

First name: \_\_\_\_\_ Last name: \_\_\_\_\_

Student ID: \_\_\_\_\_

### Algebra 1

1. Given  $x^2 + y^2 = 28$  and  $xy = 14$ , find the value of  $x^2 - y^2$ .

2. Suppose  $(a, b)$  is a solution to the system of equations  $ab = 5$  and  $a^2b + ab^2 + a + b = 42$ .

determine  $a^2 + b^2$ .

3. Find the value of  $(1 + \frac{1}{2})(1 - \frac{1}{3})(1 + \frac{1}{4})(1 - \frac{1}{5}) \cdots (1 - \frac{1}{n-1})(1 + \frac{1}{n})$ .

4. Simplify the expression of  $\sqrt{1+\frac{\sqrt{3}}{2}} + \sqrt{1-\frac{\sqrt{3}}{2}}$ .

5. Simplify the product of  $(1-\frac{1}{3})(1-\frac{1}{4})(1-\frac{1}{5})\cdots(1-\frac{1}{n-1})(1-\frac{1}{n})$ .

6. Suppose that  $a + b = 3$  and  $a^2 + b^2 = 7$ , determine  $a^4 + b^4$ .

7. If  $x^2 + 3x + 5$  is a factor of  $x^4 + ax^2 + b$ , determine  $a + b$ .