Math 43 (9:30am Class)
Quiz 1 Version L
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 $a_n = \dfrac{2-(-1)^n}{n!}$. **SCORE: ___ / 3 POINTS**

SIMPLIFY YOUR ANSWERS.

$a_1 = \dfrac{2-(-1)^1}{1!} = \boxed{3}$ **½ point**

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

$a_3 = \dfrac{2-(-1)^3}{3!} = \boxed{\dfrac{1}{2}}$ **½ point**

$a_4 = \dfrac{2-(-1)^4}{4!} = \boxed{\dfrac{1}{24}}$ **½ point**

$a_5 = \dfrac{2-(-1)^5}{5!} = \boxed{\dfrac{1}{40}}$ **½ point** ➡ **PLUS ½ point if you got at least 4 of the terms correct**

Evaluate $\displaystyle\sum_{m=3}^{6} m(m-5)$. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK. SIMPLIFY YOUR ANSWER.

$= 3(3-5)+4(4-5)+5(5-5)+6(6-5)$
$= 3(-2)+4(-1)+5(0)+6(1)$
$= \boxed{-6} \quad \boxed{-4} \quad \boxed{+0} \quad \boxed{+6}$
½ point ½ point ½ point ½ point
$= \boxed{-4}$
1 point

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

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

$a_2 = 3(2) - a_1 = 6 - 1 = \boxed{5}$ **1 point**

$a_3 = 3(3) - a_2 = 9 - 5 = \boxed{4}$ **1 point**

$a_4 = 3(4) - a_3 = 12 - 4 = \boxed{8}$ **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 7, and whose sixth term is 11. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK.

$a_6 = a_1 + (6-1)d$

$11 = 7 + 5d$ **1 point**

$d = \frac{4}{5}$ **½ point**

$a_n = 7 + \frac{4}{5}(n-1)$ **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 $\frac{(5n-4)!}{(5n-2)!}$. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK.

$= \frac{(5n-4)\cdots(3)(2)(1)}{(5n-2)(5n-3)(5n-4)\cdots(3)(2)(1)}$ **1½ points**

OR $= \frac{(5n-4)!}{(5n-2)(5n-3)(5n-4)!}$ **1½ points**

$= \frac{1}{(5n-2)(5n-3)}$ **1½ points**

$= \frac{1}{(5n-2)(5n-3)}$ **1½ points**