Name: _____ Date: _____ Period: _____

Unit 3 Exam Review *Honors Algebra 2*

Logistics of the Exam - The exam will be 20 questions. There will be 15 multiple choice [MC] questions and 5 free response [FR] questions where work and/or explanations will need to be shown to earn full credit. 10 of the multiple choice questions will be ACT style with 5 answer choices (DOK Level 1). 5 of the multiple-choice questions will be SAT style with 4 answer choices (DOK Level 2). The multiple choice questions could also include "select all that apply" or "none of the above". The free response questions will be a mix of error analysis, short answer and grid response. You will have 80 minutes for the entire exam, and you may **not** have more time.

Extra Resources and Tools Allowed on the Exam: pencil, highlighter, ruler, SAT Reference Sheet, and graphic display calculator or scientific calculator for the multiple choice section <u>only</u>.

Content of the Exam - Students will be expected to know how to:
- determine which set(s) a number belongs to.
- simplify radials with negative radicands and combine like terms if possible.
- multiply radicals with negative radicands.
- simplify an expression involving powers of i [FR]
- add and subtract complex numbers. [FR]
- multiply two complex numbers.
- divide two complex numbers. [FR]
- factor a difference of squares (DOS).
- factor a sum of squares (SOS).
- factor a trinomial using any trinomial method. [FR]
- factor a perfect square trinomial (PST).
- solve a quadratic equation by factoring.
- solve a quadratic equation by using square roots. [FR]
- solve a quadratic equation by completing the square. [FR]
- solve a quadratic equation by quadratic formula and give answers exactly.
- find the discriminant of a quadratic equation and determine the number & type of solutions.
- solve a quadratic equation by graphing.
- solve a quadratic inequality by graphing.
- use any solving method to solve an application problem.
- select the best method for solving a quadratic equation and give a reason.

In addition to the skills above, there will be critical thinking questions where you might have to apply to a new situation.

Practice Problems – The rest of this packet includes practice problems for the skill list above. Please understand that these problems will not be collected and they might not be as easy or as difficult as the ones on the exam but they will provide practice on the skills.
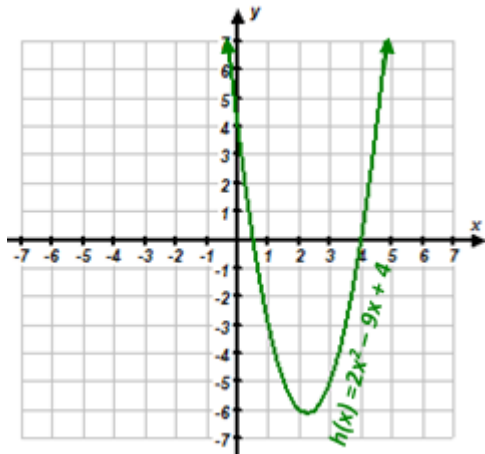
State the number set(s) the following numbers belong to by checking the appropriate boxes under the columns.

		$\mathbb{N}$ natural	$\mathbb{Z}$ integers	$\mathbb{Q}$ rational	$\mathbb{R}$ real	$\mathbb{I}$ imaginary	$\mathbb{C}$ complex
1.	29						
2.	$2+i$						
3.	$-\sqrt{10}$						
4.	$\dfrac{25}{2}$						

Simplify or multiply radicals with negative numbers as the radicand.	
5. $\sqrt{-4}$	6. $-\sqrt{-20}$
7. $\sqrt{-\frac{2}{5}}$	8. $\sqrt{-\frac{9}{25}}$
9. $2\sqrt{-6}\cdot\sqrt{12}$	10. $\sqrt{-5}\cdot\sqrt{-10}$

Add, subtract, multiply and divide complex numbers.	
11. $(13+2i)+(-4-5i)$	12. $(3+2i)-(5+4i)$
13. $(1+6i)(4-3i)$	14. $\dfrac{7}{6-i}$

Compute to either i, -1, -i, or 1.			
15. $i^{26}=$	16. $i^{315}=$	17. $i^{56}=$	18. $i^{89}=$

For the following questions, factor the expression using the best and most appropriate factoring method. Be able to factor an expression or give one of its factors.

19. Factor. x^2+64	20. Factor. $9x^2-4$	21. Factor. x^2-7x+6
22. Factor. $16x^2+8x+1$	23. $2x^2+7x-15$	24. Is $x+3$ a factor of $x^2-11x+24$?
25. Factor completely. $32x-8x^3$	26. Factor. $100x^2-49y^2$	27. Factor. $6x^2-13x-5$

For each of the following questions, please solve using the best and most appropriate solving method. Be sure to practice all 4 methods. You will be asked to solve using a particular method or will be able to choose your own method. Sometimes you might be asked what is one of the solutions not both.

28. Solve. $5x^2+3=28$	29. Solve. $x^2+8x=-15$
30. Solve. $2x^2+2x-5=0$	31. Solve. $x^2-14x+3=0$
32. Solve. $3(x+2)^2+8=29$	33. Solve. $4x^2-4x+7=-12x$

Find the discriminant for the quadratic equations.

34. $2x^2+8=5x$	35. $0=2x^2-4x+2$	36. $7x^2-10x=0$

Solve the equations below by graphing.

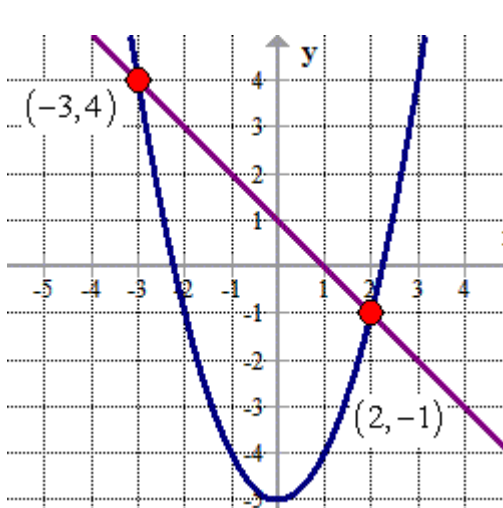| 37. Solve. $2x^2 - 9x + 4 = 0$	38. Solve $-x^2 - 2x + 3 = 3$
$h(x) = 2x^2 - 9x + 4$	$f(x) = 3$ $g(x) = -x^2 - 2x + 3$
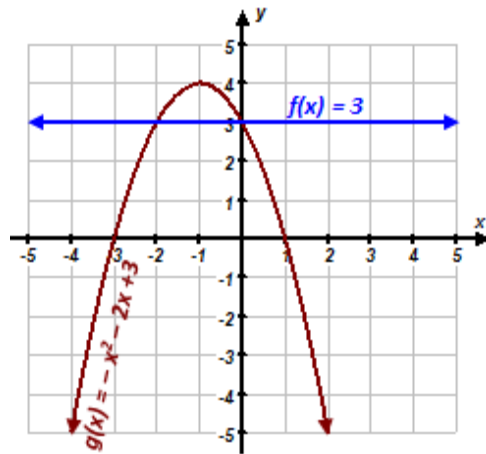
Solve the inequalities below by graphing.

39. Solve $x^2 - 5 < -x + 1$	40. Solve $x^2 - 4x + 5 \geq x + 2$
$(-3,4)$ $(2,-1)$	
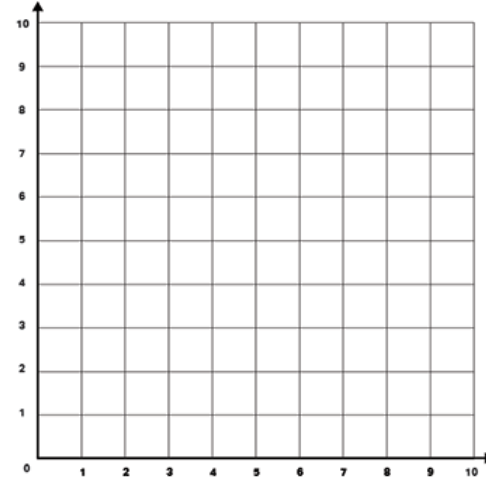
Use the situation to create and solve a model for answering the prompt.

41. A rectangular building lot is 8ft longer than it is wide and has an area of 2900ft². Find the dimensions of the lot. Hint: Area = length × width	42. Suppose that an object is launched straight upward with an initial speed of 800 feet per second. The formula that models the path of projectile is $h = -16t^2 + st$ where t is the time, s is the speed and h is the height. When does the object reach a height of 6400ft?