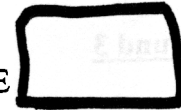


**Round 4**

SCORE



*Reduce all fractions and put all radicals in simplest radical form.*  
 The number of the problem is the value of the problem.

A new operation symbol has been created. Your task is to determine how the operation works.

Based on each equation below, what would  $7@8$  equal?

$$1@2 = 5$$

$$3@4 = 25$$

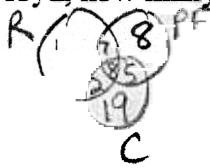
$$4@5 = 41$$

$$5@6 = 61$$

$$49 + 64 = 113$$

1. 113

2. Sixty-eight students at Rock and Roll High School had CDs by the Ramones, Pink Floyd, and the Carpenters. Eight of these students had all three of these CDs. Seven additional students had the Ramones and Floyd, five had Floyd and the Carpenters, two had the Carpenters and the Ramones. If 36 students had the Ramones, and 28 had Pink Floyd, how many students had the Carpenters?



$$19 + 2 + 8 + 5 = 34$$

2. 34

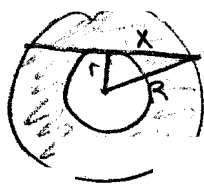
3. Express as a fraction with positive exponents and reduced to lowest terms.

$$\frac{(a^{-1} - b^{-1}) a^4 b^4}{(a^{-2} - b^{-2}) a^4 b^4} = \frac{b^4 - a^4}{a^2 b^4 - a^4 b^2}$$

$$\frac{(b^2 + a^2)(b^2 - a^2)}{a^2 b^2 (b^2 - a^2)}$$

3.  $\frac{b^2 + a^2}{a^2 b^2}$

4. The area of the ring between 2 concentric circles is  $12.5\pi$  square inches. What is the length (in inches) of a chord of the larger circle tangent to the smaller circle?



$$\pi R^2 - \pi r^2 = 2.5\pi$$

$$R^2 - r^2 = 2.5$$

$$x^2 = R^2 - r^2$$

$$x^2 = 2.5$$

$$x = \sqrt{2.5} = 2.5\sqrt{2}$$

$$2x = 5\sqrt{2}$$

4.  $5\sqrt{2}$