HILLCREST HIGH SCHOOL

Grade 9 Mathematics Exam
June 2019

MARKS: 140 **TIME:** 2 hours

EXAMINER: Mr M Alborough
MODERATOR: Mr GA MacTavish

NAME :											CLASS:	
TEACHER:											DATE:	
Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	TOTAL	%
20	6	7	7	5	14	20	26	9	8	18	140	

INSTRUCTIONS

1. This question paper consists of 11 questions. Answer ALL the questions.
2. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
3. Show ALL calculations clearly.
4. Round off ALL final answers to TWO decimal places, unless stated otherwise.
5. Indicate units of measurement, where applicable.
6. Maps and diagrams are NOT necessarily drawn to scale, unless otherwise stated.
7. Write neatly and legibly.

Question 1 **[2 X 10 = 20]**

Fill in the table below with the letter which corresponds to the correct answer:

1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10

1.1 What is the value of $b^2 - 4ac$ if $a = -1$; $b = 3$; and $c = \frac{1}{4}$?

A) 8
B) 10
C) 2
D) 9

1.2 What is the general term of the following sequence?
1; 4; 9; 16; ...

A) $T_n = n^2$
B) $T_n = n + 3$
C) $T_n = 3n - 2$
D) $T_n = n^2 + 3$

1.3 What is the coefficient of x in the following expression:
$\mathbf{3x^2 - 2xy - x + 2}$

A) y
B) 3
C) -2
D) -1

1.4 Which of the following is equal to $(x + 5)^2$?

A) $x^2 + 25$
B) $x^2 - 25$
C) $x^2 - 10x + 25$
D) $x^2 + 10x + 25$

1.5 Which of the following is **NOT** equal to the others?

A) $x^2 - 4x$
B) $x(x - 4)$
C) $(x + 2)(x - 2)$
D) $x(x - 2) - 2x$

1.6 The equation of a straight line passing through the origin and perpendicular to $y = 2x - 7$ is:

A) $y = 2x$
B) $y = -\frac{1}{2}x+7$
C) $y = -\frac{1}{2}x$
D) $y = 2x + 7$

1.7 Bruce spends $\frac{3}{8}$ of his day asleep, $\frac{1}{4}$ at school and $\frac{1}{6}$ at the gym. How much time remains?

A) 2 hours
B) 3 hours
C) 4 hours
D) 5 hours

1.8 It takes Peter 40 minutes to travel to his Uncle Ben's house, which is 60 kms away. After half an hour of travelling, how far is he from his uncle's house?

A) 10 kms
B) 15 kms
C) 30 kms
D) 45 kms

1.9 $\frac{x^2y}{xy^2} \div \frac{x}{y}$

A) $\frac{x}{y}$
B) $\frac{x^2}{y^2}$
C) $\frac{xy^2}{x^2y}$
D) 1

1.10 Factorize $x^2 + 5x - 6$

A) $(x + 2)(x + 3)$
B) $(x - 2)(x - 3)$
C) $(x - 1)(x + 6)$
D) $(x - 6)(x + 1)$

Question 2 **[6]**

For each of the following, state whether they are true or false. If they are false, give the correct statement.

2.1 $\sqrt{16+1} = \sqrt{16} + \sqrt{1}$ (2)

_____

2.2 $f(x) = 2x - 5$ is perpendicular to $g(x) = 2x + 5$. (2)

_____

2.3 $2(x-6) = 2x + 12$ has no solution. (2)

_____

Question 3 **[7]**

$$\sqrt{3}\,;\,2\,;\,-\sqrt{4}\,;\,0\,;\,-\frac{27}{4}\,;\,2\frac{1}{4}$$

From the above list of numbers, list the:

3.1 Rational number(s): _____ (3)

3.2 Irrational number(s): _____ (1)

3.3 Natural number(s): _____ (1)

3.4 Integer(s): _____ (2)

Question 4 **[7]**

4.1 Write the following ratios in their simplest form:

4.1.1 1,8 : 0,02 (2)

_____

_____

4.1.2 3,5 days : 12 hours (2)

_____

_____

4.2 In a bag of 80 skittles, there are 17 green ones. If every bag is the same, how many skittles **ARE NOT** green out of 5 bags of skittles? (2)

_____

_____

_____

4.3 Convert 1,85kg to g. (1)

_____

_____

Question 5 **[5]**

5.1 It usually takes Shuri 1 hour to get to the beach on a Saturday. On a Sunday, there is less traffic and she is able to get there in 80% of the time. How long does it take on a Sunday? Give your answer in minutes. (3)

5.2 How far would Okuye travel if she drove at 70km/h for 90mins? (2)

Question 6 **[14]**

Simplify the following algebraic expression:

6.1 $2x^2y(3x - 4y^3 + 7)$ (3)

6.2 $x(3 - x) - x(2 - x)$ (3)

6.3 $(2y - 1)(3y + 7)$ (3)

6.4 $\left(x + \frac{1}{4}\right)\left(x - \frac{1}{4}\right)$ (2)

6.5 $(2x + 1)^2$ (3)

Question 7 **[20]**

Factorize the following expressions:

7.1 $17fg - 34$ (2)

7.2 $3x^2yz^4 - 9x^3y^3z + 6xyz$ (4)

7.3 $x^2 - 10x + 24$ (2)

7.4 $x^2 + 4x - 5$ (2)

7.5 $7x^2 + 14x + 7$ (3)

7.6 $4x^2 - \frac{1}{9}$ (2)

7.7 $3(x - 2) + x(x - 2)$ (2)

7.8 $x(y - 3) + 3(3 - y)$ (3)

Question 8 **[26]**

8.1 Solve for the unknown variable in each of the following equations:

8.1.1 $2x + 5 = 9$ (2)

8.1.2 $3(x + 2) - 1 = 5$ (3)

8.1.3 $3 - \frac{2}{3}x = 7$ (3)

8.1.4 $2(x - 4) = 5(x - 2)$ (3)

8.1.5 $(x - 2)(x + 1) = 0$ (2)

8.1.6 $x^2 - 3x + 2 = 0$ (3)

8.1.7 $x^2 = 9$ (2)

8.1.8 $\frac{x-9}{5} + \frac{x+2}{2} = 2$ (4)

8.2 Steve, Tony and Thor are brothers. Thor is the eldest and Steve is 3 years younger than him. Tony is 5 years younger than Steve. Their total age is 82 years Construct an equation and the solve it to determine the age of Thor. (4)

Question 9 **[9]**

9.1 $\frac{p^2qr}{2bc} \times \frac{2bc}{pqr}$ (1)

9.2 $\frac{6a^3b^2c^4}{12ab^5c}$ (2)

9.3 $\frac{x^2y^3}{3z^5} \times \frac{12z^2}{xy}$ (2)

9.4 $\frac{xy}{z} \times \frac{2x}{yz} \div \frac{4}{xyz}$ (4)

Question 10 **[8]**

Consider the following number pattern:

9; 7; 5; 3; ...

10.1 What is the value of the next term? _____ (1)

10.2 Find the general term, T_n? _____ (2)

10.3 What is the value of the 27^{th} term? (2)

10.4 Which term has a value of **-173**? (3)

Question 11 **[18]**

11.1 If the equation of a particular straight line is $y = -2x + 1$, state the value of the gradient and the value of the co-ordinates of its y-intercept? (2)

11.2.1 Find the gradient of the line joining A(-3; 2) and B(3; -2). (2)

11.2.2 Give the equation of the line passing through the above points A and B. (4)

11.3.1 On the set of axes provided on the following page, draw both of the following graphs. Show all workings and intercepts. (8)

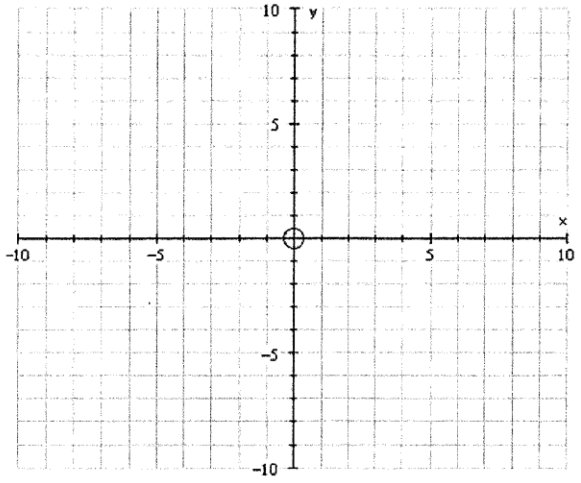
$$f(x) = -x + 4$$

$$g(x) = \frac{3}{4}x - 3$$

11.3.2 Reading off the graph, what is the x-value at which these graphs intersect? (1)

11.3.3 What will be the gradient of a line perpendicular to $g(x)$? (1)

Q 11.3.1



Workings: