Math 150 Exam 2

November 3, 2006

[10] 1a.) What is the coefficient of $x^3y^2z^5$ in the expansion of $(2x+y-z)^{10}$: $\underline{(2^3)(-1)^5(\frac{10!}{3!2!5!}) = \frac{-8(10!)}{3!2!5!}}$

[6] 1b.) What is the coefficient of $x^3y^2z^4$ in the expansion of $(2x+y-z)^{10}$: $\underline{0}$

[84] Choose 4 from the following 5 problems. Circle your choices: A B C D E
You may do all 5 problems in which case your unchosen problem can replace your lowest problem at 4/5 the value. Note you must fully explain your answers.

A.) Use Newtons binomial theorem to estimate $\sqrt{5}$ (expand to at least 4 terms).

$\sqrt{5} = (1+4)^{\frac{1}{2}} = 2(\frac{1}{4}+1)^{\frac{1}{2}} = 2\Sigma_{k=0}^{\infty}\binom{\frac{1}{2}}{k}(\frac{1}{4})^k \sim 2[1+(\frac{\frac{1}{2}}{1!})(\frac{1}{4})+\frac{(\frac{1}{2})(\frac{-1}{2})}{2!}(\frac{1}{4})^2+\frac{(\frac{1}{2})(\frac{-1}{2})(\frac{-3}{2})}{3!}(\frac{1}{4})^3]$
$= 2[1+\frac{1}{8}-\frac{1}{128}+\frac{1}{16}(\frac{1}{64})] = 2+\frac{1}{4}-\frac{1}{64}+\frac{1}{8}(\frac{1}{64}) = 2+\frac{1}{4}-\frac{1}{64}+\frac{1}{512}$

B.) Find the number of integers between 1 and 10,000 inclusive that are not divisible by 4, 6, 10.

Similar to ch 6: 2