Pre-Calculus A
Polynomials Quiz Review

Name : _____
Date : _____ Period : ____

1. Find the zeros of the function $f(x) = x^4 - x^3 - 2x^2$ algebraically.

2. Determine the complete factorization of the polynomial $f(x) = 3x^3 - 10x^2 + 12x - 22$ given one factor $(x-4)$.

   SKIP THIS ONE! ☺

3. Find the possible rational zeros and then determine the complete factorization of the function $g(x) = 2x^3 + 11x^2 - 21x - 90$.

4. Use the Rational Zero Test to list all possible rational zeros of the function $h(x) = 4x^3 - 11x^2 + 10x - 3$.

5. Use synthetic division to divide $(24x^2 - x - 8) \div (3x - 2)$.

6. Use synthetic division and one given zero to factor the polynomial completely and find all real zeros of the function. $2x^3 - 15x^2 + 27x - 10 = 0,\ x = \frac{1}{2}$

7. State all possible rational zeros of the function $h(x) = 2x^3 - 3x^2 - 3x + 2$, then find all real zeros.

8. State all possible rational zeros of the function $f(x) = x^3 - 4x^2 - 2x + 3$, then find all real zeros.

9. Use the Remainder Theorem to evaluate the function $g(x) = 2x^3 - 7x + 3$ at each given value.

   a. $g(1)$ b. $g(-2)$ c. $g(2)$

For questions #10 – 12, perform the following operations and write all answers in standard form.

10. $(8+5i)-(2+3i)$

11. $(1+2i)(6-3i)$

12. $\dfrac{4+3i}{3-2i}$

For questions #13 – 14, write the complex conjugate of the number, then multiply the two quantities.

13. $-2+3i$

14. $6-2i$

15. Show that $2-3i$ is a solution of $x^2-4x+13=0.$

16. Find all real and/or imaginary solutions of the function $f(x)=x^3-5x^2+11x-15$.

17. If 2 – 3i is a root of a polynomial equation, then _____ is also a root.

18. Find a second-degree polynomial equation with real coefficients that has a root of $-3i$.

19. Find a second-degree polynomial equation with real coefficients that has a root of $1-i$.

20. Find a fourth degree polynomial equation with real coefficients that has roots of 4, -2, and $4i$.

21. Find a polynomial equation with real coefficients that has the given zeros: -3, 0, 1, 4

Answer Key:

1. $x = -1,\ 0,\ 2$

2. SKIP ☺

3. $(x-3)(2x+5)(x+6)$

4. $\pm 1, \pm 3, \pm \frac{1}{2}, \pm \frac{1}{4}, \pm \frac{3}{2}, \pm \frac{3}{4}$

5. $24x + 15 + \frac{2}{3x-2}$

6. $x = \frac{1}{2}, 2, 5$

7. $x = -1, \frac{1}{2}, 2$

8. $x = -1, \frac{5+\sqrt{13}}{2}, \frac{5-\sqrt{13}}{2}$

9. a) 2 b) 1 c) 5

10. $6 + 2i$

11. $12 + 12i$

12. $\frac{6}{13} + \frac{17}{13}i$

13. 13

14. 40

15. Show Quadratic Formula work

16. $x = 3,\ 1+2i,\ 1-2i$

17. $2 + 3i$

18. $f(x) = x^2 + 9$

19. $j(x) = x^2 - 2x + 2$

20. $g(x) = x^4 - 2x^3 + 8x^2 - 32x - 128$

21. $h(x) = x^4 - 2x^3 - 11x^2 + 12x$