Warmup11

1. _____ What is the greatest prime factor of $(5^2)^2 - (4^2)^2$?

2. _____ The 2nd term of an arithmetic sequence is 9 and the 9th term is 14. What is the 100th term of the sequence?

3. _____ Jake has $0.20 in his pocket. How many distinct numbers of coins can he have if every coin in his pocket is worth $0.01, $0.05, or $0.10?

4. _____ If the operation $a \blacksquare b$ is defined as $\dfrac{a}{b+\frac{a}{b+\frac{a}{b}}}$, what is $1 \blacksquare 7$? Express your answer as a common fraction in simplest form.

5. _____ What is the units digit of 10! + 9! + 8! + 7! + 6! + 5! + 4! + 3! + 2! + 1?

6. _____ mi Kenneth and Chandra go out for a run. Starting at Chandra's house at the same time and on the same path, Kenneth runs 9mph and Chandra runs 6mph. Kenneth runs to his house, turns around, and runs back towards Chandra's house. If Kenneth meets Chandra exactly one mile from his house, how many miles is Kenneth's house from Chandra's?

7. _____ cm^2 A rectangular prism 2cm by 3cm by 4cm is divided by a plane into two congruent pieces. What is the greatest possible combined surface area of the two resulting pieces? Express your answer in simplest radical form.

8. _____ What is the ratio of the number of perfect square factors of 44,100 to the total number of factors of 44,100? Express your answer as a common fraction.

9. _____ How many ways can the digits 2, 3, 4, 5, and 6 be arranged to form a five-digit number that is divisible by 11?

10. _____ cm Regular hexagon ABCDEF is rotated about point B until point C is on line AB. What is the length of the arc that is traced by point E during the rotation if AB = 2cm? Express your answer as a common fraction in terms of pi.