ALGEBRA II EXAM

Circle your answers.

(1) Find a positive real number so that the sum of the number and its square is 1.

(2) The average of three numbers is 42. The first two numbers differ by 1, and the average of the second and third numbers is 47. What are the three numbers?

(3) The lines $15x + 20y = -2$ and $x - y = -2$ intersect at point P. Find all values of k so that P is on the line $2x + 3y = k^2$.

(4) Simplify $log_2 24 - log_2 \frac{3}{2}$

(5) At the conclusion of a party, 36 handshakes are exchanged. Assuming that each guest shook hands with each of the others, find the number of guests n at the party.

(6) Determine the largest possible value of the function $f(x) = x + 4y$ subject to the constraints:

    (a) $5x + 6y \leq 30$

    (b) $3x + 2y \leq 30$

    (c) $x \geq 0$, and

    (d) $y \geq 0$.

(7) Write 17.125 in base 2.

(8) Determine a value of a such that one root of the equation $ax^2 + x - 1 = 0$ is five times the other root.

(9) Find the maximum value of x so that 2^x divides 19!

(10) The numerator and denominator of a fraction are integers differing by 16. Find the fraction if its value is more than $\frac{5}{9}$ and less than $\frac{4}{7}$.

(11) Find non-zero real numbers A and B so that A and B are the roots of the equation

$$x^2 + Ax + B = 0$$

.

(12) Solve:
$$\sqrt{\frac{x-1}{x}} + 4\sqrt{\frac{x}{x-1}} = 5.$$

(13) Find a non-zero value for c so that the open interval $(-3c, c)$ is the solution set for the inequality
$$x^2 + 2cx - 6c < 0$$

.

(14) Find all values of x satisfying
$$\frac{x - \sqrt{x+1}}{x + \sqrt{x+1}} = \frac{11}{5}.$$

(15) Find the last two digits of $N = 11^{10} + 1$.

(16) Solve the following system for x and y:

$$\frac{1}{x^2} + \frac{1}{xy} = \frac{1}{a^2}$$
$$\frac{1}{y^2} + \frac{1}{xy} = \frac{1}{b^2}$$

(17) Give the values for p and q so that the points (-1, 1), (-2, -5), (2, 2), and (p , q) are the vertices of a parallelogram.

(18) Give the largest value n so that n of the points

$$\left(1,\frac{1}{6}\right),\left(-2,\frac{7}{6}\right),\left(5,-\frac{7}{6}\right),\left(1,\frac{19}{6}\right),\left(-2,-\frac{5}{6}\right),\left(5,-\frac{13}{6}\right),\left(3,-\frac{5}{2}\right),\left(-1,-\frac{13}{6}\right)$$

lie on the same line. Identify the points on this line and give the equation of the line.

(19) The set A consists of 10 distinct integers. The smallest of these integers is -6, and the largest is 5. The sum of the integers is 1. Give all possible choices for the set A.

(20) It is well known that the area of a triangle with vertices $(a,b),(c,d),(e,f)$ is given by $\frac{1}{2}\left|(c-a)(f-b)-(d-b)(e-a)\right|$. Give the area of the polygon shown below.
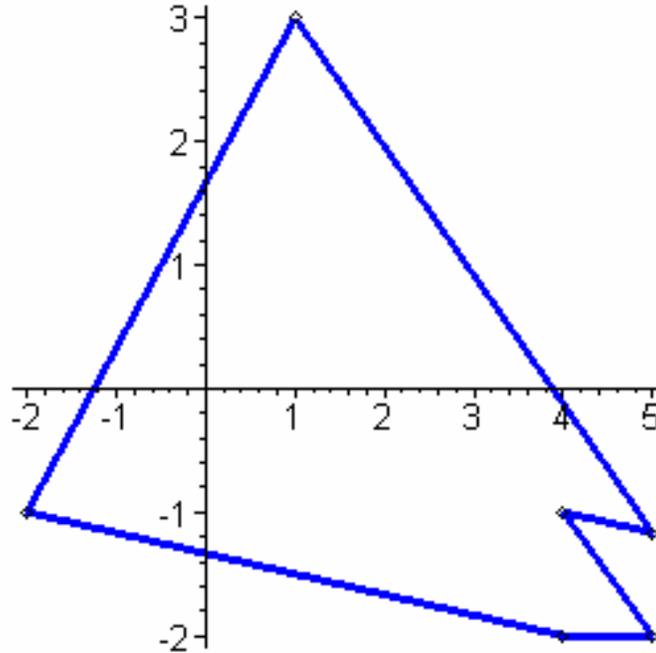
Name: _____

School: _____

Answer Sheet - Algebra II Exam

Place your answers on this sheet. The work on your exam will only be graded in case of a tie breaker.

1.	**11.**
2.	**12.**
3.	**13.**
4.	**14.**
5.	**15.**
6.	**16.**
7.	**17.**
8.	**18.**
9.	**19.**
10.	**20.**