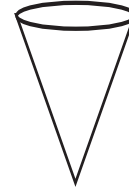




Workout 7

1. _____ cm In a right circular cone-shaped cup (pointing downward, as shown), with height 20 cm and radius 6 cm, how many centimeters deep would the water be when exactly $\frac{3}{5}$ of the cup's volume contains water? Express your answer as a decimal to the nearest tenth.



2. _____ For a given arithmetic series, the sum of the first 50 terms is 200 and the sum of the next 50 terms is 2700. What is the first term of the series? Express your answer as a decimal to the nearest tenth.

3. _____ inches In triangle ABC , the median from A is perpendicular to the median from B . If $BC = 7$ inches and $AC = 6$ inches, what is the length of segment AB ? Express your answer in simplest radical form.

4. _____ products Using the integers from 1 to 30, inclusive, all possible products of six consecutive integers are calculated. How many of the products end in exactly two zeros?

5. _____ meters Gary and Hakeem ran a 200-meter race in which Hakeem won by crossing the finish line at the same time Gary had run 192 meters. In order to try to even things up for the next race, Hakeem plans to start x meters further back so that, if they run at the same rates as before, they would end up crossing the finish line at the same time. If Gary starts the 200-meter race at the starting line, how far behind the starting line should Hakeem start to make it an 'even' race? Express your answer as a decimal to the nearest hundredth.



6. _____ If eggs cost x cents a dozen less, a buyer would pay one cent less for $x + 1$ eggs than if they were x cents a dozen more. What is the value of x ?



7. _____ cm A regular hexagon has sides of length 2 centimeters each. What is the sum of the lengths, in centimeters, of all of the diagonals of the hexagon? Express your answer as a decimal to the nearest tenth.

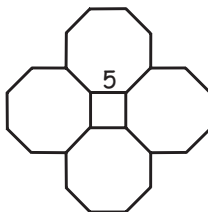
8. _____ seq



A frog is going to hop up the stairs from the first floor to the second floor. Hopping up the stairs one step at a time will require a total of ten hops. If the frog can hop one, two or three steps at a time, how many different sequences of hops are possible for the frog to reach the second floor with each hop being upward?

9. _____ The sum of all positive multiples of three that are less than 1000 is multiplied by six and added to four times the sum of the positive non-multiples of three that are less than 1000. What is the resulting sum?

10. _____ sq cm



A square with side 5 cm has four regular octagons along its sides to form a tessellation piece, as shown. Including the square, what is the combined area of these 5 shapes? Express your answer to the nearest whole number.

*Problem 4 is from the 2009 State Competition Team Round.