HILLCREST HIGH SCHOOL

Grade 8 Exam
November 2014

Examiner: J Leuschke

MARKS: 150 TIME: 2 hours

INSTRUCTIONS

1. This paper consists of 8 pages including the cover sheet.
2. Answer all questions on the paper provided.
3. You may not share calculators with anyone during the exam.
4. Round all answers off correctly to 2 decimal places unless otherwise stated.
5. Write your teacher's name on the top of your answer paper.
6. Number your answers correctly according to the numbers used in this question paper.
7. Show all working out.
8. Draw double margins.
9. It is in your best interest to set your work out neatly and legibly.

QUESTION 1

1.1 Say in each case whether the statement is true or false:

a. $(-2)^2 = -4$

b. $\sqrt{-1}$ = undefined

c. $17 - 3x$ is an algebraic expression

d. The numerator of $\frac{13}{14}$ is 14

e. $\frac{23}{18}$ is an improper fraction (5)

1.2 Choose the correct answer in each case. Just write the letter A, B, C or D:

a. Which term does not fit in with the rest?

A. $\frac{4}{x+2}$ B. $\frac{7}{x+y}$ C. $\frac{2}{x+y}$ D. $\frac{10}{y+x}$

b. The expression $6 \times 12a \div 4(3a + 8)$ is a:

A. monomial B. binomial C. trinomial D. polynomial

c. The answer of $(20 - 9)^2 + \sqrt{100 - 36}$ is:

A. 323 B. 327 C. 125 D. 129

d. Which whole number lies halfway between 6 and 14?

A. 10 B. 4 C. 7 D. -3

e. Which property do we use for:
$(-4 \times -3) + (-4 \times 10) = -4(-3 + 10) = -4 \times 7 = -28$?

A. The associative property B. The distributive property

C. The inverse of the distributive property D. The commutative property

(5)

[10]

QUESTION 2

2.1 Study the table and then answer the questions that follow:

x	1	2	3	4	12	n
y	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	m	$5\frac{1}{4}$

a. Use the input and output values in the table to find the formula and then write an equation: $y = \ldots$ (2)

b. Calculate the unknown input and output values (m and n). (2)

2.2 Formula given: $y = 2x^3 - 5$.
Find the unknown y-values and then write down the two ordered pairs from the table (show all working):

x	-3	4
y		

(4)

[8]

QUESTION 3

The following set of numbers is given: [0 ; 1 ; 2 ; 3 ; 5 ; 8 ; 15 ; 16 ; 24]. Use only the numbers in the given set to list:

3.1 The factors of 16. (1)

3.2 The prime factors of 15. (1)

3.3 The square of 4. (1)

3.4 Multiples of 5. (1)

3.5 All possible values of a if $a \in N$ and $a \leq$ the cube root of 27. (1)

3.6 Lowest common multiple of 6 and 8. (1)

3.7 Highest common factor of 6 and 8. (1)

[7]

QUESTION 4

Given: $4a^4 - 3a^3b + 6a^2b^2 \div 3 - \frac{2}{5}a \times b^3$

4.1 How many terms are in the expression? (1)

4.2 Write down the exponent of a in the last term. (1)

4.3 Write down the value of the expression if $a = \frac{1}{2}$ and $b = 0$. (2)

[4]

QUESTION 5

Simplify, showing all your work.

5.1 $3 \cdot a \cdot a + (2a)^2 - \frac{5a^3}{a}$ (3)

5.2 $(2x^2y)(-3x^3)(\sqrt{9}x^4y)$ (3)

.

5.3 $\frac{2}{3}p(6p^2)^3$ (3)

5.4 $\frac{-18m^2n^4r}{6m^2n^2r^3}$ (3)

5.5 $\frac{4p^2q-2pq+8p}{-2pq}$ (3)

5.6 Multiply $(5x^2 - 15x + 20)$ by $-\frac{1}{5}x^2y$ (3)

5.7 Subtract 7a + 4b – 3c from 8a – 3b + 4c (3)

5.8 $\frac{-y^7z^5}{4} \div \frac{z^3}{8y^2}$ (3)

5.9 Calculate the difference between $9m^4 + 3m^2 - 2$ and $3m^2 + 1$ (3)

5.10 Simplify (none of the variables is equal to zero).

5.10.1 $16x - x + 13x + 2x$ (1)

5.10.2 $\sqrt[3]{y^{12}}$ (1)

5.11 Calculate the value of $\sqrt{a^2 - b}$ if $a = -2$ and $b = 3$. (2)

[31]

QUESTION 6

Answer on the answer sheet attached to your answer book:

a. Plot Δ POQ on the Cartesian plane: P(2 ; 7); O(0 ; 0) and Q(5 ; 1). (3)

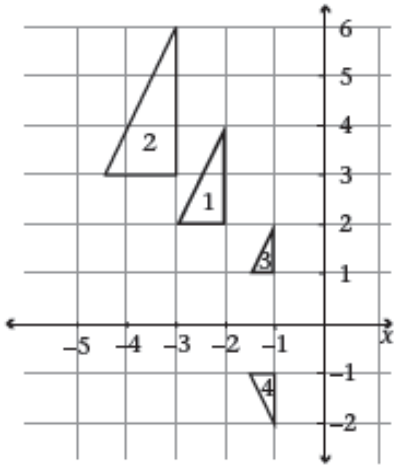
b. Reflect Δ POQ in the *y*-axis. Fill in the coordinates. (2)

c. Rotate Δ POQ through 180º around the origin. Fill in the coordinates. (2)

[7]

QUESTION 7

Use the diagram to describe precisely the transformation that took place. Also say whether they have been enlarged or reduced and give the factor.



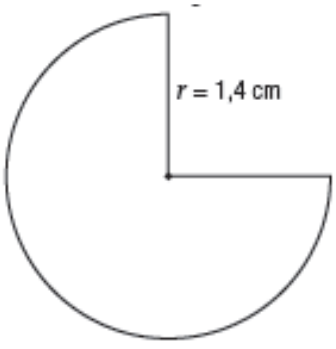
7.1 from Δ 3 to Δ 2 (2)

7.2 from Δ 1 to Δ 3 (2)

[4]

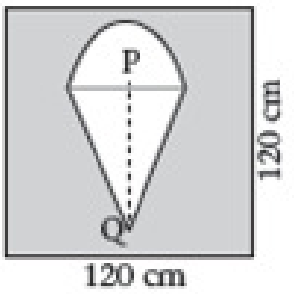
QUESTION 8

8.1 Calculate the perimeter of the given shape:



(5)

8.2 Chris used a square with side length 120cm to make a poster to advertise ice creams. The background of the poster is painted blue, the cone is painted yellow and the ice cream is painted white. The length of the cone (PQ) is 60 cm and the diameter of the ice cream is 70cm.



8.2.1 Find the area that must be painted blue. Calculate the answer in cm^2. (9)

8.2.2 Find the perimeter of the area that must be painted white. (4)

[18]

QUESTION 9

9.1 Solve for x

9.1.1 $25 - x = 16$ (1)

9.1.2 $\frac{0}{16} = 27x$ (1)

9.1.3 $10 + x - (19 + 3x) = -5x$ (4)

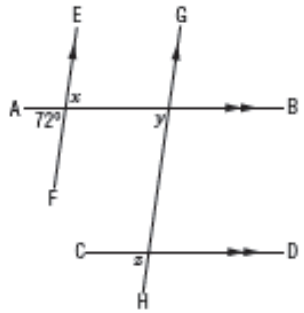
9.2 Three types of tickets were sold to spectators who wanted to watch swimming during the Olympic Games 2012. Category A tickets for £ 30 each, Category B tickets for £ 20 each and Category C tickets for £ 10 each. 250 Category A tickets were sold and twice as many Category B tickets than Category C tickets were sold. How many bought Category C tickets if the ticket sales totaled £ 27 500? (3)

[9]

QUESTION 10

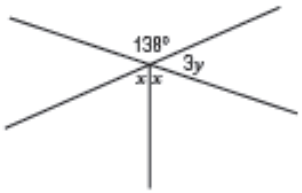
Find the values of x, y and z. Give reasons for your answers.

a



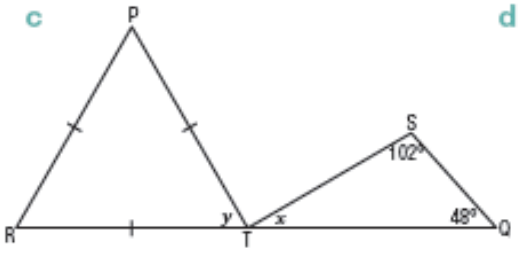
(4)

b



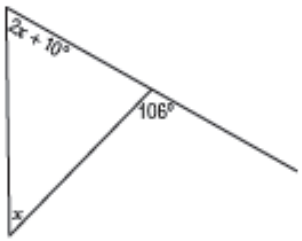
(6)

c



(5)

d



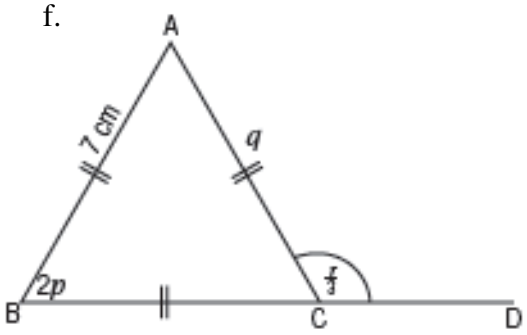
(3)

e. Is it possible that PR ∥ ST in question 10c? (2)

f. Find the values of f, p and q in the diagram below. Give reasons for your answers.

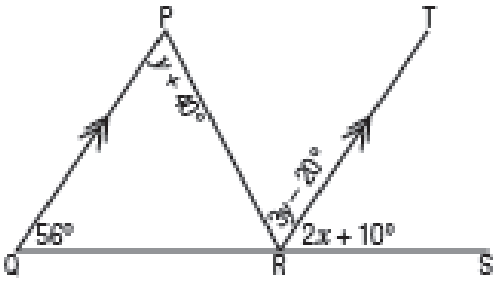
g. Find the values of x and y in the diagram below. Give reasons for your answers.

f.



(7)

g.



(8)

[35]

QUESTION 11

There are 20 CDs in a box: six with hip-hop music; three with house music; four with jazz music; two with country music and five with classical music. Write down the probability of randomly selecting a CD of:

11.1 hip-hop music

11.2 house music or jazz music

11.3 not country music

[3]

QUESTION 12

12.1 Learners scored the following percentages in an exam:

70 ; 74 ; 73 ; 68 ; 65 ; 62 ; 58 ; 57 ; 56 ; 55 ; 53 ; 53 ; 52 ; 43 ; 42 ; 39 and 31

a. Draw a stem-and-leaf graph of the data. (4)

b. Find the:

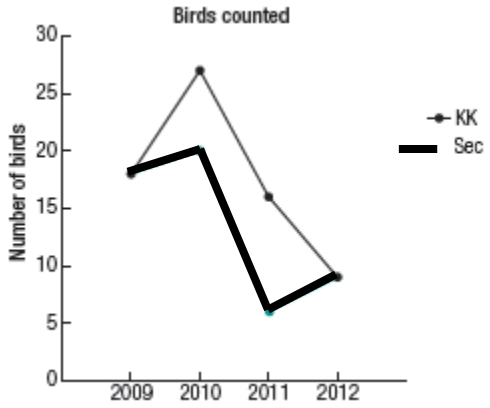
i. Mean (2)

1. Median (1)

2. Mode (1)

c. Why is it not a good idea to present this set of data on a double bar graph? (1)

12.2 The graph shows the number of Karoo Korhaans (KK) and Secretary birds (Sec) counted by bird watchers.



a. In which year was the count for secretary birds the lowest? (1)

b. Make a comment about the counts of 2010. (1)

c. Find the range of the counts for the Karoo Korhaan. (2)

d. True of false? There was a decline in the numbers of both types of birds from 2009 to 2012. Explain your answer. (1)

[14]

Total 150