Math 43 (8:30am Class)
Quiz 1 Version R
Fri Jan 13, 2012

NAME YOU ASKED TO BE CALLED IN CLASS: _____

SCORE: ___ / 20 POINTS

WHERE INDICATED, YOU MUST SHOW THE WORK THAT LEAD TO YOUR ANSWER TO GET FULL CREDIT.

Find the first 5 terms of the sequence defined by $a_n = \dfrac{1-(-1)^n}{n!}$. **SCORE: ___ / 3 POINTS**

SIMPLIFY YOUR ANSWERS.

$a_1 = \dfrac{1-(-1)^1}{1!} = \boxed{2}$ **½ point**

$a_2 = \dfrac{1-(-1)^2}{2!} = \boxed{0}$ **½ point**

$a_3 = \dfrac{1-(-1)^3}{3!} = \boxed{\dfrac{1}{3}}$ **½ point**

$a_4 = \dfrac{1-(-1)^4}{4!} = \boxed{0}$ **½ point**

$a_5 = \dfrac{1-(-1)^5}{5!} = \boxed{\dfrac{1}{60}}$ **½ point** ➡ **PLUS ½ point if you got at least 4 of the terms correct**

Evaluate $\sum_{m=2}^{5} m(m-3)$. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK. SIMPLIFY YOUR ANSWER.

$= 2(2-3)+3(3-3)+4(4-3)+5(5-3)$
$= 2(-1)+3(0)+4(1)+5(2)$
$= \boxed{-2} \quad \boxed{+0} \quad \boxed{+4} \quad \boxed{+10}$
½ point ½ point ½ point ½ point
$= \boxed{12}$
1 point

Find the first 4 terms of the sequence defined recursively by $a_1 = 1, \quad a_k = k^2 - a_{k-1}$ (for $k \geq 2$). **SCORE: ___ / 3 POINTS**

$a_1 = 1$ ➡ **MINUS ½ point if you forgot to write $a_1 = 1$**

$a_2 = 2^2 - a_1 = 4-1 = \boxed{3}$ **1 point**

$a_3 = 3^2 - a_2 = 9-3 = \boxed{6}$ **1 point**

$a_4 = 4^2 - a_3 = 16-6 = \boxed{10}$ **1 point**

Fill in the blanks: For the sum $\sum_{m=2}^{k} a_m$, m is called the index (OR dummy index) of summation, **SCORE: ___ / 2 POINTS**

k is called the upper limit of summation, and

2 is called the lower limit of summation.

Find a general formula for the arithmetic sequence whose first term is 6, and whose fourth term is 11. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK.

$a_4 = a_1 + (4-1)d$

$11 = 6 + 3d$ **1 point**

$d = \frac{5}{3}$ **½ point**

$a_n = 6 + \frac{5}{3}(n-1)$ **1½ points**

Use sigma notation to write the sum $\frac{1}{4} + \frac{3}{8} + \frac{7}{16} + \frac{15}{32} + \frac{31}{64}$. **SCORE: ___ / 3 POINTS**

½ point 5

½ point $\sum \frac{2^n - 1}{2^{n+1}}$ **½ point for numerator, ½ point for denominator ➡ PLUS ½ point if both correct**

½ point $n = 1$

OR

½ point 6

½ point $\sum \frac{2^{n-1} - 1}{2^n}$ **½ point for numerator, ½ point for denominator ➡ PLUS ½ point if both correct**

½ point $n = 2$

Simplify the expression $\frac{(3n-3)!}{(3n-1)!}$. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK.

$= \frac{(3n-3)\cdots(3)(2)(1)}{(3n-1)(3n-2)(3n-3)\cdots(3)(2)(1)}$ **1½ points** OR $= \frac{(3n-3)!}{(3n-1)(3n-2)(3n-3)!}$ **1½ points**

$= \frac{1}{(3n-1)(3n-2)}$ **1½ points** $= \frac{1}{(3n-1)(3n-2)}$ **1½ points**