1) $P(B)$

(2)

$$\begin{aligned}
 P(A) \times P(B) &= P(A \text{ and } B) \\
 0,6 \times P(B) &= 0,15 \quad \checkmark_m \\
 \therefore P(B) &= 0,25 \quad \checkmark_a
 \end{aligned}$$

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

(2)

$$\begin{aligned}
 P(A \text{ or } B) &= P(A) + P(B) - P(A \text{ and } B) \\
 &= 0,6 + 0,25 - 0,15 \quad \checkmark_m \\
 &= 0,7 \quad \checkmark_a
 \end{aligned}$$

- b) Miss Balzer is afraid of height and wonders if her age is effecting her fear because she wasn't afraid when she was younger. She finds the following data:



	Scared of heights	Not scared of heights	Total
Under the age of 20	398	202	600
Over the age of 20	152	248	400
Total	550	450	1000

- 1) What is the probability that someone is scared of heights given that they are over the age of 20. (2)

$$P(S | \text{over } 20) = \frac{152}{400} \quad \checkmark_a$$

- 2) Are the events of being under the age of 20 and not scared of heights independent? Show all relevant calculations. (4)

$$P(\text{under 20}) = \frac{600}{1000} \quad \checkmark a \quad P(\text{under 20 and not scared})$$

$$P(\text{Not Scared}) = \frac{450}{1000} = \frac{202}{1000}$$

$$\frac{600}{1000} \times \frac{450}{1000} = 0,27 \quad \checkmark a = 0,202 \quad \checkmark a$$

$$\therefore P(\text{under 20}) \times P(\text{Not scared}) \neq P(\text{under 20 and not scared})$$

$\therefore$ Not Independent $\checkmark ca$

- c) Miss Balzer's niece and nephews (Teagan, William, Timothy, Noah and Ethan) are having their picture taken as a gift for their grandpa's 70th. They are all standing in a row.

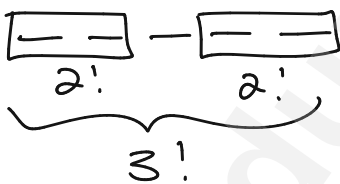
- 1) How many ways can the children be arranged in a row? (1)

$$5! = 120 \quad \checkmark a$$

- 2) How many ways can the children be arranged in a row if William and Timothy want to stand next to each other? (2)

$$4! \times 2! = 48 \quad \checkmark a \quad \checkmark a$$

- 3) Determine the probability that Teagan stands next to Ethan and Noah stands next to William. ~~(5)~~ 4



$$\begin{aligned} \text{Prob} &= \frac{2! \cdot 2! \cdot 3!}{5!} \quad \checkmark a \quad \checkmark a \quad \checkmark m \\ &= \frac{24}{120} \\ &= \frac{1}{5} \quad \checkmark ca \end{aligned}$$



QUESTION 12

4 MARKS

A bottle is filled with a fluid whose concentration is 100%.

A small fraction $\left(\frac{1}{n}\right)^{th}$ of the fluid is now removed and replaced by water. The bottle is shaken so that its contents are well mixed.

$\left(\frac{1}{n}\right)^{th}$ is again removed from the bottle and is replaced with water.

Determine n if the percentage concentration left in the bottle after both fractions are removed is 64%.

<u>Concentration</u>	<u>Water</u>
100%	0%
remove $\frac{1}{n}$ $\left(1 - \frac{1}{n}\right) \times 100$	$\frac{1}{n} \times 100$
remove $\frac{1}{n}$ $\left(1 - \frac{1}{n}\right) \left[\left(1 - \frac{1}{n}\right) \times 100 \right]$	
$= \left(1 - \frac{1}{n}\right)^2 \times 100$	
$\therefore 100 \left(1 - \frac{1}{n}\right)^2 = 64$	
$\left(1 - \frac{1}{n}\right)^2 = 0,64$	
$1 - \frac{1}{n} = 0,8$	
$-\frac{1}{n} = -0,2$	
$\frac{1}{n} = \frac{1}{5}$	
$\therefore n = 5$	

**PROBLEM
SOLVED**



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