

NAME: \_\_\_\_\_

DATE: 11/04/14

**ASSIGNMENT: Paper 3 Polynomial Preview**

**1.) Consider the expansion of the following expression:  $(x^4 - 3)^6$**   
(2007 Math SL Paper 1 question)

**a.) Write down the number of terms in this expansion: \_\_\_\_\_ [3 marks]**

**b.) Find the term for  $x^{20}$ : \_\_\_\_\_ [3 marks]**

**2.) Consider the function  $f(x) = (x - 1)(9x^2 + kx + 1)$ . For what value of “k” will the function have a root with a multiplicity of 2? (2007 Math SL Paper 1 question)**

**Answer: \_\_\_\_\_ [3 marks]**

**3.) Factor  $(27x^3 + 8y^6)$ .**

**Answer: \_\_\_\_\_ [3 marks]**

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4.) Alyssa graphs  $f(x) = 4x^3 - 2x^2 + 6x + 1$  and believes that  $-\frac{1}{4}$  will be the root of the function.

a.) Utilize synthetic division to determine the truth value of her hypothesis.  
[3 marks]

True or False (show all work)

b.) How many real roots and how many imaginary roots are there in this function?  
[2 marks]

Answer: \_\_\_\_\_

5.) Find the quotient of  $2x^5 - x^3 + 2x^2 - 3$  and  $x^2 + 1$ . [3 marks]

Answer: \_\_\_\_\_

6.) In the following function, utilize factoring to find ONE root:  $f(x) = 125x^3 - 64$   
[3 marks]

Answer: \_\_\_\_\_

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7.) Write the simplest form of the polynomial that has the following roots:  $\sqrt{5}$ ,  $3 - i$   
[3 marks]

8.) Find the roots of the following function and state the multiplicity of each:  
[5 marks]

$$f(x) = 3x^4(x - 4)(x^2 - 16)(x^2 - x - 12)$$

Answer: \_\_\_\_\_

9.) Rachel lies awake thinking of two functions: [3 marks]

$$a(x) = 2x^3 - 7x^2 + x + 1 \quad \text{AND} \quad b(x) = 5x^4 + x^2 - 8x - 3$$

She mentally thinks of all the possible roots and realizes that the functions could only potentially share two roots. What are the two roots and why?

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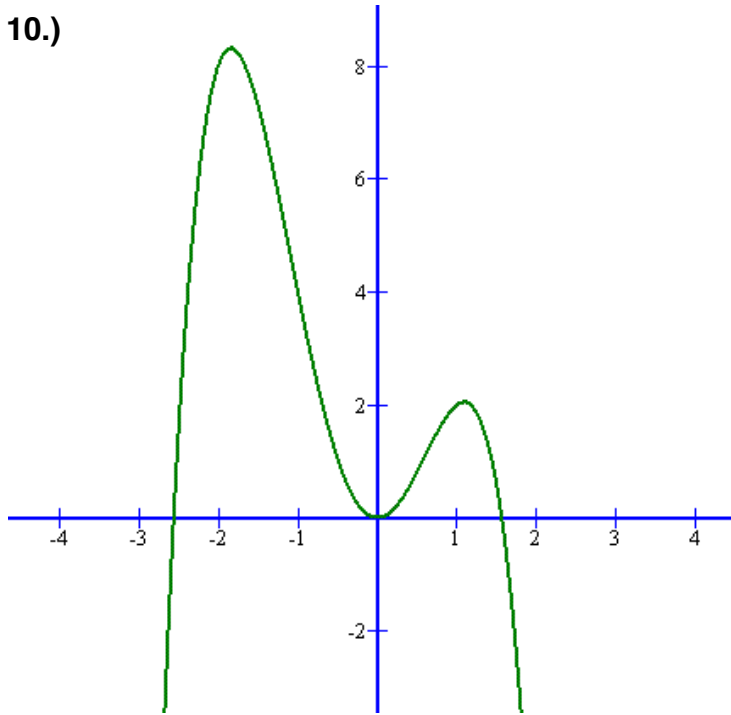
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10.)



The graph of  $h(x)$  is displayed to the right. [2 marks each]

A: Give the ordered pair(s) for the local maximum(s).

\_\_\_\_\_

B: Give the ordered pair(s) for the local minimum(s).

\_\_\_\_\_

C: Describe the end behavior for the graph: \_\_\_\_\_

D: Is the graph... EVEN or ODD

E: Is the leading coefficient, or "a" value... POSITIVE or NEGATIVE

F: What is value of  $h(-1)$ : \_\_\_\_\_

11.) Consider the function  $f(x) = 3x^4 - 2x^2 + x - 5$ . Sequentially layer transformations in order to create new functions in a step-by-step process.

Create  $u(x)$  by horizontally translating  $f(x)$  4 units to the right. [2 marks]

\_\_\_\_\_

Create  $t(x)$  by vertically stretching  $u(x)$  by a factor of 2. [2 marks]

\_\_\_\_\_

Create  $v(x)$  by reflecting  $t(x)$  across the x-axis. [2 marks]

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