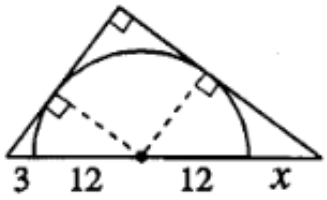
# Math Awareness Month Competition
## University of Kansas, Department of Mathematics
## 2018 Examination for 6th-8th Grades

**DIRECTIONS**: You have 40 minutes for the five problems.
Show all of the necessary work and provide a complete justification for each answer.
Enclose each answer in a box. Solve each problem on a separate sheet of paper.
You are allowed to use a calculator but you are not allowed to borrow or interchange calculators during the test.

1. If $a < b$, then $3^2 + 4^2 + 5^2 + 12^2 = a^2 + b^2$ is satisfied by only one pair of positive integers $(a, b)$. What is the value of $a + b$?

2. A semicircle is tangent to both legs of a right triangle and has its center on the hypotenuse. The hypotenuse is partitioned into 4 segments, with lengths $3, 12, 12$, and $x$, as shown. What is the value of $x$?




3. Let $p(x)$ be a polynomial of degree 4 satisfying $p(2) = p(-2) = p(-3) = 1$ and $p(1) = p(-1) = 2$. What is $p(0)$?

4. A box contains exactly five chips, three red and two white. Chips are randomly removed one at a time without replacement until all the red chips are drawn or all the white chips are drawn. What is the probability that the last chip drawn is white?

5. Amy, Brad, and Cole split \$1000 among them to be invested in different ways. Each begins with a different amount. At the end of one year, they have a total of \$ 1500 dollars. Amy and Brad have both doubled their money, whereas Cole has managed to lose \$100 dollars. How much did Cole start with?