

HILLCREST HIGH SCHOOL

MATHEMATICS: GRADE 8

JUNE 2013

TIME: 2 HOURS

TOTAL: 140

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READ THE INSTRUCTIONS CAREFULLY

THIS PAPER CONSISTS OF 8 QUESTIONS AND 6 PAGES.

CHECK THAT THERE ARE NO PAGES MISSING

1. Write your name and your maths teacher's name on your answer paper.
2. Answer all the questions.
3. Where necessary show all working details and work neatly.
4. A calculator may be used, provided it is non-programmable.
5. Where necessary, give answers rounded off to one decimal digit.
6. It is in your interest to write clearly and neatly.

QUESTION 1:

1.1 Arrange the following numbers in ascending (smallest to biggest) order:

$-7; \frac{5}{2}; 4,5; -1\frac{1}{2}; -3,25; 0$  (3)

1.2 State whether the following are TRUE or FALSE.

1.2.1  $0 < -5$  (1)

1.2.2  $1 > -4$  (1)

1.2.3  $-7 > -6$  (1)

1.3 From the list of numbers below, write the missing number that would make each of the following equations true. (numbers may be used more than once)

$-23; 23; -3; 3; -2; 2; -16; 16$

1.3.1  $10 + \square = -13$

1.3.2  $10 - \square = -13$

1.3.3  $10 - \square = 13$

1.3.4  $5 \times \square + 19 = 4$

1.3.5  $-5 \times \square + (-2 \times -7) = 4$

1.3.6  $\sqrt[3]{27} + \sqrt{\square} = 7$  (6)  
[12]

QUESTION 2:

2.1 Calculate the value of the ?:



2.2 Draw a flow diagram for  $\frac{a+1}{2}$ . (2)  
[6]

QUESTION 3:

3.1 Complete the following sentences by filling in the most appropriate word from the list below. Write the question number and the word/s only.

add, subtract, multiply, divide, plus, minus, like, unlike, zero, one

3.1.1 Terms are separated by \_\_\_\_\_ and \_\_\_\_\_ signs. (2)

3.1.2 We can only add or subtract \_\_\_\_\_ terms. (1)

3.1.3 When we multiply bases that are the same, we \_\_\_\_\_ the exponents. (1)

3.1.4 When there is no coefficient or exponent written, the value of the coefficient or exponent is \_\_\_\_\_ . (1)

3.2 How many terms in the following expressions?

3.2.1  $3a + 2b - 5cd$  (1)

3.2.2  $4t + (2p + 3q)$  (1)


3.3 Write an algebraic expression for the following:

3.3.1 The sum of  $5p$  and  $3q$ . (1)

3.3.2 The number of hours in  $b$  days. (1)

3.3.3 Susan's age in 10 years time if she is  $y$  years old now. (1)

3.3.4 The difference between  $a$  and  $b$ . (1)

3.3.5  (2)

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QUESTION 4:

- 4.1 For the following statements, write TRUE or FALSE, if FALSE, give an example that shows why it is FALSE.
- 4.1.1 Natural numbers can be divided into two groups, namely, even and odd numbers.
- 4.1.2 The square root of any natural number is also a natural numbers.
- 4.1.3 A prime number is a number that is divisible ONLY by itself and one.
- 4.1.4 The first 6 prime numbers are 2; 3; 5; 7; 9; 11.
- 4.1.5 A factor of a number is any number that divides exactly into the given number, with no remainder. (7)
- 4.2 Any number can be written as a product of prime factors e.g.  $24=2 \times 2 \times 2 \times 3$
- 4.2.1  $392 = 2 \times \dots$  Complete by finding the other prime factors of 392. (2)
- 4.2.2 What is the smallest number 392 must be multiplied by to make it a perfect square? (1)
- 4.3.1 I have 32 cups and 40 saucers, I need to pack them into boxes so that a box of cups contains the same number of cups as a box of saucers does. (ie. if a customer buys one box of each they will have equal number of cups and saucers)  
What is the highest number of cups/saucers I can pack in a box? (3)
- 4.3.2 I have a number of cards. If I arrange them in rows of 2, 3 or 4, one card always remains. However, if I arrange them in rows of 5, nothing remains. How many cards do I have?  
(If you think there can be more than one answer, give the smallest value) (3)  
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QUESTION 5:

Calculate the following without the use of a calculator: (show all necessary working)

- 5.1  $\frac{10 + (-10)}{16}$  (2)
- 5.2  $\frac{-64}{4 - 4}$  (2)
- 5.3  $(\sqrt{29})^2$  (1)
- 5.4  $7 \times 2 - 4 \times 5$  (2)
- 5.5  $\sqrt{16} - 9^2$  (3)
- 5.6  $\sqrt{100 - 36}$  (2)
- 5.7  $\sqrt{4} \times \sqrt[3]{27}$  (3)
- 5.8  $\sqrt[3]{64} - \sqrt[3]{1}$  (3)  
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QUESTION 6:

6.1 Are the following statements TRUE or FALSE, write your choice, if FALSE, give the correct answer.

6.1.1  $a \times b \times (3 + 2) = 5ab$

6.1.2  $2y + x = 2yx$

6.1.3  $x \times (1 + 5) \times y = 6 + xy$

6.1.4  $3z + y + x$  is in its simplest form.

6.1.5  $7 + 8b + 2 = 9 + 8b$  (7)

6.2 Simplify fully, show any necessary working:

6.2.1  $a + a + a$  (1)

6.2.2  $a \times a \times a$  (1)

6.2.3  $2c + 6d + 5c - 3d$  (2)

6.2.4  $7yz + 5yz - 6zy$  (2)

6.2.5  $5b^4 - (-b^4)$  (2)

6.2.6  $3a + 5a^2 + 6a - 7a^2$  (2)

6.2.7  $(3t^2)(-7t^3)$  (2)

6.2.8  $5ab^3 \times 2a^3b$  (2)

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QUESTION 7:

7.1 Simplify the following as far as possible:

7.1.1  $\frac{7b^2}{7b^2}$  (1)

7.1.2  $\frac{-4a^5}{4a^3}$  (2)

7.1.3  $\frac{4p + 8k}{2}$  (2)

7.1.4  $\frac{6m + 6mn}{2m} + \frac{3m - 9mn}{3m}$  (3)

7.2 Multiply the brackets out and simplify if possible:

7.2.1  $2(4x + 1)$  (2)

7.2.2  $-x(x - 3)$  (2)

7.2.3  $6b(2f - 3g) + 3b(f - 4g)$  (4)

7.2.4  $3(2x^2 + 3x - 4)$  (4)

7.3 Calculate the value of:

$4a + 2b$  if  $a = 2$  and  $b = 5$  (3)

[23]

QUESTION 8:

8.1 Solve for the unknown variable by inspection:

8.1.1  $a + 2 = 5$  (1)

8.1.2  $5 - b = 7$  (1)

8.1.3  $5c = 15$  (1)

8.1.4  $\frac{d}{-4} = 5$  (1)

8.2 Solve for variable that makes the equation true.

8.2.1  $7e = 4e + 9$  (2)

8.2.2  $5f + 4 = 3f + 16$  (3)

8.2.3  $g + 7 = 31 - 5g$  (3)

8.2.4  $4h + 8 = 12h + 4 - 2h - 2$  (4)

8.2.5  $2k + 8 = 2(k + 4)$  (2)

8.2.6  $6(j - 1) = 3(j + 4) + 6$  (5)

8.3 I think of a number. If I multiply the number by 3 and then add 6, I will get 51. What number did I think of? (Show how you got the answer.) (3)

8.4 Is  $b = 4$  the solution of the equation  $\frac{5b}{2} - 3 = b$ ? Give a reason for your answer. (2)

8.5 Rachel opened her mathematics text book to the sum of the facing pages to be 243. At what two numbered pages did she open her book? (3)  
[31]