HILLCREST HIGH SCHOOL

GRADE 10 NOVEMBER EXAMINATION 2015

MATHEMATICS
PAPER 1

TIME : 2 HOURS MARKS : 100

EXAMINER : MRS WOODROW
MODERATOR : MR DUNLOP

INSTRUCTIONS TO CANDIDATES

1. This paper consists of 5 Sections (A – E).
2. Annexure 1 and Venn Diagram attached to the answer booklet.
3. Answer ALL questions.
4. **ALL CALCULATIONS MUST BE SHOWN CLEARLY.**
5. An approved calculator (non-programmable and non-graphical) may be used unless stated otherwise.
6. All final answers must be rounded off correct to **TWO decimal places** unless stated otherwise.
7. Indicate units of measurement, where applicable.
8. Start each question on a **NEW PAGE**.
9. Write neatly and legibly.

QUESTION A - ALGEBRA

1 Express the following algebraically :-

1.1 

(2)

2 Simplify the following without the use of a calculator. Show all working details, leaving your answers with positive exponents.

2.1 $\frac{x^{n+1}}{x^{n-1}}$ (2)

2.2 $\frac{25^{1-x}\times 9^{2x-1}}{75^{x}\times 27^{x}}$ (5)

3 Simplify completely :-

3.1 $\frac{a^2bc^2}{4y^3}\times\frac{3ay^2}{c}\div\frac{6c}{ay}\times\frac{8b}{c}$ (3)

4 Solve for x.

4.1 $x^2 - 12 = -x$ (3)

4.2 $4x^2 = 2(5x+3)$ (4)

Solve for x. Write your answer in interval notation and illustrate it on a number line.

4.3 $-2 < \frac{2-2x}{4} < 3$ (5)

5 Using the following formula make *i* the subject of the formula :-

$A = P(1+i)^{16}$ (3)

6 Solve for x and y simultaneously :- (5)

$2(y+3) - x = 0$

$7x = 68 + y$

[32]

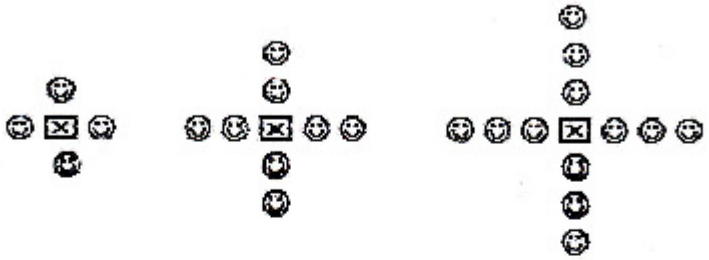
2.1

QUESTION B – NUMBER PATTERNS

1 Determine the first two numbers in the following sequence :- (2)

3 ; 5 ; 7 ; 12 ; 19 ; 28

2



2.1 How many faces will there be in the next pattern? (1)

2.2 How many faces will there be in the nth pattern? (2)

2.3 In which pattern will there be 84 faces? (2)

2.4 For the following sequence : 2 ; -1 ; -4 ; a ; -10; .....

2.4.1 Find the missing value a. (1)

2.4.2 Find the general formula for the sequence. (2)

2.4.3 Find the value of T_{30} (2)

[12]

QUESTION C – FINANCE AND GROWTH

1 Andrew wants to buy a motorbike for R 15 500. He will pay a deposit of R 2 500.

1.1 Calculate the value of the loan he needs to apply for. (2)

1.2 Determine the total amount he will have to pay over 3 years using a hire purchase agreement if the interest charged on the loan is 18% p.a. (3)

2 The department of Water Affairs established that an area of alien vegetation contains approximately 1800 Rooikrans trees. If over the next 5 years that number increased to 3172, calculate the rate of increase of the trees per annum (C.I.). (4)

[9]

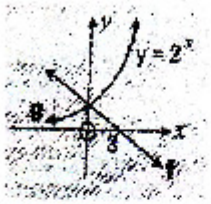
QUESTION D – FUNCTIONS AND GRAPHS

1 If (p ; 4) lies on the line defined by $y=3x-5$, then p = ... (2)

2 If $f(x)=\frac{x-6}{3}$; determine f(3) (2)

3 Find the equation of the straight line passing through (4,-1) and perpendicular to $4-y=2x$. (5)

4 Determine the range of g in the following graph. (1)



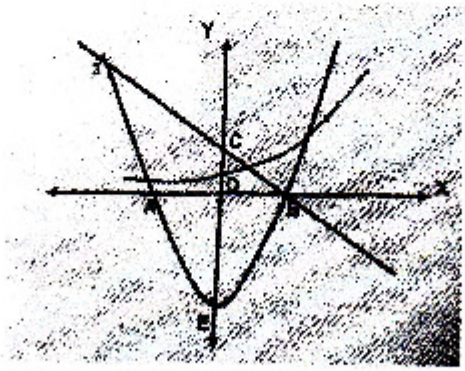
5 Given $g(x)=\frac{2}{3}x^2+6$ and $h(x)=x+3$

5.1 Make neat sketches of g(x) and h(x) on the same set of axes on the attached graph (Annexure 1). Label your graph and clearly show the points of intersection with the axes. Show all your working on the graph sheet. (8)

5.2 Use your graph to determine the value(s) of x for which $g(x)>0$ (2)

6 In the following diagram, which is not drawn to scale, are the graphs of :-

$f(x)=3-3x$, $g(x)=3^x$ and $h(x)=3x^2-3$



Graph f cuts the axes at B and C, graph g cuts the axis at D and graph h cuts the axes at A, B and E.

a) Find the length of CD. (3)

b) Find the length of CE. (2)

c) Find the length of AB. (2)

d) Determine the co-ordinates of J. (5)

[32]

$g(x) = ax+q$

QUESTION E – PROBABILITY

1 A poll was taken about the leisure time activities of 90 students.

- 60 students read (R)
- 70 students go to the cinema (C)
- 4 students did neither
- 44 students read and go to the cinema

1.1 Represent the information given above in a Venn diagram (attached). (4)

1.2 Use your Venn diagram to calculate the probability that a randomly chosen student :-

1.2.1 does not read or go to the cinema. (1)

1.2.2 reads only. (2)

1.2.3 goes to the cinema or reads. (2)

2 Given the events A and B for which $P(A) = 0,4$ and $P(B) = 0,55$ determine where A and B are inclusive :-

2.1 $P(A \cap B)$ (2)

2.2 $P(A \cup B)$ (2)

3 If this event were mutually exclusive determine :-

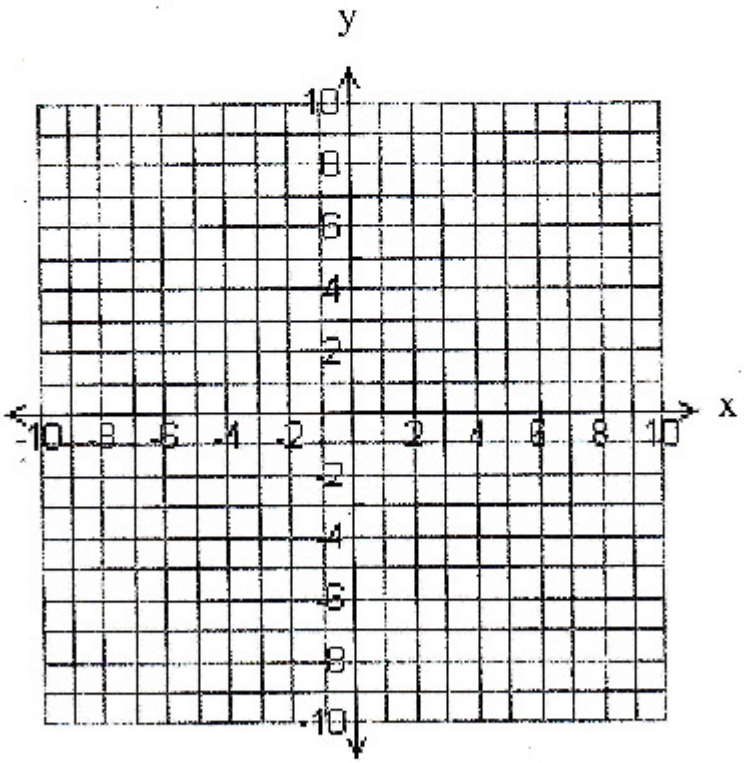
$P(A')$ (2)

[15]

GRAND TOTAL **[100]**

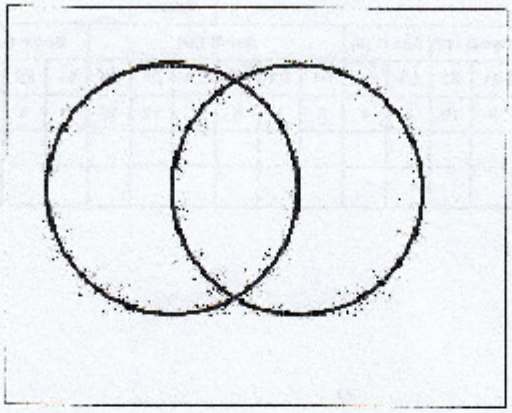
Gr 10 Mathematics Paper 1																			
Name :																			
Teacher :													Date :						Total
	Sec A (32)						Sec B (12)		Sec C (9)		Sec D (32)						Sec E (15)			100
	A1	A2	A3	A4	A5	A6	B1	B2	C1	C2	D1	D2	D3	D4	D5	D6	E1	E2	E3	
	2	7	3	12	3	5	2	10	5	4	2	2	5	1	10	12	9	4	2	
Sign																				

ANNEXURE 1



P.T.O

Section E – Venn Diagram



Working area (if required) :