Math 43 (9:30am Class)
Quiz 1 Version D
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 $a_1 = 1, \quad a_k = 3k - a_{k-1}$ (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**

Simplify the expression $\dfrac{(5n-4)!}{(5n-2)!}$. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK.

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

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

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

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

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.

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

$\boxed{11 = 7 + 5d}$ **1 point**

$\boxed{d = \dfrac{4}{5}}$ **½ point**

$\boxed{a_n = 7 + \dfrac{4}{5}(n-1)}$ **1½ points**

Evaluate $\sum_{m=3}^{6} m(m-5)$. **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 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**

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

m is called the <u>index (OR dummy index) of summation</u>,

k is called the <u>upper limit of summation</u>, and

2 is called the <u>lower limit of summation</u>.

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 $\boxed{n=2}$