HONORS Algebra 2 Name: _____

UNIT 1 STUDY GUIDE *Unit 1: Quadratics Revisited*

Copy problems and show all work on a separate sheet of paper (neatly!).

Learning Target 1: Factor Quadratic Expressions and Solve Quadratic Equations by Factoring

#1-4: Factor the expression completely.

1) $9x^2 + 24x + 16$ $(3x+4)^2$

2) $x^2 - 8x - 48$ $(x-12)(x+4)$

3) $12x^2 - 30x$ $6x(2x-5)$

4) $16x^2 - 8x - 24$ $8(2x-3)(x+1)$

5) What numbers can you use for b in $x^2 + bx - 24$ so that the expression can be factored? Assume that $b > 0$ (positive). Hint: Begin with a product-sum table. $b = 2, 5, 10, 23$

Solve each equation by **factoring**.

6) $3x^2 + 10x = 8$ $x = -4, \frac{2}{3}$

7) $x^2 - 16 = 0$ $x = \pm 4$

8) $55x^2 - 11x = 0$ $x = 0, \frac{1}{5}$

Learning Target 2: Complex Numbers and Solve Quadratic Equations using Other Methods

Make sure you know the powers of i: $i^1 = i$, $i^2 = -1$, $i^3 = -i$, $i^4 = 1$,...***(remember the pattern repeats)***

Simplify completely

9) $12 + \sqrt{-50}$ $12 + 5\sqrt{2}\,i$

10) $3i^{37} - 5i^{28}$ $-5 + 3i$

11) What is the complex conjugate of $-6 + 7i$? $-6 - 7i$

#12-15: Simplify or perform the indicate operation. Write tour answer in standard form.

12) $(3 + 2i) + (-7 - 4) - (6 - 5i)$ -7

13) $(2 - 3i)(4 + 5i)$ $23 - 2i$

14) $(3 - 11i)^2$ $-112 - 66i$

15) $\frac{4 + 7i}{1 - 2i}$ $-2 + 3i$

16) What is the complex conjugate of $-2 + 7i$? $-2 - 7i$

17) Solve for x by **completing the square**. Give exact solutions in simplest form. $x^2 = 8x + 6$ $x = 4 \pm \sqrt{22}$

18) Solve using the **quadratic formula**. Give exact solutions in simplest form.

$5x^2 + 4x = 5$ $x = -\frac{2}{5} \pm \frac{\sqrt{29}}{5}$

Solve the equation using any method (try to choose the best one). Give exact solutions in simplest form (no decimals).

CS 19) $3x^2+12x=9$ $x=-2\pm\sqrt{7}$

20) $3x^2-5x=-1$ $x=\frac{5}{6}\pm\frac{\sqrt{13}}{6}$ QF

IO 21) $7x^2+45=2x^2+25$ $x=\pm 2i$

22) $3(x-1)^2+7=34$ $x=4,-2$ IO

QF 23) $5x^2+6x+9=0$ $x=-\frac{3}{5}\pm\frac{6}{5}i$

24) $x^2+13=6x$ $x=3\pm 2i$ CS

25) Find the discriminant of the quadratic equation. Do NOT solve the equation.

a) $7x^2+6x+2=0$ -20

b) $2x^2-3x+1=0$ 1

c) $x^2-6x+9=0$ 0

d) $x^2+4x-1=0$ 20

26) The discriminant of a quadratic equation is given is given. What does it tell you about the number and type of solutions the equation will have?

a) 18 2 real irrational

b) -16 2 imaginary

c) 36 2 real rational

d) 0 1 (repeated), real, rational

27) Determine if the graph of the quadratic function has 0, 1, or 2 *x*-intercepts.

a) $y=x^2+4x-1$

The discriminant is 20, so the graph has 2 *x*-intercepts.

b) $y=7x^2+6x+2$

The discriminant is -30 so there are no *x*-intercepts.