HILLCREST HIGH SCHOOL

Grade 10Mathematics P1 Exam
November 2014

Examiner: M Cole Moderator: A Sparks

MARKS: 100 TIME: 2 hours

INSTRUCTIONS AND INFORMATION
Read the following instructions carefully before answering the questions.

1. This question paper consists of 7 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations, diagrams, graphs, etc that you have used in determing your answers
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
6. Number the questions correctly according to the number system used in this question paper.
7. If necessary, round off answers to TWO decimal places, unless stated otherwise.
8. Number the answers correctly according to the numbering system used in this question paper.
9. Write neatly and legibly.

QUESTION 1

1.1 Simplify the following expressions fully:

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

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

1.2 Factorise the following expressions fully:

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

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

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

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

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QUESTION 2

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

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

2.1.2 $96=3\times 2^x$ (3)

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

2.2 Solve for*p*and *q*simultaneously if:

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

[13]

QUESTION 3

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

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

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

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

3.2 The multiples of three form the number pattern: 3 ; 6 ; 9 ; 12 ; …
If a new pattern is made using just the even numbers of the above number pattern,
Determine the 13^{th} number in this pattern that is even. (3)

[11]

QUESTION 4

4.1 Thando has R4 500 in his savings account. The bank pays him a compound interest rate of 4.25% p.a. Calculate the amount Thando will receive if he decides to withdraw the money after 30 months. (3)

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

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

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

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

4.3 The following information is given:

1 ounce = 28.35 g
$1 = R8.79

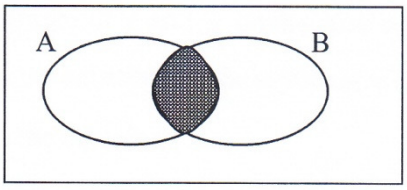
Calculate the Rand value of a 1 kg gold bar, if 1 ounce of gold is worth $ 978.34. (4)

[14]

QUESTION 5

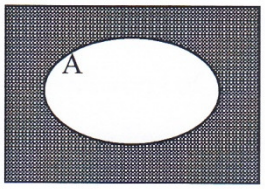
5.1 What expression BEST represents the shaded area of the following Venn diagrams?
$P(A \cup B)$ $P(A \cap B)$ $P(A)$ $P(A')$

5.1.1



(1)

5.1.2



(1)

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

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

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

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

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

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

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

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

5.3.2 Fill in the Venn diagram on the DIAGRAM SHEET to represent the above information. (4)

5.3.3 Determine the probability that a learner is:

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

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

[13]

QUESTION 6

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

6.1 Sketch the graphs of *f* and *g* on the set of axes provided on the DIAGRAM SHEET. (4)

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

6.3 Write down the domain of *f*. (2)

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

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

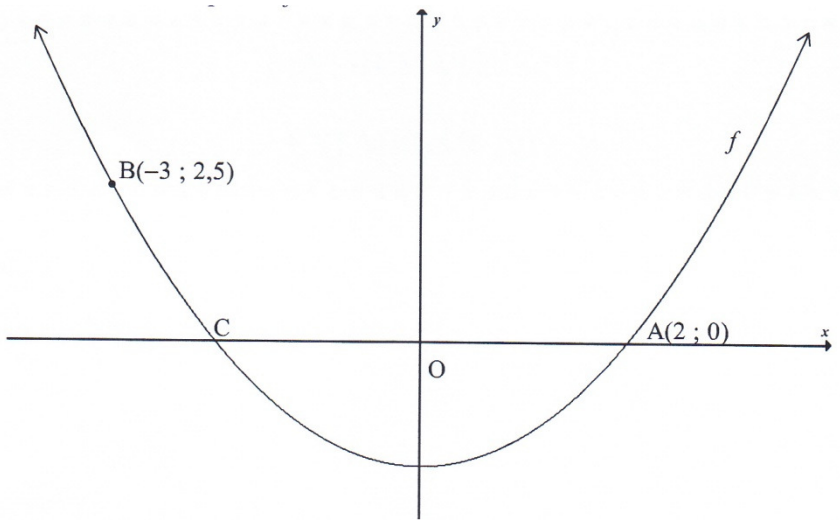
6.6 Determine '*c*' for $y = -x + c$, the axis of symmetry of *f*. (2)

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

[20]

QUESTION 7

The graph of $f(x) = ax^2 + q$ is sketched below.
Points A(2 ; 0) and B(-3 ; 2.5) lie on the graph of *f*.
Points A and C are *x*-intercepts of *f*.



7.1 Write down the coordinates of C. (1)

7.2 Show the equation of *f(x)* is equal to $f(x) = \frac{1}{2}x - 2$ (3)

7.3 Write down the range of *f*. (1)

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

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

[10]

Total 100

NAME:								
TEACHERS NAME:								
QUESTION	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**TOTAL**
TOTAL	**19**	**13**	**11**	**14**	**13**	**20**	**10**	**100**
MARKS								
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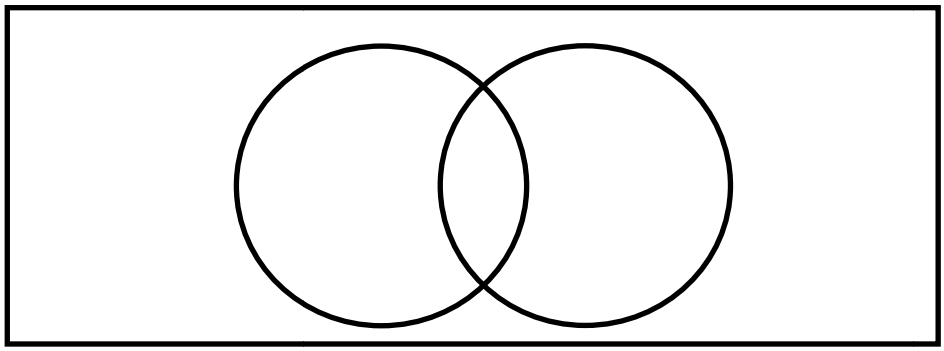
Question 5.3.2



Question 6.1