

Math 115 Quiz #4 No calculators, books, or notes. Show all work. 4/22/09

① Simplify the factorial expression:

$$\frac{30!}{28!} = \frac{30 \cdot 29 \cdot 28!}{28!} = 30 \cdot 29 = 870$$

② Write in sigma notation:

$$\left(3 - \left(\frac{1}{5}\right)^2\right) + \left(3 - \left(\frac{2}{5}\right)^2\right) + \left(3 - \left(\frac{3}{5}\right)^2\right) + \left(3 - \left(\frac{4}{5}\right)^2\right)$$

$$\sum_{h=1}^4 \left(3 - \left(\frac{h}{5}\right)^2\right)$$

③ Write the first five terms of the sequence defined recursively: $a_1 = 3$, $a_{k+1} = 2(a_k - 1)$

$$a_2 = 2(a_1 - 1) = 2(3 - 1) = 4$$

$$a_3 = 2(4) = 8$$

$$a_4 = 2(8) = 16$$

$$a_5 = 2(16) = 32$$

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① Simplify the factorial expression:

$$\frac{40!}{38!} = \frac{40 \cdot 39 \cdot 38!}{38!} = 40 \cdot 39 = \cancel{1560} = 1560$$

$\begin{array}{r} 39 \\ \times 4 \\ \hline 156 \end{array}$

② Write in sigma notation:

$$\left(5 + \left(\frac{1}{7}\right)^2\right) + \left(5 + \left(\frac{1}{8}\right)^2\right) + \left(5 + \left(\frac{1}{9}\right)^2\right) + \left(5 + \left(\frac{1}{10}\right)^2\right)$$
$$\sum_{n=7}^{10} \left(5 + \left(\frac{1}{n}\right)^2\right)$$

③ Write the first five terms of the sequence defined recursively: $a_1 = 2$, $a_{k+1} = 3(a_k - 1)$

$$a_2 = 3(1) = 3$$

$$a_3 = 3(2) = 6$$

$$a_4 = 3(5) = 15$$

$$a_5 = 3(14) = 42$$