Math 43 (8:30am Class)
Quiz 1 Version A
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 4 terms of the sequence defined recursively by $a_1 = 2, \quad a_k = k^2 - a_{k-1}$ (for $k \geq 2$). **SCORE: ___ / 3 POINTS**

$a_1 = 2$ ➡ **MINUS ½ point if you forgot to write $a_1 = 2$**

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

$a_3 = 3^2 - a_2 = 9 - 2 = \boxed{7}$ **1 point**

$a_4 = 4^2 - a_3 = 16 - 7 = \boxed{9}$ **1 point**

Simplify the expression $\dfrac{(2n-4)!}{(2n-2)!}$. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK.

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

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

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

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

Find a general formula for the arithmetic sequence whose first term is 7, and whose fourth term is 14. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK.

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

$\boxed{14 = 7 + 3d}$ **1 point**

$\boxed{d = \dfrac{7}{3}}$ **½ point**

$\boxed{a_n = 7 + \dfrac{7}{3}(n-1)}$ **1½ points**

Evaluate $\sum_{m=2}^{5} m(m-4)$. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK. SIMPLIFY YOUR ANSWER.

$= 2(2-4)+3(3-4)+4(4-4)+5(5-4)$

$= 2(-2)+3(-1)+4(0)+5(1)$

$= \boxed{-4} \quad \boxed{-3} \quad \boxed{+0} \quad \boxed{+5}$

½ point ½ point ½ point ½ point

$= \boxed{-2}$

1 point

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

SIMPLIFY YOUR ANSWERS.

$a_1 = \dfrac{1+(-1)^1}{1!} = \boxed{0}$ ½ point

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

$a_3 = \dfrac{1+(-1)^3}{3!} = \boxed{0}$ ½ point

$a_4 = \dfrac{1+(-1)^4}{4!} = \boxed{\dfrac{1}{12}}$ ½ point

$a_5 = \dfrac{1+(-1)^5}{5!} = \boxed{0}$ ½ point ➡ PLUS ½ point if you got at least 4 of the terms correct

Fill in the blanks: For the sum $\sum_{k=2}^{m} a_k$, **SCORE: ___ / 2 POINTS**

m is called the upper limit of summation,

k is called the index (OR dummy index) of summation, and

2 is called the lower limit of summation.

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

½ point $\boxed{5}$

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

½ point $\boxed{n=1}$

OR

½ point $\boxed{6}$

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

½ point $\boxed{n=2}$