Math 43 (9:30am Class)
Quiz 1 Version O
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 $a_1 = 2, \quad a_k = 3k - a_{k-1}$ (for $k \geq 2$). **SCORE: ___ / 3 POINTS**

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

$a_2 = 3(2) - a_1 = 6 - 2 = \boxed{4}$ **1 point**

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

$a_4 = 3(4) - a_3 = 12 - 5 = \boxed{7}$ **1 point**

Simplify the expression $\dfrac{(4n-3)!}{(4n-1)!}$. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK.

$= \boxed{\dfrac{(4n-3)\cdots(3)(2)(1)}{(4n-1)(4n-2)(4n-3)\cdots(3)(2)(1)}}$ OR $= \boxed{\dfrac{(4n-3)!}{(4n-1)(4n-2)(4n-3)!}}$

1½ points **1½ points**

$= \boxed{\dfrac{1}{(4n-1)(4n-2)}}$ $= \boxed{\dfrac{1}{(4n-1)(4n-2)}}$

1½ points **1½ points**

Find a general formula for the arithmetic sequence whose first term is 6, and whose sixth term is 14. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK.

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

$\boxed{14 = 6 + 5d}$ **1 point**

$\boxed{d = \dfrac{8}{5}}$ **½ point**

$\boxed{a_n = 6 + \dfrac{8}{5}(n-1)}$ **1½ points**

Evaluate $\sum_{m=3}^{6} m(m-4)$. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK. SIMPLIFY YOUR ANSWER.

$= 3(3-4)+4(4-4)+5(5-4)+6(6-4)$

$= 3(-1)+4(0)+5(1)+6(2)$

$= \boxed{-3} \quad \boxed{+0} \quad \boxed{+5} \quad \boxed{+12}$

½ point ½ point ½ point ½ point

$= \boxed{14}$

1 point

Find the first 5 terms of the sequence defined by $a_n = \dfrac{2+(-1)^n}{n!}$. **SCORE: ___ / 3 POINTS**

SIMPLIFY YOUR ANSWERS.

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

$a_2 = \dfrac{2+(-1)^2}{2!} = \boxed{\dfrac{3}{2}}$ **½ point**

$a_3 = \dfrac{2+(-1)^3}{3!} = \boxed{\dfrac{1}{6}}$ **½ point**

$a_4 = \dfrac{2+(-1)^4}{4!} = \boxed{\dfrac{1}{8}}$ **½ point**

$a_5 = \dfrac{2+(-1)^5}{5!} = \boxed{\dfrac{1}{120}}$ **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 $\boxed{n=2}$