First name: _____ Last name: _____ Student ID: _____

Algebra 2 Homework

1. Solve each equation by factoring.

1. $3x^2 + 11x - 20 = 0$	2. $x^2 + 14x + 24 = 0$	3. $8x^2 - 55x = -42$
4. $x^2 + 16x + 55 = 0$	5. $x^2 + 8x + 7 = 0$	6. $x^2 + 4x = 60$

2. Solve each equation by factoring

1. $-2x^2 + 14x - 6 = 14$	4. $x^2 + 3x - 4 = 0$	3. $x^2 - 2x - 8 = 0$
4. $4x^2 = 3x^2 + 4x + 5$	5. $x^2 + 8x = -12$	6. $x^2 - x - 10 = 2$
7. $6x^2 - 24x - 48 = 18x$	8. $x^2 + 8x + 7 = 0$	9. $x^2 + 4x - 5 = 0$

Challenge problems

1. Let the operation * be defined by $a * b = a^2 + 3^b$. What is the value of (2 * 0) * (0 * 1)?

2. Let N = 999,999,999,999,999,999. How many 9's are in the decimal expansion of N^2?

3. Which is the largest of the following: 1^{48}, 2^{42}, 3^{36}, 4^{30}, 5^{24}, 6^{18}, 7^{12}, 8^6, 9^0? (Write the exponential expression, not the large integer which it equals.)

4. What is the largest possible value for the sum of two fractions such that each of the four 1-digit prime numbers occurs as one of the numerators or denominators?

5. How many integers x in {1, 2, 3, …, 99, 100} satisfy that $x^2 + x^3$ is the square of an integer?

6. How many pairs (x, y) of positive integers satisfy $2x + 7y = 1000$?

7. What is the sum of the three smallest prime numbers each of which is two more than a positive perfect cube?

8. How many 9's are in the decimal expansion of 99999989999^2? (This is the square of an 11-digit number.)

9. Simplify $\sqrt{3+2\sqrt{2}} - \sqrt{3-2\sqrt{2}}$.

10. What is the smallest positive integer k for which there exist integers $a > 1$ and $b > 1$ for which the correct simplification of $\sqrt{k}$ is $a\sqrt{b}$, and the correct simplification of $\sqrt[3]{k}$ is $b\sqrt[3]{a}$?